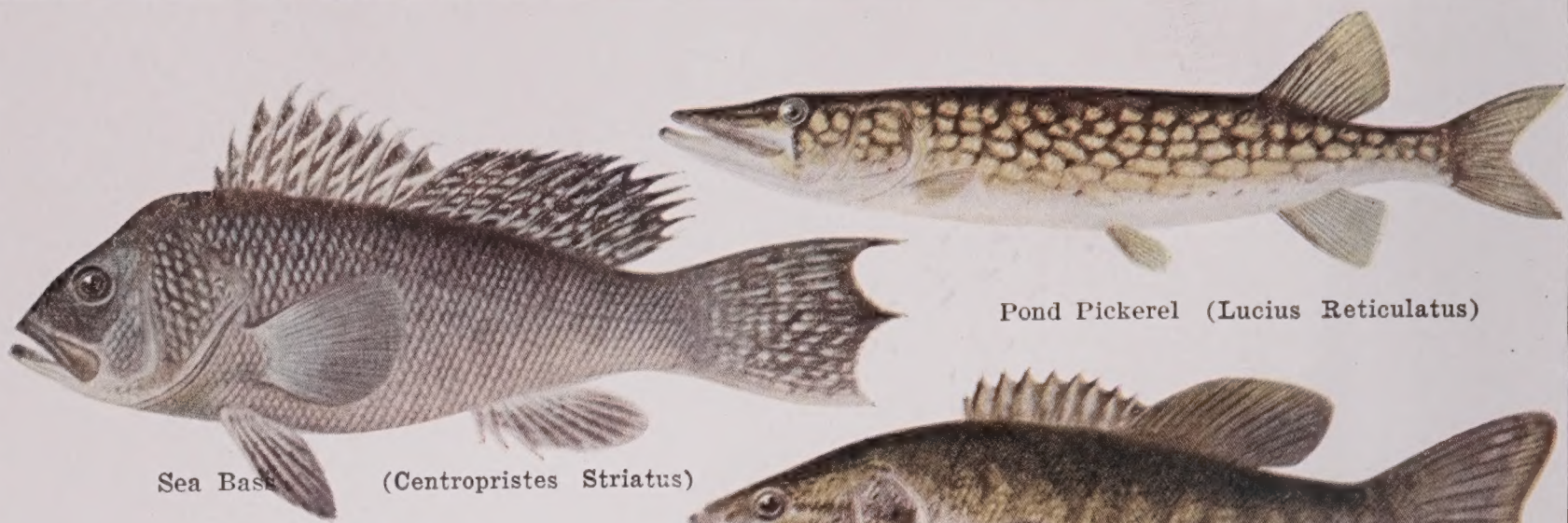






NORTH AMERICAN FOOD AND GAME FISHES.



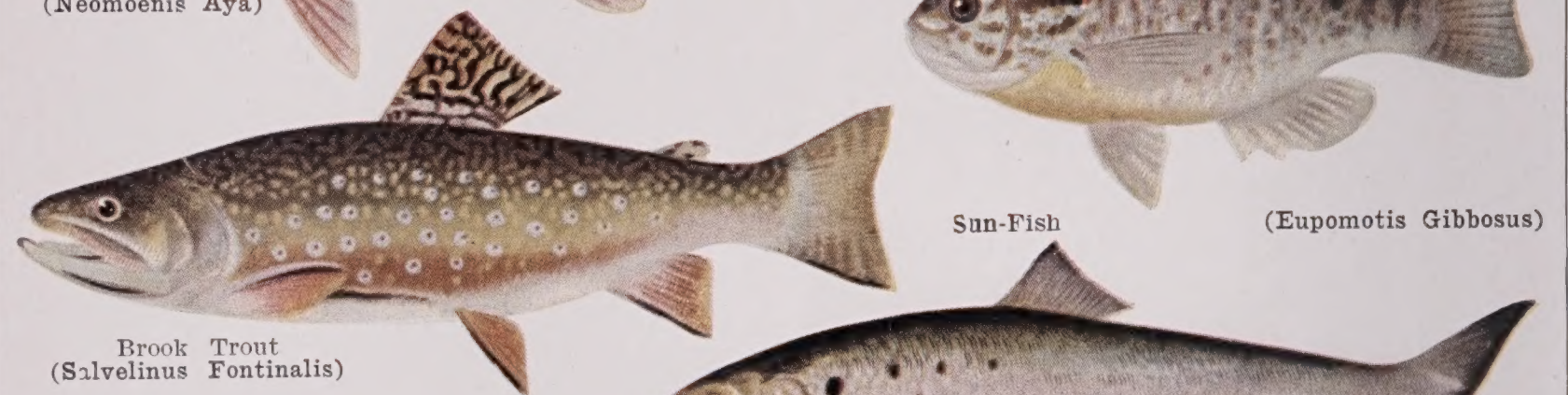
Sea Bass (Centropristes Striatus)

Pond Pickerel (Lucius Reticulatus)



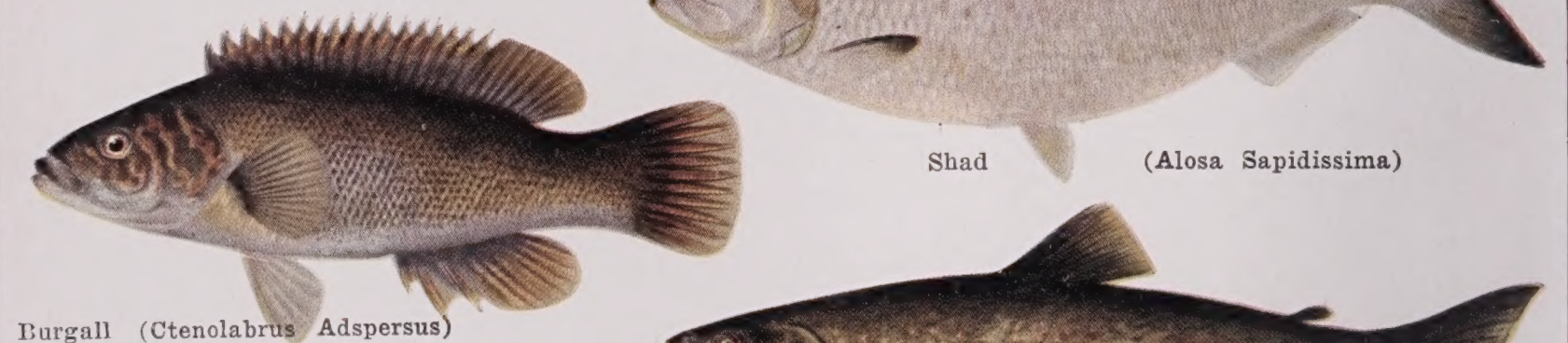
Red Snapper (Neomoenis Aya)

Small-Mouthed Black Bass (Micropterus Dolomieu)



Brook Trout (Salvelinus Fontinalis)

Sun-Fish (Eupomotis Gibbosus)



Burgall (Ctenolabrus Adspersus)

Shad (Alosa Sapidissima)



Bullhead (Amiurus Nebulosus)

Canadian Red Trout



Mud-Fish (Amia Calva)

Yellow Perch (Perca Flavescens)

THE STANDARD AMERICAN ENCYCLOPEDIA

*A Dictionary
of Universal Knowledge in eight
volumes—Fully illustrated*

VOLUME II

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THE STANDARD
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IN EIGHT VOLUMES—FULLY ILLUSTRATED

Volume II
BOOKBINDING—CRIBBAGE

Bookbinding, the art of stitching or otherwise fastening together and covering the sheets of paper or similar material composing a book. The edge of a modern book constituted by the margin of the paper composing it is called the binding edge.

When books were literal volumes, or rolls, the way of binding them, if it could be so called, or at least of keeping them together, was to unroll them from one cylinder and roll each again, as it was perused, on another. When books became separate folios the first method of dealing with them seems to have been the tying them together by a string passed through a hole at the margin of the pile. This is still done in the South of India and Ceylon with writings on talipot or other palm leaves. The holding together of folios of a literary man's manuscript by a small clasp at one edge is an essentially similar device. The present method of binding seems to have been invented by or under Attalus, King of Pergamus, or his son, Eumenes, about 200 B. C. The oldest bound book known—the binding was ornamental—is the volume of St. Cuthbert, about A. D. 650. Ivory was used for book covers in the 8th century; oak in the 9th. The "Book of Evangelists," on which the English kings took their coronation oath, was bound in oak boards, A. D. 1100. Velvet, silk, hog-skin and leather were used as early as the 15th century; needlework binding began in 1471; vellum, stamped and ornamented, about 1510; leather about the same date, and calf in 1550. Cloth binding superseded the paper known as boards in 1823; india rubber backs were introduced in 1841, tortoise shell sides in 1856.

One of the most famous names in connection with the history of bookbinding is that of Jean Grolier de Servières (1479-1565), treasurer of Francis I. of France. For his library were prepared sumptuous bindings with elaborate and beautiful ornamentations. Hence the name of the Grolier Society of bibliophiles. Grolier's books are highly esteemed by collectors. (See GROLIER DE SERVIÈRES, JEAN.)

Gold "tooling" was probably introduced from the East, and was quickly followed by the use of coloring and by inlay-work. The art of inlaying on bindings was highly developed, especially in Italy. Later taste preferred simpler methods.

The chief processes of bookbinding are the following: Folding the sheets; gathering the consecutive signatures; rolling the packs of folded sheets; sewing, after saw cutting the backs for the cords; rounding the backs and gluing them; edge cutting; binding, securing the book to the sides; covering the sides and back with leather, muslin, or paper, as the case may be; tooling and lettering; and, finally, edge gilding. Books may be full

bound, *i. e.*, with the back and sides leather; or half bound, that is, with the back leather and the sides paper or cloth.

Bookbinding may be divided into two classes—viz., case binding or cloth work, and leather or bound work. The former was introduced by Pickering, the publisher, and Leighton, the binder, in 1822. Before that time books were issued by the publishers bound in millboards covered with colored paper. In both France and Germany most books, even the finest, are originally issued in paper covers; whereas, in England, the whole edition often appears in cloth binding. As the latter is that most generally used for ordinary books, it may be first described.

Books are usually supplied to the binder in sheets of 16 pages, that being the number most easily folded. If, for convenience, they are printed in larger sheets of 32 or 64 pages, then these are cut into the proper size before going to the binder. Each sheet has its pages arranged so that, when folded, they will follow one another in their proper order; and on the first page of each sheet is a letter called its signature. The first sheet of a book is A, the second B, and so on. The sheets are folded either by hand or by any one of a variety of ingenious machines which do the work with great expedition and accuracy. When folded, bundles of the different sheets of the book are laid in order on a table, and a sheet is gathered off each bundle till a book is completed, and so on till the number of books is finished. The separate books are then collated or revised to see that the signatures follow each other in proper order. They are then pressed in a machine to give them a little solidity, and being put straight, are passed over a table having three or four (according to the size of the book) circular saws projecting slightly, which make shallow cuts across the back. The cuts make holes in the sheets, through which they are stitched on a cord which is placed in the saw cut. The stitching is either done by hand in a frame on which the cords are stretched, or by one of the clever machines which have been invented for the purpose. Some of the machines sew the sheets on tapes, in which case the sawing is dispensed with. The cords or tapes on which the books are sewed are cut with a little piece, half an inch or so, left projecting, and this, after the end or waste papers are tacked on with paste to each side, is pasted down on the outside sheet. The work up to this point is executed by girls. The sewed books are taken to the forwarders, who commence operations by cutting the edges by means of a guillotine, after which any ornamentation of the edges, such as sprinkling with colors, marbling, or gilding, is applied. They are then

Bookbinding

rounded on the back by hammering on a plate, and put into a press which forces a piece of the back over the sides, forming shoulders, called the joints, which grip the case. A piece of thin canvas being glued over the back, with a portion overlapping, the book is ready for the case, which has meanwhile been also in preparation. The case consists of two pieces of millboard, cut to the proper size by a most ingenious machine, which, like the greater part of the machinery used in bookbinding, is of American invention; the boards are separated by a piece of paper of the proper width to form the back of the book, and the whole covered with especially prepared cloth of any desired color. The cases are made with great expedition by three or four girls working in concert. The ornamentation of the case is next executed. This varies from the simplest lettering or title on the back or side to the most elaborate decoration especially designed by artists who study that branch of art. This may be stamped in gold, ink of various colors, or blind (*i. e.*, plain), or a combination of all three. The designs are engraved on brass, the gilt portion on one piece, the ink or blind on another, and stamped on the case by means of a press worked either by hand or steam. Where gilt work is intended, gold leaf is first put on the case, and, after being impressed by the stamp, which is kept hot when in use, the superfluous gold is rubbed off, the parts stamped only adhering to the case. The ornamentation of cases is capable of an infinite variety of modifications. When the case is ready, the outside end papers of the book are pasted, including the pieces of cord and canvas already mentioned; the case is carefully placed in the joints, and the whole placed in a hydraulic press till dry, when the binding is finished.

Leather or bound work differs from case work in the essential particular that the boards are put together on the book. The sewing is much similar to that already described, except that it is more carefully done, and the cords are stronger; and longer pieces are left. The forwarder hammers the back round and forms the joint by hand, laces the ends of the cords through the boards, and pastes them down securely. The edges are then marbled or otherwise ornamented, and headbands, ingenious arrangements to strengthen the top and bottom of the back, are worked on. After lining the back with strong brown paper, little strips of pasteboard to form the back into panels are stuck on, and a piece of leather, very carefully prepared, with the edges pared thin, and cut to a proper size, is pasted over the whole cover, with about an inch turned over the boards. The work is then handed over to the finisher. In his

Bookkeeping

hands the leather is sized with diluted paste, varnished with glair made of white of egg, and the gilt ornamentation, lettering, etc., is executed by hand tools at his discretion. This part of the process demands great skill on the part of the workman, who should have the instincts of an artist. In calf binding, a differently colored piece of leather is generally pasted on the title panel, but in morocco work this is dispensed with. During the finishing process a book may pass through the workman's hands as many as 30 or 40 times, a separate operation being performed every time.

In half binding, a strip of leather is glued or pasted over the back of the book and reaching about an inch and a half on the board on each side; a triangular piece of leather is usually pasted over the corners to strengthen them. The cloth or paper to cover the sides is then put on and turned over the boards, the marbled or otherwise ornamented end papers are pasted on the inside, and, after being pressed, the book is finished. What is called Roxburghe binding is simply half binding in morocco, without leather corners; generally with the top only gilt.

In magazine parts, or other books covered in paper, the sheets are stitched together and the paper cover pasted on the back. Sometimes they are fastened with two or three wire stitches clamped through by means of a machine. In what are called limp books—*i. e.*, books with thin boards which do not project beyond the leaves, the cloth is generally pasted over a paper cover stitched along with the book, and the edges cut afterward.

There are several divisions of the bookbinding profession. Where publishing is on a large scale, as in London, Edinburgh, New York, and Philadelphia, binding for publishers, which is principally cloth work, is carried on in extensive factories, fitted up with costly and elaborate machinery driven by steam. The binding of account books is a separate branch called stationery binding. Other binders devote themselves to fine art binding; others to paper work; others again to Bibles and prayer books exclusively. In all, however, the same three requisites, solidity, elasticity, and elegance, are necessary to a well bound book. The marbling of edges and the preparation of end papers is a separate industry.

Bookkeeping, the art of keeping books in which pecuniary transactions are so unremittingly and so accurately entered that one is able at any time to ascertain the exact state of his financial affairs, or of any portion of them, with clearness and expedition. The art, in a certain undeveloped state, must have existed from immemorial antiquity, but it received such improvement and impulse at Venice as to

make that comparatively modern city to be considered its birthplace. The first known writer on bookkeeping was Lucas di Borgo, who published a treatise on the subject in Italian in 1495. It is generally divided into bookkeeping by single and bookkeeping by double entry. In the former every entry is single, *i. e.*, is placed to the debit or credit of a single account, while in the latter it is double, that is, it has both a debtor and creditor account. In other words, by single entry each transaction is entered only once in the ledger, and by double entry twice. Bookkeeping by single entry is imperfect, and is scarcely fitted even for very limited establishments. Bookkeeping by double entry being first practiced in Venice, Genoa, and the adjacent towns, is often called the Italian method. In bookkeeping by double entry all transactions inward fall under four heads: cash, bills, book debts, and stock. There are, moreover, a cash book, a bill book, a book for book debts—called the ledger—and a book for the record of stock, that is, stock on hand. There are various other books in a large establishment. In smaller establishments it is enough to have a cash book, a day book, a journal and a ledger. It is in the ledger that the elaborate classification of all transactions is entered. The ability to make out a balance sheet is much increased by the simple device of making impersonal entries, that is, entering cash, iron, etc., as if they were mercantile traders, and grouping a number of articles together under the heading sundries. Then there are accounts of the form sundries debtor to cash, or cash debtor to sundries. If a merchant has purchased iron, what he has paid for it is debited to iron, which is expected to meet it when the metal is disposed of, and so with every other expense incurred by the firm for purposes of business.

Book of Common Prayer, the book that forms the liturgy of the Church of England. It is a development from the "Breviary Missal" and "Manual" compiled in the 11th century by Osmund, Bishop of Salisbury. A revision of the "Breviary" was made in 1516, by order of Cardinal Wolsey, and it was again revised in 1531, and the "Missal" in 1533. In 1542 a Committee of Convocation was appointed whose work, a litany, in English, was issued in 1544. In 1547 Cranmer's rendering of the "Missal" into English appeared as the "Order of Communion." In 1548 the first version of the present "Book of Common Prayer" was reported to the convocation and adopted by Parliament, as a part of the Act of Uniformity of 1548–1549. A second revision was sanctioned by Parliament in 1552. This was repealed by Queen Mary, and restored by Elizabeth, with

changes in 1559. The Puritans suppressed the book, but it was restored at the Restoration. The Savoy Conference of 1661 modified it by concession to the Puritans. It was adopted in Ireland in 1662 and has since been used by the Anglican Church, in its various branches. It consists of various tables, Morning and Evening Prayers, the Litany, Prayers and Thanksgivings, Collects, Epistles and Gospels chosen in accordance with the Church calendar, Order of Communion and other special services, as Matrimony, and Burial of the Dead, the Catechism, the Psalter services connected with the imposition of the clerical and lay offices, and Articles of Religion. The "Prayer Book" of the Protestant Episcopal Church of the United States is a revision of the Anglican book, authorized in 1789, and revised again, 1886–1893.

Book of the Dead, a compilation of the religious literature of Egypt in 106 chapters. According to Sayce's "Ancient Empires of the East" (1884), it is a collection of inscriptions from the mummy cases, tombs, and demotic writings—the funeral ritual of the Egyptian, setting forth in mystical language, the adventures of the soul after death and the means of escaping torment.

Book of Martyrs, a history of the persecution of Reformers in England, by John Foxe (*q. v.*).

Book of Mormon, a book forming the authoritative scriptures of the members of the Church of Jesus Christ of Latter-Day Saints. Joseph Smith, an American, of Manchester, N. Y., professed to have heard in 1823 the Angel Moroni reveal to him in visions that the Bible of the Western Continent was buried in a box near his residence. This, according to his own account, he at length found—a volume six inches thick, with leaves of thin gold plate, eight inches long by seven broad, bound together with three gold rings; on which leaves was a mystic writing that he characterized as reformed Egyptian. With the book he professed to have found a pair of magic spectacles, by means of which he was able to read the contents, which he dictated to an amanuensis. This book consists of an alleged history of America from 600 B. C., when Lehi and his family (descended from the dispersion after the building of the Babel tower) landed in Chile. Between the descendants of Nephi, Lehi's youngest son, and the offspring of his older brothers, who are the North American Indians, long conflicts were waged; the Nephites finally being almost annihilated. There remained a fragment, among whom were Mormon and his son, Moroni. They collected the records of their people, and buried them in the hill of Cumorah, on the Divine as-

Bookplate

surance that they would be found by the Lord's prophet. Besides this history, the book, as it finally was received, has various moral and religious teachings. The real history of it is as follows: Solomon Spalding, an eccentric preacher, wrote a historical romance in 1812, which a compositor, into whose hands it fell, sold to Smith. This was, for substance, the "Book of Mormon," which Smith issued, to which various additions have since been made.

Bookplate, an English name for labels of ownership frequently placed on the inside covers of books. The use of bookplates is of some antiquity, and mention has been made of one dated in the middle of the 15th century, but at present the fine bookplates of Bilibaldus Pirckheimer (1470-1530), designed by Albert Dürer, hold the foremost place in point of time. Engraved English bookplates are not found of so early a date, but an old folio volume from Henry VIII.'s library, now in the British Museum, contains an elaborately emblazoned drawing which formed the bookplate of Cardinal Wolsey, with his arms, supporters, and cardinal's hat. The earliest English engraved bookplate at present known is that of Sir Nicholas Bacon, father of Lord Chancellor Bacon, which is dated 1574. The number of English examples dated previous to the Restoration which have come down to us are singularly few, but after this period the series is well represented, and some of these plates are of considerable historical interest. Samuel Pepys had several bookplates; those with his own portrait could not have been engraved before 1685, because he is described therein as Secretary to the Admiralty under Charles II. and James II., but the one with his initials and the crossed anchors was probably engraved as early as 1668. The bookplate of Pepys' faithful friend, William Hewer (in whose house at Clapham the diarist died), is dated 1699. The date on the plate of the well known Alderman and Lord Mayor, Sir Robert Clayton, is 1679. The names of Bishop Burnet, William Penn, and Robert Harley, Matthew Prior, Lawrence Sterne, David Garrick, Horace Walpole, John Wilkes, and Charles James Fox, may be mentioned among those found on the highly prized bookplates of the collectors.

The styles of design adopted by book collectors for their bookplates have been very diverse. Some of these labels have contained merely the name of the possessor, but the majority are armorial, some are allegorical in design, and others are ornamented with miniature landscapes. Many distinguished artists have condescended to produce bookplates. The name of Albert Dürer has already been mentioned as the designer of Pirckheimer's two plates — one

Bookworm

in which the allegorical and the armorial elements are united, and the other consisting of a large and bold portrait of the once celebrated senator of Nuremberg. Of English engravers, William Marshall and Robert White may be especially mentioned. Hogarth engraved a bookplate for John Holland, heraldic artist, and another for George Lambert, the scene painter. George Vertue and Thomas Worlidge also produced bookplates, and Thomas Bewick was at one time fully employed in their production. One of the prettiest of bookplates is that designed by Agnes Berry in 1793 for the Hon. Mrs. Damer. This was engraved by Francis Legat. The earliest bookplates were of large size, as if made especially for folios, but a smaller size soon became general, a size which was used for both large and small books. Sir William Stirling Maxwell used a variety of sizes for differently sized books, and some of these bookplates were of gigantic proportions. The fashion of collecting bookplates is a very modern one, and not many years ago little attention was paid to them. A label of special interest might be retained in a book, but in most instances the bookplate of the latest owner was placed over that of the former one. The existence of these labels in books adds much to their interest, but the craze for collecting bookplates, apart from the books they once adorned, has little to be said in its favor.

Bookworm, any grub which feeds on the paper of books. The name more especially belongs to the larva of an anobium (*anobium pertinax*, *A. eruditum*, etc.), a small coleopterous insect, which is one of the DEATH-WATCH (q. v.) insects; though the larva of *æcophora pseudospictella*, a small brown moth, seems to have nearly an equal claim to it. The latter much resembles the anobium, save that it has six legs, while the anobium has none. Most people are familiar with the effects of the bookworm's ravages; but the creatures are extremely rare in the United States, especially since so many chemical substances have been introduced into the manufacture of paper. In Southern Europe, the book eating anobium is still common enough. It is not unlike the little grub found in hazel nuts — has a soft body with a horny brown head and strong jaws, and readily succumbs to exposure. As it usually attacks from the boards inward, the interior pages of a book are generally safe from its ravages; though M. Peignot asserts he found 27 volumes standing in a row, pierced from end to end by a single worm tunnel. In the United States books in libraries, though usually free from the ravages of the bookworm, are infested and damaged by a small cockroach — the croton bug, or *blatta germanica*.

Boom

Boom, a beam, tree, or pole. In navigation, a long pole run out from any part of a ship to stretch the foot of any particular sail; whence, jib boom, main boom, stud-sail boom, etc. In fortification, in marine defenses, a strong chain or cable stretched across the mouth of a river or harbor, to prevent the enemy's ships from entering, and having a number of poles, bars, etc., fastened to it; whence the name; as, to cut or burst the boom. In navigation, a pole set up as a sea mark to point out the channel to seamen, when navigating in shallows. The word is also applied to a hollow, roaring sound; as, the boom of a cannon; the reverberating cry of the bittern; and likewise to a sudden rise in the market value of real estate, stocks or commodities; an enthusiastic popular movement in favor of any person, cause or thing; as, a real estate boom, a political boom; a boom in sugar.

Boomerang, a missile weapon invented and used by the native Australians, who are generally deemed the lowest in intelligence of any tribe or race of mankind. It is a curved stick, round on one side and flat on the other, about three feet long, two inches wide, and three-quarters of an inch thick. It is grasped at one end and thrown sickle-wise, either upward into the air, or downward so as to strike the ground at some distance from the thrower. In the first case it flies with a rotary motion, as



BOOMERANG.

its shape would indicate, and after ascending to a great height in the air, it suddenly returns in an elliptical orbit to a spot near its starting point. On throwing it downward to the ground, it rebounds in a straight line, pursuing a ricochet motion until it strikes the object at which it is thrown. The most singular curve described by it is when it is projected upward at an angle about 45° , when its flight is always backward, and the native who throws it stands with his back to the object he intends to hit.

Boondeé, or **Bundi**, a principality of Hindustan, in Rajputana, under British protection; area, 2,300 square miles. Although small, Boondeé is important as the medium of communication between the N. and S. Pop. (1901) 171,227. Boondeé, the capital, is picturesquely situated, and its antiquity, numerous temples, and magnificent fountains give it a very interesting appearance. Pop. 19,313.

Boone, city and county-seat of Boone co., Ia.; on the Chicago and Northwestern, and the Des Moines, Northern and Western rail-

Boötes

roads; 36 miles N. E. of Des Moines, the State capital. It is an important milling, manufacturing, and coal mining center, and in the vicinity are large deposits of fire and pottery clays. The chief industries are the manufacture of flour, brick and tile, and pottery, and the mining and shipping of coal. Pop. (1900) 8,880; (1910) 10,347.

Boone, Daniel, the pioneer of Kentucky, born in Bucks county, Pa., Feb. 11, 1735. He was a Colonel in the United States service, and signalized himself by his many daring exploits against the Indians, and also by his extensive surveys and explorations of the State of Kentucky. In 1793 he removed to Upper Louisiana, then belonging to the Spaniards, and was appointed by them commandant of a district there. He was one of the most successful of the enterprising American pioneers of the 18th century, and may be said to have explored, and aided in the settlement of the country from the Alleghany Mountains to the frontier of Missouri. Many places have been named in his honor. He died in Missouri, Sept. 26, 1820.

Booro, one of the Molucca Islands in the Indian Archipelago, W. of Ceram and Amboyna, belonging to the Dutch. It is oval in shape, 92 miles long and 70 broad. Though mountainous and thickly covered with wood, it is productive, yielding rice, dye woods, etc. Pop. 8,000.

Booroojird, a town, Persia, Province of Irak-ajemi, in a fertile and well cultivated valley. Pop. 20,000.

Boot, an article of dress, generally of leather, covering the foot and extending to a greater or less distance up the leg. Hence the name was given to an instrument of torture made of iron, or a combination of iron and wood, fastened on to the leg, between which and the boot wedges were introduced and driven in by repeated blows of a mallet, with such violence as to crush both muscles and bones. The special object of this form of torture was to extort a confession of guilt from an accused person. See also **BOOTS AND SHOES**.

Boötes (bō-é'tēs), the son of Ceres and of Iasion, who, being plundered of all his possessions by his brother Pluto, invented the plough, to which he yoked two oxen, and cultivated the soil to procure subsistence for himself. As a reward for this discovery, he was translated to heaven by his mother, with the plough and yoke of oxen, under the name of Boötes, *i. e.*, the Ox Driver, which is still borne by one of the constellations. According to others, Boötes was the son of Lycaon and Calisto, whom his father slew, and set before Jupiter for a repast to try his omniscience. Jupiter restored him to life, and placed him among the stars.

Booth

In astronomy, a constellation called also Arctophylax, or the Bear Driver. It is situated between Corona Borealis on the E., and Cor Caroli, or the Greyhounds, on the W. It contains 54 stars, including 1 of the first magnitude, Arcturus, 7 of the third, and 10 of the fourth. Its mean declination is 20° N., and its mean right ascension is 212°; its center is, therefore, on the meridian on June 9.

Booth, Agnes (Mrs. JOHN B. SHOEFFEL), an American actress, born in Sydney, Australia, in 1846. She made her first American appearance in New York in 1865, becoming later Edwin Forrest's leading lady; assumed numerous famous rôles with success; and was three times married. She died Jan. 12, 1910.

Booth, Ballington, General of the Volunteers of America, born in Brighthouse, England, July 28, 1859. He is a son of Gen. William Booth, founder of the Salvation Army, with which body he was officially connected until 1896, when he seceded and founded the Volunteers, a religious military body organized in the interest of the unchurched masses. His wife, MAUDE, has ably seconded her husband's efforts, and is very popular on the lecture platform.

Booth, Barton, an eminent English actor, born in 1681, was a near relation of Henry Booth, Earl of Warrington. Imbibing a passion for a theatrical life, he ran away from Trinity College, Cambridge, and joined a company of strolling players. In 1701, he made his first bow at the Theater Royal, Drury Lane, where his reception was enthusiastic. In 1712, he performed the principal character in Addison's "Cato," and soon after became manager of the house, where he continued to perform until nearly his death. His best part as an actor is said to have been Othello, but his favorite rôle was the far less important one of the Ghost in "Hamlet." His tone, manner, and gait were so solemn and unearthly, that the audience appeared to be under the impression that a positive specter stood before them. He died in 1733.

Booth, Edwin Thomas, an American actor, born near Belair, Md., Nov. 13, 1833; the fourth son of JUNIUS BRUTUS BOOTH (q. v.). When 16 years of age, he made his first appearance on the stage, in the part of Tressel, his father acting as Richard III. Two years later he himself successfully assumed the part of Richard in place of his father, who unexpectedly refused to fulfill an evening's engagement. The following year the two went to California, where the son remained for several years, visiting Australia meanwhile. Meeting with little pecuniary success, in 1856, he returned to the Atlantic States, and from that time forward was recognized as a leading member of his profession. He visited England

Booth

(1861-1862), and in 1864 produced "Hamlet" at New York for 100 nights consecutively. In 1869 he opened a splendid theater in New York, whose building cost over \$1,000,000, but which involved him in pecuniary ruin. He revisited California in 1876, and in the spring of 1877 was able to settle with his creditors, having earned during the season over \$600,000. Booth visited Great Britain and Germany in 1880-1882, and was everywhere received with enthusiasm. He died in New York, June 7, 1893.

Booth, John Wilkes, an American actor, born in Hartford county, Md., in 1838; another son of JUNIUS BRUTUS BOOTH. He sided with the Confederates in the Civil War, and to avenge the defeat of their cause he formed a conspiracy against the life of President Lincoln. He mortally wounded the President, while the latter was attending a performance in Ford's Theater, in Washington, on April 14, 1865; broke his own leg in escaping from the building; and concealed himself in Virginia till the 26th, when, on being discovered, and refusing to surrender, he was shot.

Booth, Junius Brutus, an Anglo-American tragedian, born in the parish of St. Pancras, London, May 1, 1796. He received a classical education, but early manifested a predilection for the stage, and when 17 years of age appeared in some unimportant parts. Subsequently he played Richard III., at Covent Garden, a part in which he suddenly became famous. In 1821 he went to the United States, where for the ensuing 30 years he followed his profession with much success. He died suddenly on board a Mississippi river steamer, Nov. 12, 1852.

Booth, Mary Louise, an American journalist and author, born in Yaphank, Long Island, N. Y., April 19, 1831; was widely known as the editor of "Harper's Bazar," which place she held from 1867 till her death. Her "History of the City of New York" was the first complete work upon the subject and is still probably the best. It was published in 1859, a second edition in 1867; a third, thoroughly revised, in 1880. No book has been a greater favorite of local collectors. One copy was extended to nine large volumes and enlarged by many thousand illustrations; another, owned by the author, had 2,000 illustrations inserted; and a third was extended to 22 volumes. Miss Booth's translations number over 30 volumes. They are chiefly from the French of About, Victor Cousin, Méry, Gasparin and Laboulaye. The most pretentious is Henri Martin's "History of France," six volumes of which she finished. She died in New York city, March 5, 1889.

Booth, William, founder and General of the Salvation Army, was born at Nottingham, England, April 10, 1829, was educated there, and from 1850 to 1861, acted as min-

ister of the Methodist New Connection. From the first he was zealous in holding evangelistic services, but the new departure which led to the creation of the Salvation Army on military lines began in 1865 with mission work among the lower classes in the East End of London. Since 1878 Booth's movement has been known as the Salvation Army, of which he has continued to be the mainspring and controlling power, directing its movements at home and abroad from his headquarters in London. His enthusiasm and wonderful organizing power have given life to the religious military system, of which he is really "general." The property of the Salvation Army is held for its exclusive use by Booth. His wife was associated with him in the publication of several hymns and religious works dealing with the movement, till her death in 1890.

Booth-Tucker, Frederick St. George de Lantour, commander of the Salvation Army in the United States, was born in India, in 1853. He held important official posts in India but resigned them in 1881 to join the Salvation Army. Upon his marriage with Emma Moss Booth, daughter of Gen. William Booth of the Salvation Army, he prefixed Booth to his own name of Tucker, and in 1896 became commander in the United States. His wife was killed, in a railway accident, Oct. 29, 1903.

Boothia Felix, a peninsula on the N. coast of North America, in which is the most northern part of the continent, Murchison Point, 73° 54' N. lat. It is joined to the mainland by Boothia Isthmus, is bounded on the N. by Bellot Strait, and to the E. is separated from Cockburn Island by Boothia Gulf, a southward continuation of Prince Regent's Inlet. It was discovered by Sir John Ross (1829-1833), and named after Sir Felix Booth, who had furnished \$85,000 for the expedition. Here, on the W. coast, near Cape Adelaide, Ross discovered the magnetic pole, 70° 5' 17" N. lat., and 96° 46' 45" W. long.

Booton, or Bouton, an island of the Malay Archipelago, separated by a narrow strait from the S. E. ray of Celebes, and from the island of Muna. Area, 1,700 miles. It is high, but not mountainous, and thickly wooded, produces fine timber, rice, maize, sago, etc. The people are Malays. The Sultan, who resides at Bolio, is in allegiance to the Dutch, an under-resident being stationed on the island. Pop. 17,000.

Boots and Shoes, foot coverings of the human family; exceedingly varied in form, and not less diverse in the material out of which they are made. These differences are not merely due to the caprices of fashion and the influence of traditional costume and habit, but they owe their existence in large measure to the conditions of climate, and to the necessities of the daily life and occu-

pations of their wearers. It must be at once obvious that the foot coverings which would be sufficient and healthful amid tropical sands would be most unsuitable for withstanding the rigors of a Greenland winter. The lightest sandal, which simply defends the sole of the foot, is appropriate for the one condition, while the other demands the closest, most warm, and water tight covering which can be devised. The elementary foot covering is the sandal, which consists only of a pad or sole shaped to the sole of the foot, and held on by straps or thongs. From the sandal grows up the slipper, in which straps and lacing are dispensed with, and a sufficient upper of leather or other soft material is provided to keep the article on the foot. The ordinary short shoe is the next development, it being laced, buttoned, or otherwise fastened on the foot; and in the boot the upper is continued so as to embrace more or less of the leg.

The sandal is the most ancient foot covering of which we have any record, and examples of very ancient manufacture, taken from Egyptian mummies, are preserved in public collections. The shoe frequently referred to in the Old Testament, and which played an important part in buying and selling, and in other social usages, was a sandal. The common sandal of the ancient Egyptians consisted of strips of papyrus plaited into a kind of mat, and that form remains the type of sandal of plaited grass or straw worn to this day by multitudes in Central Asia, India, China and Japan. The sandal was the ordinary shoe of the ancient Greeks. In Greece, shoes were used only in exceptional circumstances, and long boots lacing up the front were worn by hunters. Sandals (*soleæ*) were the everyday wear of the Roman populace; the patricians wore shoes (*calcei*) of black leather; red leather shoes were reserved for the senators; and the long boot or buskin (*cothurnus*), reaching, sometimes, to near the knee, and frequently supplied with a thick sole to add to the apparent stature of its wearer, was appropriated to tragedians and hunters. Sandals and slippers continue to this day to be the staple footgear of Oriental communities, and great wealth of ornamentation—inlaying of wood in sandals, and elaborate embroidery in gold and colored silks, with fantastic curling of the toes—are characteristics of the richer productions of the Eastern tradesmen.

In mediæval times, shoes with long, pointed toes were worn by the high born; and toward the end of the 14th century these points became ridiculously elongated, so that there appeared to be a long strap projecting from each foot. Different kinds of half boots were worn by the Anglo-Saxons and Anglo-Normans; and in the

reign of Edward IV., if not earlier, the boot proper, with tops and spurs, was established as an article of knightly dress. In the reign of Charles I., a species of boot, exceedingly wide at the top, made of Spanish leather, came into use; and with Charles II. the highly decorated French boot was introduced as an article of gay courtly attire. Meanwhile, the jack-boot, as it is called, had become indispensable in the costume of cavalry soldiers and horsemen generally; and by William III. and his followers it was regularly naturalized in England. This huge species of boot remained in use in British cavalry regiments until comparatively recent times, and, in a somewhat polished and improved form, it is still worn by the Horse Guards. The jack-boot is almost entitled to be called the parent of the top and some other varieties. Boots with tops of a yellow color were so commonly worn by gentlemen in the 18th century, as to become a peculiarity in the national costume of the English. When Philip, Duke of Orleans, and other revolutionists of note, affected to imitate the sentiments and manners of the English they ostentatiously wore top boots. Among jockeys and fox hunters, top boots are likely to remain in permanent use. What, perhaps, contributed to break up their general use, was the introduction of the Hessian boot as an article of walking dress. Worn over tight pantaloons, the Hessian boot was a handsome piece of attire, giving, undoubtedly, an elegant appearance to the nether costume. Boots of this shape were worn by English general officers in the early part of the French War, and somewhat later. At length they were superseded by the well known Wellington boot, which, as its name imports, was introduced by the great Duke, as a simplification, under the loose military trouser. When the name of Blucher was given to a half boot, the Wellington was almost entirely abandoned in England in consequence of the universal use of short ankle boots. It is still largely used in some continental countries and in the United States.

For many reasons the ancient domestic craft of shoemaking is dying out. Machinery and appliances for every operation are being gradually perfected, and although no machine work can equal in combined solidity and elasticity the productions of a first class craftsman, superior operatives are comparatively scarce, and the products of the factory are at least even in quality, and much cheaper than hand made boots and shoes. Shoemaking as a handicraft is a sedentary and contemplative industry. The foot to be fitted being duly measured, the upper leathers are cut out and sewed together, an operation called closing. The stuff for the soles is then cut out of tanned

oxhide, the pieces being the insole, the outsole, and the lifts of the heel. These are steeped in water; a last or foot model suitable for the boot or shoe to be made is chosen, and to the bottom of it the insole leather is nailed; and then by pulling and hammering it is molded accurately to follow the contour of the last sole. The edges of the insole are then pared and rounded down; the upper is drawn tightly down over the last, and its lower edge is nailed temporarily over the edge of the insole. A narrow strip of leather, the welt, sufficient to run round the whole sole excepting the heel part, is then selected, and the three edges, sole, upper and welt, are by an inseaming stitch sewed together. The welt then forms a band to which the outsole is sewed around the edges. The heel lifts are built up, and sewed and nailed together; and thereafter the finishing operations include the burnishing of the sole and edges, the insertion of eyelets or buttons in the uppers, etc.

The shoe trade as a factory industry only grew with the development of the sewing machine, and now, except for repairing, there is scarcely such a thing as hand sewing in the uppers of shoes. The great difficulty which, apart from hand sewing, at first lay in the way of applying machinery to shoemaking, was in the fastening together of the sole and the uppers. Early in the 19th century, one Randolph, and a little later, the celebrated engineer, Sir M. I. Brunel, patented methods of fastening together soles and uppers by means of metal pins and rivets. The upper leather was drawn well over the insole, the outer sole was then applied, and the whole pinned together and riveted by the point of the pins coming against, and being turned by an iron shod last inside. The germs of the modern sewing machine were embodied in a patent secured in 1790 by Thomas Sant, the object of his invention being to sew boots and shoes; but the sewing machine was not applied to bootmaking till after its success in ordinary stitching was demonstrated. A machine for sewing together soles and uppers was patented in the United States by Blake, and, as subsequently improved by Mackay, it became the apparatus which, for the period during which the patents were current, dominated the factory shoemaking industry. The Blake-Mackay machine sewed through outsole, upper and insole at one operation; but as the corporation owning the machine held the patent right for machine sewed boots and shoes, improvements by outsiders were for the time barred. Now there are in operation many varieties of sewing machines, some of which sew welted boots in all respects like the hand made product.

Factory-made boots and shoes are now entirely cut out by machinery, the uppers

are sewn by strong sewing machines, and soles and uppers are fastened together either by (1) sewing, (2) pegging with wooden pegs, (3) riveting with metal pins, or (4) screwing by means of the Standard screw machine. The latter most ingenious apparatus uncoils a reel of screwed brass wire, inserts it into the sole, and cuts off the wire flush with the outsole with remarkable rapidity; and for solidity and durability the work leaves nothing to be desired.

In both Great Britain and the United States the factory trade in boots and shoes has, since 1860, undergone a remarkable development. In the former Northampton is the capital of the industry, the other towns in which it forms a prominent feature being Leicester, Stafford, Norwich, Bristol, Linlithgow, and Maybole.

In the latter, until comparatively late in the nineteenth century, the boot and shoe industry was largely restricted to Eastern Massachusetts. From 1890 to 1900, however, shoe manufacturing in Massachusetts remained practically stationary, the increase being only 17-10 per cent., while the increase throughout the entire United States was 183-10 per cent.; the greater part of the increase was, therefore, in the West. The value of the shoe products of the United States in 1890 was \$220,649,358, and in 1900, \$261,028,580. In 1905 the value (estimated) was \$284,521,152. In St. Louis and in Cincinnati large quantities of high-grade shoes are produced, the product of the St. Louis factories in 1905 being 16,818,092 pairs, valued at \$26,163,280. With the introduction of labor-saving machinery and the numerous improvements in the machines formerly used, the value of the product has increased more rapidly than the number of employees and the amount of wages paid, although the average wage has also considerably increased. The most notable tendencies of the past decade are the centralization of the shoe industry into the hands of a limited number of firms, and the rapid development of the industry in the Western States.

Revised by THE SHOE AND LEATHER GAZETTE.

Bopp, Franz, a distinguished German Sanskrit scholar and philologist, born in Mainz in 1791. In 1812 he went to Paris for the study of Sanskrit and Oriental literature, and remained there five years. After living for some time in London and Göttingen, he settled in Berlin, where he eventually became ordinary professor of Oriental literature. He contributed much to the study of Sanskrit in Europe, and he may be said to have been the first who raised philology to the rank of a science. His great work was his "Comparative Grammar of Sanskrit, Zend, Greek, Latin, Lithuanian, Gothic, and German" (3rd ed.,

1868-71), which was translated into English by Eastwick (1845-50). He died in Berlin in 1867.

Bora, Katharina von, wife of Luther, was born in 1499. She took the veil early; but feeling unhappy in her situation, applied, with eight other nuns, to Luther. The nuns were released from their convent, and, in 1525, Luther married her, having himself by this time laid aside the cowl. After Luther's death she kept boarders for her support. She died at Torgau in 1552.

Boracic Acid, an acid uncombined but not pure—for it is often mixed with sulphur—found abundantly as a beautiful sublimate in small pearly crystalline scales in a crater in Vulcano, one of the Lipari Islands. In Tuscany it is contained in the steam which, along with sulphurous exhalations, ammonia and other substances, issues from fissures in the soil. On account of its having been obtained at Sasso, the acid is called by mineralogists sassolin. It occurs besides in mineral waters, and combined with various metals in minerals, of which boracite, hayesine, natroboracite, stassfurtite, and tincal, the native borate of sodium or borax, are the most important. The acid is generally prepared for chemical purposes by decomposing a hot solution of borax with sulphuric acid. As the solution cools, the boracic acid forms a crystalline crust over the fluid, and gradually deposits on the sides of the vessel. It is collected, and after washing and recrystallization is tolerably pure. It forms pearly hexagonal scales, with a somewhat greasy feeling, and a bitterish taste. It dissolves in water and very readily in alcohol, to the flame of which it imparts a peculiar green color.

The operation followed in concentrating the water in which the acid is dissolved is one of great practical difficulty, because in Tuscany, where the solution is found, there is no available fuel. This drawback was overcome by Count Larderel, who with much skill finally contrived to utilize the volcanic heat of the district to concentrate the solution. The method has been so successful that eight or nine large works spread over a district of several square miles contrive to produce upward of 800 tons of boracic acid per annum. The following is an outline of the process: Round the cracks in the soil, called fumaroles, or *soffioni*, from which the steam containing not a half per cent. of the acid issues, and inclosing the small lakes or lagoons in which it condenses, brick tanks are built on different levels but communicating with each other. These are supplied with cold water in which the steam is further condensed. As the steam passes up under considerable pressure, the water in the lagoons seems to boil, and it is some-

Boracic Acid

times projected to a considerable height in the air. When the water is sufficiently saturated it is run off into a deep vessel where it is allowed to stand until the black mud mechanically suspended in it deposits, and then the clear fluid is run into a series of large shallow evaporating pans of lead. These pans are heated by steam from other soffioni, which is made to pass under them by a system of flues. As the evaporation proceeds, the fluid becomes richer in boracic acid, and when it has at last reached a certain specific gravity, it is passed into a deep vat, where it is allowed to cool, and where the boracic acid deposits. In this state it is impure, but it is improved by recrystallization, and it is then packed in casks and exported. Commercial boracic acid contains sometimes as much as 25 per cent. of foreign matter, consisting of sulphates and other salts of the alkalies, of calcium and magnesium, clay, and other impurities. The most important of these foreign matters is ammonia which is present in such quantity that it is regularly collected when boracic acid is converted into borax.

Previous to the utilization of the Tuscan boracic acid, native borax was imported under the name of tincal, from India. As imported it is in small pieces of a dirty yellowish color, and is covered with a fatty or soapy matter. The tincal was formerly purified in Venice and in Holland by a process which was kept secret, but which consisted apparently in boiling it with lime to remove the fatty matter, filtering from impurities, and after some labor getting it in crystals. The tincal is found in various salt lakes in Asia, and a description of one of these is given in a paper on the "Botany and Geology of Tibet," appended to Capt. Samuel Turner's "Visit to the Court of Teshoo Lama" (London, 1800). The lake, said to be some 20 miles round, is situated in a bleak mountainous region, 15 days' journey N. from Teshoo-lama, and is frozen for the greater part of the year. It is supplied only by springs, and its level varies very little. The water contains common salt and borax, and large deposits of these compounds are continually forming in the bottom and on the border of the lake. During summer the natives go to the lake, break up the masses, and send them to Calcutta and other ports. The crude tincal after being greased is exported; sometimes it is subjected to partial purification before exportation. In Thibet crude tincal is used for soldering.

Since the Tuscan method was introduced, and since other sources of boracic acid in North and South America and still more recently in the salt mines at Stassfurt have been rendered available, the demand for tincal has been very much smaller and the price of borax has been reduced.

Boracic Acid

Pure borax, the anhydroborate of sodium, forms large transparent six-sided prisms, which dissolve readily in water, effloresce in dry air, and when heated melt in their water of crystallization, swell up, and finally fuse to a transparent glass. In this state borax dissolves metallic oxides which frequently impart to it characteristic colors. From this property borax is employed in soldering metals, as it removes films of oxide, and leaves the metals in metallic contact with each other and with the solder. It is also employed in making fine glaze for porcelain, as it renders the materials more fusible. In medicine it is employed in ulcerations and in skin diseases.

Another native compound of boracic acid is the borate of magnesium, or boracite of mineralogists. It occurs in beds of anhydrite and gypsum at various localities in Germany, in the form of small cubes which are colorless, though they are sometimes of different tints, and which are truncated on the edges and on four of the solid angles. This mineral is remarkable for becoming, when heated, electrified negatively at the perfect angles, and positively at the truncated angles. It is slowly soluble in water and in acids, and is fusible before the blow-pipe. A heteromorphous variety of this mineral is called stassfurtite, because it is found in the salt mines of Stassfurt. It is used as a source of boracic acid and borax. Hayesine, occurring in Nova Scotia, and tiza, occurring near Iquique in South Peru, are double borates of calcium and sodium containing water and traces of sulphuric acid and chlorine. They are found in small soft rounded lumps, which, when broken, present a silky appearance from consisting of a mass of the finest crystalline threads interwoven with one another.

These compounds are derived from the element boron, which was discovered about the same time by Gay-Lussac and Thénard, and by Sir Humphry Davy. The separation was effected by decomposing vitrified boracic anhydride with potassium, and purifying the resulting boron by washing with water and hydrochloric acid. Other methods have been since contrived which are more convenient and economical. Obtained by these processes, boron is a dark brown or green amorphous powder which stains the skin, has no taste or odor, and is only slightly soluble in water. It does not change, except in density, when exposed even to a white heat, provided it be surrounded by a gas with which it does not combine; but if it be heated in the air, or in oxygen, it burns more or less brilliantly and is converted into boracic anhydride. It is also acted on to a greater or less extent by chemical reagents, such as sulphuric, nitric, and hydrofluoric acids, by chlorine, by alkalies, alkaline salts, etc. It is one of the few elements which combine direct with nitrogen.

Borax

Besides the amorphous boron, which corresponds with the amorphous form of carbon, there is another which resembles the diamond, and is accordingly called the adamantine or diamond boron. Boron is therefore an allotropic substance. The diamond form is prepared either by heating the amorphous boron with aluminum in a crucible suitably arranged, or by heating a mixture of a boron compound with aluminum, or with aluminum and carbon. Boron diamonds scratch ruby and corundum.

Borax. See BORACIC ACID.

Borchgrevink, Carsten Egeberg (bork-grāv'ink), a Norwegian explorer, born in Christiania in 1864. He went to sea at an early age, but returned to go to college. In 1888 he went to Australia, where he worked as a surveyor in Queensland and New South Wales, and scaled Mt. Lindsay. In 1894-95 he accompanied a whaling expedition to the South Seas, in the course of which he made observations in Antarctic waters. On Aug. 22, 1898, he sailed from England in command of the "Southern Cross" exploring expedition, equipped by Sir George Newnes. With sledges the expedition reached lat. 78° 50' S.—the "farthest south." Consult his "First on the Antarctic Continent" (1901).

Bordeaux (bor-dō'), a city and port of France, capital of the Department of Gironde, on the Garonne river, about seventy miles from the sea. It is built in a crescent form round a bend of the river, which is here lined with fine quays and crossed by a magnificent stone bridge, and consists of an old and a new town. The former is mostly composed of irregular squares and narrow, crooked streets; while the latter is laid out with great regularity, and on a scale of magnificence hardly surpassed by any provincial town in Europe. In the old town are the Cathedral of St. André, St. Michael's Church, with its superb front of florid Gothic, the Hôtel de Ville, and the Palais de Justice. There are extensive and finely planted promenades. Its position gives it admirable facilities for trade, and enables it to rank next after Marseilles and Havre in respect of the tonnage employed. Large vessels sail up to the town, and there is ready communication by railway or river with the Mediterranean, Spain and the manufacturing centers of France. The chief exports are wine and brandy; sugar and other colonial produce and wood are the chief imports. Shipbuilding is the chief industry, and there are sugar refineries, woolen and cotton mills, potteries, soap works, distilleries, etc. Bordeaux is the Burdigala of the Romans. By the marriage of Eleanor, daughter of the last Duke of Aquitaine, to Henry II. of England, Bordeaux was transferred to the English crown. Under Charles VII., in 1451, it was re-

Bordoné

stored again to France. Montaigne and Montesquieu were born in the neighborhood; the latter is buried in the Church of St. Bernard. Pop. (1906) 251,947.

Borden, Gail, an American inventor, born in Norwich, N. Y., Nov. 6, 1801. In 1829 he removed to Texas, where he lived during its critical epoch, taking active part in many public movements. In 1849 he became interested in providing simple, nutritious, and portable food supplies for emigrants and explorers. His experiments led to Borden's pemmican (*q. v.*), meat biscuit (see BISCUIT), and condensed milk (*q. v.*). The pemmican was first used by Dr. E. K. Kane (*q. v.*) on his arctic expedition. The meat biscuit received the "great council medal" at the World's Fair at London in 1852. Borden applied for a patent for the condensed milk in May, 1853, but it was not granted until Aug. 19, 1856, when the commissioner of patents finally became convinced of the novelty and merit of the process. Borden never professed to be the originator of condensed milk, but he was the inventor of the method by which evaporation was accomplished under protection from atmospheric influence, and which superseded all others in manufacture. He died in Texas, Jan. 11, 1874.

Borden, Simeon, an American inventor and surveyor, born at Freetown, now Fall River, Mass., Jan. 29, 1798. He instructed himself in mathematics and devised successful surveying instruments. The first American geodetic survey, that of Massachusetts in 1838-41, was his work. Subsequently he was connected with the construction of railroads. He died in Freetown, Oct. 28, 1856.

Bordentown, a city in Burlington co., N. J., on the Delaware river, the Delaware and Raritan canal, and the Pennsylvania railroad; fifty-seven miles S. W. of New York city. It is noted as being a former residence of Joseph Bonaparte, brother of Napoleon I., and for many years the house and grounds belonging to the estate possessed much interest for the tourist. The city is the seat of the Bordentown Military Institute, the Priscilla Braislin School, St. Joseph's Academy (Roman Catholic), and the Bordentown Female College. There are steam forge and iron works, a foundry and machine shop, worsted mills, shirt factory, canning factories, a shipyard and other industries. Pop. (1900) 4,110; (1910) 4,250.

Bordoné, Paris (bor-dō'nè), an Italian painter of the Venetian school, born in Treviso in 1500; was a pupil of Titian, and was invited to France by Francis I., whose portrait he painted, as also those of the Duke of Guise, the Cardinal of Lorraine, and others. His works are not rare in the public and private collections of Europe, his

most famous picture being the "Old Gondolier Presenting a Ring to the Doge," at Venice. He died in Venice, in 1570.

Bore, or Eagre, a sudden influx of the tide into the estuary of a river from the sea, the inflowing water rising to a considerable height and advancing like a wall against the current. The most celebrated bores in the Old World are those of the Ganges, Indus and Brahmaputra. The last is said to rise to a height of 12 feet. In some rivers in Brazil it rises to the height of 12 to 16 feet. In Great Britain the bore is observed more especially in the Severn, Trent, Wye, and Solway.

Bore, in metallurgy, a tool bored to fit the shank of a forged nail, and adapted to hold it while the head is brought to shape by the hammer. The depression in the face of the bore is adapted to the shape required of the chamfered under part of the head. The word is also applied to the cavity of a steam engine cylinder, pump barrel, pipe, cannon, barrel of a firearm, etc. In mechanics it is expressed in inches of diameter; in cannon formerly in the weight in pounds of solid round shot adapted thereto, but since the introduction of modern rifled ordnance of the breech loading pattern, the bore of cannon is always expressed in inches of diameter or in the equivalent of inches.

Boreas, a bellowing wind; the Northern wind; a cold, Northerly wind. In mythology, the son of Astræus and Eos, usually worshipped as the god of the North Wind. The assiduity with which the worship of Boreas was cultivated at Athens proceeded from gratitude, the North Wind having on one occasion destroyed the fleet of the Per-



BOREAS.

sians when meditating the invasion of Attica. A similar cause induced the inhabitants of Megalopolis to consider Boreas as their peculiar divinity, in whose honor they instituted an annual festival. Boreas was usually represented with wings dripping with golden dewdrops, and the train of his garment sweeping along the ground.

Borghese, a Roman family, which derives its origin from Sienna, and which held the highest offices in this republic from the middle of the 15th century. Pope Paul V., who belonged to this family, and ascended

the papal chair in 1605, loaded his relations with honors and riches. In 1607 he appointed his brother, Francesco Borghese, leader of the troops sent against Venice to maintain the papal claims; bestowed the principality of Sulmone on Marco Antonio Borghese; the son of his brother Giovanni Battista; granted him a considerable revenue, and obtained for him the title of a grandee of Spain. Another of his nephews, Scipione Caffarelli, he created cardinal, and made him adopt the name of Borghese. From Marco Antonio Borghese, Prince of Sulmone, is descended the rich family of Borghese.

Borghese, Camillo Philip Louis, formerly Duke of Guastalla, Prince of France, etc.; born in Rome in 1775. When the French invaded Italy he entered their service and showed great attachment to the cause of France, in particular to General Bonaparte. In 1804 he became a French prince, and grand cross of the Legion of Honor, and at the breaking out of the war against Austria in 1805, commander of a squadron of the imperial guard. After its termination his wife received the duchy of Guastalla and he was created Duke of Guastalla. After having served in 1806 in the campaign against the Prussians and Russians, and after having been sent to Warsaw to prepare the Poles for a revolt, the emperor appointed him governor-general of the provinces beyond the Alps. He fixed his court at Turin and became very popular among the Piedmontese. After the abdication of Napoleon he broke up all connection with the Bonaparte family and separated from his wife. The prince sold to the French government for the sum of 8,000,000 francs 322 works of art which ornamented the palace of his ancestors, known under the name of the Villa Borghese. Among them were several masterpieces, including "The Borghese Gladiator," "The Hermaphrodite," "The Silenus," "The Dying Seneca," "Amor and Psyche." Bonaparte provided for the payment out of the national domains in Piedmont which the King of Sardinia confiscated in 1815; at the same time, in consequence of the second invasion of France, the prince received back part of these treasures of art. In 1818 he sold Lucedio, in Savoy, for 3,000,000 livres. In the kingdom of Naples he possessed the principalities Sulmone and Rosano. He was one of the richest Italian princes. He died in Florence, April 10, 1832.

Borghese, Princess Marie Pauline, the beautiful sister of Napoleon; born in Ajaccio, Oct. 20, 1780. When the English occupied Corsica in 1793 she went to Marseilles, where she was on the point of marrying Fréron, a member of the Convention, and son of that critic whom Voltaire made famous, when another lady laid claim to his

hand. The beautiful Pauline was then intended for General Duphot who was afterward murdered in Rome in December, 1797; but she bestowed her hand from choice on General Leclerc, then in Milan, who had been in 1795 chief of the general staff of a division at Marseilles, and had there fallen in love with her. When Leclerc was sent to St. Domingo with the rank of captain-general, Napoleon ordered her to accompany her husband with her son. She embarked in December, 1801, at Brest, and was called by the poets of the fleet, the Galatea of the Greeks, the Venus Marina. Her statue, in marble, as "Venus," was made by Canova at Rome—a successful image of the goddess of beauty. She was no less courageous than beautiful, for when the negroes under Christophe stormed Cape François, where she resided, and Leclerc, who could no longer resist the assailants, ordered his lady and child to be carried on shipboard, she yielded only to force. After the death of her husband, Nov. 23, 1802, she married at Morfontaine, in 1803, the Prince Camillo Borghese. Her son died in Rome soon after.

With Napoleon, who loved her tenderly, she had many disputes and as many reconciliations for she would not always follow the caprices of his policy. Yet even the proud style in which she demanded what her brothers begged made her the more attractive to her brother. Once, however, when she forgot herself toward the empress whom she never liked, she was obliged to leave the court. She was yet in disgrace in Nice when Napoleon resigned his crown in 1814, upon which occasion she immediately acted as a tender sister. Instead of remaining at her palace in Rome, she set out for Elba to join her brother, and acted the part of mediatrix between him and the other members of his family. When Napoleon landed in France she went to Naples to see her sister Caroline, and afterward returned to Rome. Before the battle of Waterloo she placed all her diamonds which were of great value, at the disposal of her brother. They were in his carriage, which was taken in that battle, and were shown publicly in London. He intended to have returned them to her. She lived afterward separated from her husband in Rome where she occupied part of the Borghese palace and where she possessed, from 1816, the Villa Sciarra. Her house, in which taste and love of the fine arts prevailed, was the center of the most splendid society in Rome. She often saw her mother, her brothers Lucien and Louis, and her uncle Fesch. When she heard of the sickness of her brother Napoleon, she repeatedly requested permission to go to him at St. Helena. She finally obtained her request, but the news of his death arrived immediately after. She died in Flor-

ence, June 9, 1825. She left many legacies, and a donation, the interest of which was to enable two young men of Ajaccio to study medicine and surgery. The rest of her property she left to her brothers, the Count of St. Leu and the Prince of Montfort. The whole property amounted to 2,000,000 francs.

Borgia, Cesare (bor'jē-a), the natural son of Pope Alexander VI., and of a Roman lady named Vanozza, born in 1478. He was raised to the rank of Cardinal in 1492, but afterward divested himself of the office, and was made Duc de Valentinois by Louis XII. In 1499 he married a daughter of King John of Navarre, and accompanied Louis XII. to Italy. He then, at the head of a body of mercenaries, carried on a series of petty wars, made himself master of the Romagna, attempted Bologna and Florence, and had seized Urbino when Alexander VI. died, 1503. He was now attacked by a severe disease, at a moment when his whole activity and presence of mind were needed. He found means, indeed, to get the treasures of his father into his possession, and assembled his troops in Rome; but enemies rose against him on all sides, one of the most bitter of whom was the new Pope, Julius II. Borgia was arrested and carried to Spain. He at length made his escape to his brother-in-law the King of Navarre, and was killed before the castle of Viana, March 12, 1507. He was charged with the murder of his elder brother, of the husband of his sister Lucretia, and the stiletto or secret poisoning was freely used against those who stood in his way. With all his crimes he was a patron of art and literature.

Borgia, Lucretia, daughter of Pope Alexander VI., and sister of Cesare Borgia, was born in 1480. In 1493 she was married to Giovanni Sforza, Lord of Pesaro, but after she had lived with him for four years, Alexander dissolved the marriage, and gave her to Alphonso, nephew of Alphonso II. of Naples. Two years after this new husband was assassinated by the hired ruffians of Cesare Borgia. Her third husband was Alphonso d'Este, son of the Duke of Ferrara. She was accused of almost every species of crime; but several modern writers maintain that the charges against her are false or much exaggerated. She patronized art and literature. She died in 1523.

Boring, a process in mechanical and engineering operations, variously performed according to the medium dealt with. For making small holes in soft woods and like substances, awls are employed, which merely cut and displace a portion of the yielding material. In boring hard woods and large holes, carpenters use gimlets, augers, and the brace and bits, which all cut and scoop out the material. In the jewelry and small

Boring

metal industries, hand drills, which consist of a spindle with steel bits, to which reciprocating rotation is given, are the implements for piercing small holes. The boring of holes in metal plates is effected by means of drills driven by machinery. The drill is inserted in the end of a vertical spindle, which revolves in a fixed frame, and is driven by the bevel wheels. The metal to be bored is placed on a table or other support, below the drill; and the up and down motion, or end pressure and off action, of the drill is effected by the hand gear, turning the screw; which, being coupled to the top of the spindle, presses it down or raises it, according to the way it is turned. The spindle slides vertically in the collar forming the axis of the bevel wheel, but is carried round with it by means of a pin, which projects into a groove.

As applied to the earth and to rocks, boring embraces two classes of operations—boring of shot holes for blasting, and the sinking of bores in prospecting for minerals, and in forming wells for water, salt brine, and mineral oils. Blast holes in rocks are made from one to two—sometimes more—inches in diameter, and may pierce to the depth of 9 feet. Such holes are most simply made in hard rock by a steel pointed drill, struck by a hammer, and turned partly round after each blow to make the hole cylindrical. The addition of a little water serves to preserve the temper of the boring tool, and makes the rock more easy to cut. In soft rock, whenever the hole is to be vertical, a jumper is used. This is a weighted drill, which acts merely by its own weight when let fall from about a foot in height. The powdered stone is removed at intervals by a scraper. But in all great engineering undertakings rock boring machinery now supplants hand work. The machines are principally devised to imitate the percussive action of the hand drill, the boring chisel being worked and rotated by compressed air, and sometimes directly by steam. The compressed air machines possess the great advantage of aiding in the ventilation of the working—often a most important consideration, seeing the operations are chiefly carried on in confined spaces where vast volumes of poisonous gases are evolved from explosions. The earliest practical rock boring machine was that of Sommeiller, one of the engineers of Mont Cenis tunnel, at which undertaking the apparatus was first used. Now the forms of percussion machines are very numerous, improvements being directed toward lightness and simplicity of parts, and to the method—automatic or otherwise—of advancing the boring tool as the work proceeds. Among the best known machines are the Barrow, Burleigh, Darlington, Ferroux,

Boring

Ingersoll, and McKean rock borers. Diamond drills working in the manner described below are also used. Brandt's rotatory borer is an apparatus similar in action to the diamond drill, but with a crown of hardened steel in place of cutting diamonds. The tool is pressed against, and rotated by water power. An apparatus similar in principle to the brace and bits of the carpenter is used with advantage in uniform rock, such as slate.

The bores for deep wells of all kinds, and for discovering the mineral contents of a region, come under one category. As a preliminary operation in mining, boring is of the utmost importance for discovering the position, thickness, and dip of mineral strata or lodes, and for ascertaining the nature of the overlying deposits. Bores are made by three classes of implement—(1) boring rods, (2) rope borers, and (3) diamond drills.

The rod boring instrument consists of an iron shank, having a cross bar at the top and a hollow screw at the bottom; to this all the successive boring instruments are fastened. A simple chisel is first attached to the screw, and one or two men press upon the cross bar, and, at the same time, force it round like an auger; while another workman, by means of a lever erected overhead, with a chain descending from it to the cross bar, gives an up and down motion to the instrument. When the chisel becomes clogged, from the accumulation of material which it has loosened, it is exchanged for a cylindrical auger, provided with a valve, which scoops out the separate material; and thus by alternate chopping and scooping the work is carried on. The nature of the strata is determined with considerable facility and certainty by examining the fragments brought up by the auger. As the work advances, successive lengths of rod are screwed on at the upper end. A derrick pole is erected over the bore hole for the purpose of elevating the rods, to permit the change of the tools.

The rope method of boring has been long in use among the Chinese. By it the great loss of time, arising from the screwing and unscrewing the rods, at each elevation of the chisel or auger, is saved. The chisel and scooping instrument are fastened to a rope, which is alternately elevated and allowed to descend by the simple force of gravity; the instrument thus forces its way through the ground. In the softer rocks of the newer formations this method has been successfully employed in boring for artesian wells. The rope boring machinery of Mather and Platt, of Salford, in which a flat hempen rope is employed, is, in extensive use.

For deep well sinking, as in the Pennsylvanian oil region where depths of 2,000 feet

Born

and more have to be reached, and for mineral prospecting, the diamond drill has, of late years, largely superseded all other borers. With this apparatus the earth can be pierced at any angle, which is a great advantage in investigating mineral deposits; and, moreover, the drill produces solid and continuous cores of the strata through which it passes, so that a complete section of any bore can be exposed to view. The diamond drill consists of a crown, or cylinder of steel, around one edge of which are fixed a series of black diamonds. These diamonds are so set that they project alternately a little beyond the outside and inside edge of the cylinder. This crown is screwed to lengths of iron tubing as it cuts its way by rotation into the rock, and it makes, as it descends, an annular cutting somewhat bigger than the thickness of the continuous tube, which the crown and its shaft form. Thus a core of rock is cut out and held within the tube, and the pieces may be lifted out from time to time as the work proceeds. The detritus resulting from the abrasion of the ring of rock is continuously washed away by a current of water, forced down within the tubing. Diamond drills are made of many sizes, from 1½ up to 18 inches' diameter. The prototype of the diamond drill was M. Fauvelle's hollow boring rod with steel crown described at the British Association meeting in 1846.

Born, Bertrand de, a French troubadour and warrior, born about the middle of the 12th century in the Castle of Born, Périgord. He dispossessed his brother of his estate, whose part was taken by Richard Cœur de Lion in revenge for De Born's satirical lays. Dante places him in the Inferno on account of his verses intensifying the quarrel between Henry II. and his sons. He died about 1209.

Börne, Ludwig (ber'ne), a German political writer, born in Frankfort-on-the-Main, of Jewish parents, May 6, 1786. He founded, and for three years conducted, "Die Wage," a journal devoted to civics, science, and art. Of his numerous satirical sketches, all full of humor and wit, these are perhaps the most brilliant: "Monograph on the German Postal Snail," "The Art of Becoming an Original Author in Three Days," "Memorial Address to Jean Paul." Fierce animosity toward the dynastic policies of Germany permeated whatever he wrote; even his literary and dramatic criticism was biassed by this passion. His last completed work, "Menzel, the French Devourer" ("Franzosenfresser"), is proof that to the last his voice was still for war. His "Complete Works," in 12 vols., were published in 1863. He died in Paris, Feb. 12, 1837.

Borneo

Borneil, Giraut de (bor-nāy'), a Provençal troubadour of the 12th century; a native of Exideuil, Dordogne. His contemporaries bestowed on him the sobriquet "Master of Troubadours." Some 80 of his songs are extant; among them the charming song of the morning, "Alba."

Bornemann, Wilhelm, a Low German dialect poet, born in Gardelegen in 1766. He is one of the foremost representatives of modern Low German poetry. His works are "Low German Poems" (1810), republished in a 10th edition in 1891; "Pictures of Nature and the Chase" (1829); "Humorous Hunting Songs." He died in 1851.

Borneo, an island, next to Australia and Papua, the largest in the world, is situated in the Indian Archipelago, in 7° 3' N.—4° 10' S. lat., and 108° 53'—119° 22' E. long. It is bounded on the E. by the Sea of Celebes and the Macassar Strait, S. by the Sea of Java, W. and N. by the Gulf of Siam and the China Sea. Its length is about 800 miles, with a breadth of 700, and an area of about 284,000 square miles. The population is roughly estimated at 1,865,000, but may be more.

Topography.—The coasts, which are often low and marshy, and rendered dangerous to navigation by numerous islets and rocks, present no deep indentations, though they are pierced by numerous small bays and creeks. A great part of the island must be described as mountainous; but the relations of the various ranges and groupings are still very imperfectly known, and in very few cases has the altitude of the leading summits been accurately ascertained. In the far N. rises the magnificent structure of Kinabalu (13,698 feet high), built up of porphyritic granite and igneous rocks—the culminating peak probably of the whole Indian Archipelago, and not unworthy in its picturesqueness of such a rank. Throughout the narrow northern portion of the island there runs a kind of central ridge in a general S. W. direction, with highest points ranging from 4,000 to 8,000 feet; and this can be traced, at least as a water parting, far to the S. W.; though, broadly speaking, the whole S. country is corrugated and crinkled, as it were, in a most irregular manner. This is the result of the great process of denudation carried on by the tropical rains, which, scooping out the interior valleys and plains, have laid down the vast alluvial tracts that extend seaward into deltaic morasses. As far as is yet known, the mountain framework of the whole island consists, like Kinabalu, of eruptive and crystalline rocks of high antiquity. Of modern volcanic activity, so prevalent elsewhere in the Indian Archipelago, there is, in Borneo, no trace either in tradition or in the record of the rocks.

A large portion of the surface, not covered by alluvium, consists of tertiary deposits, in regard to the age of which, however, geologists are not agreed. Pages might be filled with the mere nomenclature of the rivers of Borneo; the more important may be seen on the accompanying map. Though many are powerful streams, navigable far inland for boats of considerable burden, their value as waterways is lessened by the bars which usually prevent the entrance of sea going vessels, and in their upper reaches by frequent rapids and occasional waterfalls. In connection with the river systems there are numerous lakes in Borneo; but of true mountain lakes on a large scale there are probably few. The great lake of Kinabalu, which figured in older accounts, with 100 miles of circumference, is a pure myth, based perhaps on a misunderstood description of the great grass covered plain of Danao.

Climate and Productions.—The climate in the low grounds is humid, hot, and unhealthful for Europeans; but in the higher parts toward the N. the temperature is generally moderate, the thermometer at noon varying from 81° to 91° F. During the rainy season, from November to May, heavy storms of wind with loud thunder are experienced on the W. coast. The influence of the land and sea breezes passes inland to quite remarkable distances across the level plains and up the river valleys. Vegetation is extremely luxuriant. The forests produce ironwood, bilian, teak, ebony, sandalwood, gutta percha, dye woods, benzoin, wax, dragon's blood, sago, various resins, vegetable oils, and gums. The camphor of Brunei is the best in Asia. The mohor tree, well adapted for making native boats, attains a height of 80, and the kaladang, suited for large masts, of 200 feet. Nutmegs, cloves, cinnamon, pepper, betel, ginger, rice, millet, sweet potatoes, yams, cotton in Amuntai, sugar cane in Sambas and Montrado, indigo, tobacco, coffee in Sambas, pineapples, cocoanuts, etc., are cultivated. The mountains and forests contain many monkeys, among which is the orang outang. Tapirs, a small kind of tiger, small Malay bears, swine, wild oxen or banteng, and various kinds of deer abound. The elephant is only found in the N., and the rhinoceros in the N. W. The few domesticated animals are buffaloes, sheep, goats, dogs, and cats. A few horses are seen in Banjermassin. Among the birds are eagles, vultures, argus pheasants, peacocks, flamingoes, pigeons, parrots, and also the swifts (*collocalia esculenta*) which construct the edible nests prized by the Chinese for making soup. The rivers, lakes, and lagoons swarm with crocodiles, and many kinds of snakes, frogs, lizards, and leeches. Fish is plentiful, and the coasts

are rich in tortoises, pearl mussels, oysters, and trepang. Brilliant butterflies and moths are in great variety. Among the mineral products are coal, gold, and copper, especially in Montrado; antimony, iron, tin, platina, nickel, diamonds and other precious stones, rock crystals, porcelain clay, petroleum, and sulphur. The diamond mines are chiefly in Landak and Pontianak; Sambas produces the greatest quantity of gold; the kingdom of Brunei, Kutei, and Banjermassin, the largest amount of coal. The Pengaron coal field, worked by the Dutch Government, is one of the most important.

The People.—The population consists of three classes, the Dyaks or Dayaks, who are the aboriginal heathen inhabitants, and constitute the great bulk of the population; the Mohammedans or Malays—for this name is extended so as to include all professors of Islam, whether true Malays, Buginese, Javanese, Dyaks, or Arabs; and the Chinese. The Dyaks live chiefly in the interior, and employ themselves with tillage and the collecting of gutta percha, resin, gums, ratans, gold dust, and wax. They are divided into numerous tribes. The Malays (taking the name ethnographically) dwell on the coasts, are traders and bold sailors. They are more civilized than the Dyaks, cultivate the grounds around their houses, lay out gardens, keep cattle, and live partly by fishing. The Chinese, chiefly from Canton, have penetrated far into the interior. They engage in trade and mining, are unwearied in their efforts to make money, and then return to their native country. They have always endeavored to live as independent republics (*kong-si*) under chiefs chosen by themselves, and according to Chinese laws. In 1857 the Chinese living in Sarawak rebelled, and were nearly exterminated. The Dutch were also compelled to put them down by force of arms, and have imposed a poll tax. The women of Borneo, except the Dyak, weave cotton fabrics, make earthenware, baskets, and mats of beautiful designs and colors. In the district of Banjermassin are factories of weapons. The principal exports are gold, gold dust, diamonds, coal, ratans, gutta percha, edible nests, cotton, wax, timber, dye woods, mats, resins, sandalwood, camphor, etc.; the imports, earthenware, iron, steel, and copper work, piece goods, yarns, woolen and silk fabrics, medicines, provisions, wines, spirits, rice, sugar, tea, tobacco, opium, trepang, gambir, gunpowder, etc.

Political Divisions.—Borneo has never formed a political unity, and there is no native designation for the island as a whole. The name Borneo (Burnei or Brunei) in fact properly applies only to the Malay kingdom on the N. W. coast; and Kalamantan or Kalamantin, sometimes quoted as a general appellation, is also of limited pur-

port. The following are the present political divisions:

(1) *Borneo Proper*.—This originally included nearly the whole of the N. W. of the island. The Sultan has absolute authority. In 1847 he undertook not to surrender any of his territory to any other power without the sanction of the British Government. The capital, Brunei, 20 miles from the coast, on the river of the same name, has at the most 20,000 inhabitants; whereas it was credited by Pigafetta (16th century) with 25,000 houses. The total population of the country within its present limits may be stated at 125,000. Its area was reduced by the erection of

(2) *Sarawak* into a practically independent principality by Sir James Brooke (1841–1868), and by the establishment of

(3) *The British North Borneo Company* as a recognized governing body. The company's charter, granted in 1881, transferred to them rights originally obtained by an American in 1865. This territory consists partly of a portion of the old kingdom of Brunei, partly also of districts on the E. coast, claimed by the Sultan of the Sulu Islands. Against the British occupation of the Sulu territory, a protest was made by Spain, which had for some time been gradually incorporating the Sultan's possessions. As a matter of fact, the British North Borneo Company has been successful in appropriating and developing its territory, which, with an area of 30,709 square miles, and a coast line of 900 miles, is now divided into the East Coast Residency and the Provinces of Dent, Keppel, and Alcock, and has its capital at Elopura or Sandakan, the largest settlement, with 5,000 inhabitants. The population of the territory is estimated at 200,000.

(4) *Dutch Possessions*.—By far the largest part of the island is ruled directly or indirectly by the Dutch, who have divided it into the Residency of the Western Division of Borneo, and that of the Southern and Eastern, the former having Pontianak as the seat of government, the latter Banjarmasin. Besides a number of smaller dependencies, the Western Division contains the kingdom of Landak, Tayan, Mampawa, Sukadana, Simpang, Matan, Sekadow, Sintang, Sambas. Among the separate States which go to form the Southern and Eastern Division are Kotaringin, Banjarmasin, and Martapura. In consequence of a decree of the Sultan of Banjarmasin, the district watered by the Great Dyak or Kahayan is preserved for the native tribes, who, in 1879, were estimated at 18,000 souls; Chinese, Malays, etc., are forbidden to ascend the river higher than the Kanpore Pilany. The same is the case with the basins of the Kapuas Mururg, known as the Little Dyak district. The population of the whole of the

Dutch portion of the island on Dec. 31, 1881, was 959,491, of whom 799 were Europeans, 31,550 Chinese, 924,731 natives, 2,070 Arabs, and 341 miscellaneous Orientals. In the number of natives are included from 200,000 to 300,000 Malays settled along the coast, who used, formerly, to be counted among the strangers.

(5) *The Island of Labuan*, off the coast of Brunei, has belonged to the British since 1846.

The chief towns in Borneo are Sambas (10,000), Pontianak (9,000), Banjarmasin (30,000), Brunei (20,000), and Kuching (12,000).

History.—The Chinese had commercial dealings with Borneo as early as the 5th century, but they made no settlement for a long time after. The Malay kingdom of Borneo proper dates back to the 13th century. Another Malay settlement of later origin, Sambas, was at first dependent on Johore in the Malay Peninsula. Sukadana was founded by Hindu Javanese from the kingdom of Majapahit (see JAVA), and spread its influence on the whole S. part of the W. coast. Mampawa was a Buginese settlement, and Pontianak was founded as late as 1771 by a colony of Arabs, Malays, and Buginese. Islam began to be preached by Arabs from Palembang in the 16th century.

The Portuguese effected a settlement in 1690 at Banjarmasin; from thence they were, however, soon expelled. The Dutch succeeded in concluding a treaty of commerce with the princes of Banjarmasin. They erected a fort and factory in 1643, and a second in 1778 at Pontianak. The British made unsuccessful attempts in 1702 and 1774 to effect a settlement in Borneo, but, during the 19th century, they acquired a preponderating influence on the N. W. coast.

Bornier, Henri (born-yā'), **Vicomte de**, a French dramatist, member of the Academy, born at Lunel, Dec. 25, 1825. His plays are notable for splendor of diction. Among them are "Luther's Wedding" (1845); "Dante and Beatrice," "The Daughter of Roland." He twice won the prize of the Academy, with the lyrics, "The Isthmus of Suez" (1861) and "France in the Extreme East" (1863). He was the author of several successful novels and romances. He died in 1868.

Bornu, formerly a negro kingdom of Central Africa, now divided between England, France, and Germany; bounded on the E. by Lake Tchad, and N. by the Sahara. The greater part of the country is perfectly level, and much of it is liable to be overflowed in the rainy season, which lasts from October to April. The heat from March to June is excessive, ranging from 104° to 107° F. The two principal rivers are the Shari and the Komaduga Yaobe, both of which

Boro Budor

fall into Lake Tēnad. The soil is fertile, yields plentiful crops of maize, millet, and other tropical produce. Wild beasts are very numerous. Coats of mail are made both for horses and their riders. The population, which is estimated at about 5,000,000, are mostly of negro race, and called Bornuese or Kanuri. The ruling race, called Shuwas, are of Arab descent and bigoted Mohammedans; but many traces of fetichism remain among the masses. Whatever they have of civilization is derived from the Arabs. The shores and islands of Lake Tchad are inhabited by negro pirates called *yedina* or *budduma*. The slave trade is eagerly prosecuted in Bornu. In the beginning of the 19th century, Bornu was conquered by the Fellatahs, whose yoke, however, was soon shaken off under the leadership of a fanatic fakir named Mohammed-el-Amin. Dr. Nachtigal, who visited Bornu in 1870, described it as rapidly decaying. The ruins of Birni, the old capital, on the Yaobe, may still be seen. Kuka, or Kukawa, the present capital, on the W. shore of Lake Tchad, has a population of about 60,000. Gornu, to the S. E., is still more populous, and has one of the most important markets of Central Africa.

Boro Budor (the "Great Buddha"), the ruin of a splendid Buddhist temple in Java, Kadu Residency, near the junction of the Ello and Progo, is the most elaborate monument of the Buddhist style of architecture anywhere existing. Buddhism was early introduced into Java, and Javanese chronicles place the building of the temple in the beginning of the 7th century; there are no inscriptions, but it was probably finished between 1400 and 1430. Boro Budor is built on a low hill, between four vast volcanoes, which supplied the blocks of trachyte of which the edifice is built; its height to the cupola is 118 feet. It is a pyramid of a square form, each side at the base measuring 520 feet, and consists of seven walls, which are built like the steps of a stair, up a hill. Between the walls are narrow terraces running round the building; in each is an arched doorway leading to the next higher terrace. These walls are richly ornamented with statuary. Outside are over 400 niches topped with fantastic domes, and each occupied by a large statue of Buddha. Between each of these are bas reliefs, including figures of the god seated, and architectural ornaments and carvings of all sorts. Below the niches, on the lower story, is an immense bas relief running round the whole building, representing scenes from the life of Buddha, and religious subjects. The inner faces of the building are also profusely ornamented with bas reliefs, representing battles, sea fights, processions and chariot races, carried to an extent unrivaled by any other building in

Borough

the world. Of the large reliefs alone there are over 2,000; and most of them are as vigorously designed as they are carefully executed. Within the upper square terrace are three circular ones, the outer ornamented with 32, the next with 24, and the upper with 16 small bell shaped shrines (*dagops*), each containing a seated statue of Buddha, which can be seen through the open works of their roofs. The whole is surmounted by a cupola, the principal and probably the most ancient part of the structure. It is now empty, a sunken chamber, 10 feet deep, representing what was, no doubt, a *dagop* intended to contain the precious relic for which this splendid temple was erected. The niches containing the cross-legged figures have been supposed to be a copy, in durable architecture, of the cells of a Buddhist monastery, each occupied by a shaven priest; the cupola is rather to be classified with the topes or stupas of Afghanistan. The structure is thus a compound of a tope with a copy, in durable architecture, of the frail cells of a vihara.

Borodino, a village of Russia, 70 miles W. of Moscow; on the Kaluga, an affluent of the Moskwa. It gave name to the great battle fought between the French army under Napoleon and the Russians under Kutusoff, Sept. 7, 1812. The battle of Borodino was one of the most obstinately disputed in history, and the loss on both sides was almost equally great. Out of 257,000 men engaged, between 70,000 and 80,000 were killed and wounded. The Russians retreated on the following day, but in the most perfect order, and, therefore, claim this battle as a victory; but the French, who name the battle from the Moskwa, have always maintained a similar claim.

Boro=Glyceride, a compound of boracic acid with glycerine, represented by the formula $C_3H_5BO_3$. It is a powerful antiseptic, and being perfectly harmless is as useful an agent in the preservation of food as in surgery, etc.

Boron. See BORACIC ACID.

Borough, originally a fortified town. In England, a corporate town or township; a town with a properly organized municipal government. If it sends a representative or representatives to Parliament it is a parliamentary borough, if not, it is only a municipal borough. The qualifications for voters in both classes of boroughs are the same. In all boroughs a mayor is chosen annually, and a certain number of aldermen and councilors periodically, the burgesses or voters electing the councilors, and the councilors electing the mayor and aldermen. Mayor, aldermen, and councilors form the council. In the United States, an incorporated town or village.

Borromeo Islands

Under a ruling of the United States Board on Geographic Names, this word, when forming a part of a place word, is now abbreviated to boro, as Hillsboro.

Borromeo Islands, a group of four small islands on the W. side of Lago Maggiore, Northern Italy. They are situated in the W. arm of the lake, and are named after the ancient family of Borromeo. Vitaliano, Count Borromeo, about 1671, caused soil to be carried to them, built terraces, and converted them into beautiful gardens. The two most celebrated are Isola Bella and Isola Madre. On the W. side of Isola Bella, which rises above the water in 10 successive terraces, stands a palace of the Borromeo family, containing many admirable paintings and other works of art. Isola Madre is laid out in the same terraced style, and is crowned by a now dilapidated palace. The Isola de' Pescatori is inhabited by about 200 fishermen. Jean Paul Richter has described the place in his "Titan."

Borromeo, Carlo, Count, a celebrated saint and cardinal of the Roman Church; born in Arona, on Lago Maggiore, Oct. 2, 1538; studied the law at Pavia; was in 1559 made doctor, and in 1560 was a successively appointed by his uncle Pius IV., apostolical prothonotary, referendary, cardinal, and Archbishop of Milan. As legate over Romagna, the March of Ancona and Bologna, he had a great share in the civil government; as protector of Portugal, of the Netherlands, of Switzerland, of the Franciscans, Carmelites, and of the Knights of Malta, he administered several important branches of the spiritual government of the Pope, who created him his grand penitentiary, and did nothing of importance without his advice. The reopening and the results of the Council of Trent, so advantageous to the papal authority, were chiefly effected by the great influence of Borromeo. He did much for the embellishment of the papal buildings, employing even his own fortune for that purpose, and established many excellent institutions as Archbishop of Milan; improved the discipline of the clergy, founded schools, seminaries, an order of secular priests (oblates), libraries, hospitals, and was indefatigable in doing good. During the pestilence which raged in Milan in 1576 he distinguished himself by his heroic devotion to his flock. As soon as the scourge appeared in the city, he hastened from a distant part of his diocese, where he was making a pastoral visitation, and spent all his energies in giving bodily aid and spiritual consolation to the plague-stricken inhabitants. All his virtues, however, could not save him from persecution and calumny; he was even severely attacked by the government, but no charge could be proved against him. He died Nov.

3, 1584. Miracles were immediately said to be wrought at his tomb, and his canonization took place in 1610.

Borrow, George, an English traveler, linguist, and writer on gypsy life; born in East Dereham, Norfolk, in 1803. On his father's side he was descended from a Cornish family, and his mother was of French extraction. His father was a recruiting officer who constantly changed his residence, and thus Borrow's early years were passed in various parts of the United Kingdom. He received part of his education in Edinburgh High School, and in 1820 was articled to a Norwich solicitor. It was about this time that he laid the foundation of his linguistic knowledge under the guidance of William Taylor, a friend of Southey. After his father's death he went to London where he earned his livelihood by literary work; but soon tiring of this he set out on a series of journeys through England, France, Germany, Russia, and other countries, acting latterly as agent of the British and Foreign Bible Society and correspondent of the "Morning Herald." During the seven years or so prior to his engagement by the Bible Society he seems to have suffered great privations, but of his movements at that time he has told us nothing. He married in 1840, and settled on a small estate of his wife at Oulton Broad, in the N. E. of Suffolk, and there he died July 30, 1881. He maintained to the last his strong sympathy for gypsy life, and not only permitted but encouraged the gypsies to encamp on his estate. His best-known work is "The Bible in Spain" (3 vols. 1843); and his other publications include "Targum, or Metrical Translations from Thirty Languages and Dialects" (1835); "The Zincoli, or an Account of the Gypsies in Spain" (1841); "Lavengro, the Scholar, the Gypsy, the Priest" (1851), a sort of idealized autobiography; "The Romany Rye," a sequel to Lavengro (1857); "Wild Wales, its People, Language, and Scenery" (1862); and "Romano Lavo-Lil" (1874), a dictionary of the gypsy language. Borrow was a strong, manly character, delighting in the free, open-air existence of the gypsies whose life he knew so well, and despising heartily all affectation, cant, and false gentility.

Borsippa, a very ancient city of Babylonia, the site of which is marked by the ruins Birs Nimrud.

Boscan Almogaver, Juan, a Spanish poet; born in Barcelona about 1493. He followed the court of Charles V., and the education of the Duke of Alba was committed to him. After his marriage he was occupied in publishing his works, together with those of his deceased friend, Garcilaso,

Boscan Almogaver

Boscawen

in which he was employed at his death. Boscan first introduced Italian measures into Spanish, and thus became the creator of the Spanish sonnet. He died near Perpignan, France, about 1542.

Boscawen, Edward, a British admiral, son of the first Viscount Falmouth, born in Cornwall, Aug. 19, 1711. He distinguished himself at Porto Bello and Cartagena, and in 1747 took part, under Anson, in the battle of Cape Finisterre. His chief exploit was a great victory, in 1759, over the Toulon fleet, near the entrance of the Straits of Gibraltar. He died in Surrey, Jan. 10, 1761.

Bosch Bok, the bush buck, a name given to several South African species of antelope.

Bosch Vark, the bush hog or bush pig of South Africa (*choiropotāmus africanus*), one of the swine family, about 5 feet long, and with very large and strong tusks. The Kaffirs esteem its flesh as a luxury, and its tusks, arranged on a piece of string and tied round the neck, are considered great ornaments.

Boscobel, a locality in Shropshire, England, remarkable historically as the hiding place of Charles II. for some days after the battle of Worcester, Sept. 3, 1651. At one time he was compelled to conceal himself among the branches of an oak in Boscobel Wood, where, it is related, that he could actually see the men who were in pursuit of him and hear their voices. The royal oak, which now stands at Boscobel, is said to have grown from an acorn of this very tree.

Boscovich, Roger Joseph (bos'kō-vich), an Austrian astronomer and geometrician, born in Ragusa, May 18, 1711. He was educated among the Jesuits, and entered into their order. He was employed by Pope Benedict XIV. in various undertakings, and in 1750-1753 measured a degree of the meridian in the Ecclesiastical States. He afterward became Mathematical Professor in the University of Pavia, whence, in 1770, he removed to Milan, and there erected the celebrated observatory at the College of Brera. He died in Milan, Feb. 12, 1787.

Bosio, François Joseph, Baron, a French sculptor, born in Monaco, March 19, 1769. He was much employed by Napoleon and by the successive Bourbon and Orleans dynasties. His works are well known in France and Italy. He died in Paris, July 29, 1845.

Bosna-Serai, or **Serajevo**, the capital of Bosnia, on the Migliazza, 570 miles W. N. W. of Constantinople. It contains a palace, built by Mohammed II., to which the city owes its name. It was formerly surrounded with walls, but its only defense now is a

Bosporus

citadel, built on a rocky height at a short distance E. from the town. Bosna-Serai is the chief mart in the province, the center of the commercial relations between Turkey, Dalmatia, Croatia and South Germany, and has, in consequence, a considerable trade, with various manufactures. Pop. (1895) 38,083.

Bosnia, a former Turkish province in the Balkan Peninsula, W. of Servia, by the Treaty of Berlin (1878) to be administered for an undefined future period by the Austrian Government; area (including Herzegovina and Novi-Bazar), 19,800 square miles (of which Bosnia Proper occupies 16,000), with (1895) 1,568,092 inhabitants, mostly of Slavonian origin, and speaking the Servian language. They are partly Mohammedans, partly Roman and Greek Catholics. The country is level toward the N.; in the S. mountainous. Its chief rivers are the Save, the Verbas, the Bosna, Rama, and Drina. About half the area is covered with forests. Tillage is carried on in the valleys and low grounds; maize, wheat, barley, rye, buckwheat, hemp, tobacco, etc., being grown. Fruits are produced in abundance. Sheep, goats, and swine are numerous. The minerals include coal, which is worked in several places, manganese, antimony, iron, etc. Among the manufactures are iron goods, arms, leather, linens, and woollens.

Bosnia, in ancient times a part successively of Illyria, Pannonia and Dalmatia, was, during the great migrations occupied by Slavs or Slavonized Illyrians, at first dependent on Hungary; but it became a kingdom in 1376, under Tivartko, a native prince. Occupied by the Turks in 1401, it was annexed in 1463, but not recognized by Europe as a Turkish Province till 1699. Extortionate taxation caused a rebellion of the Christians, in 1849, suppressed by Omar Pasha; but a more determined rising in 1875, which the Turks failed to put down, led to the occupation of the Province by the Austro-Hungarians, which the Moslem population opposed in a fierce but unavailing struggle. The Treaty of Berlin formally intrusted the administration to Austria-Hungary, the nominal supremacy of the Sultan being recognized in 1879. In 1908, Bosnia, Herzegovina, and Novi-Bazar were annexed by Austria.

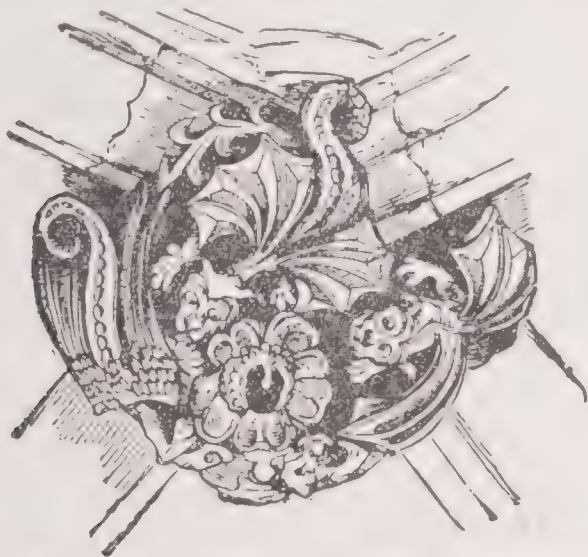
Bosporus, or **Bosphorus**, the strait, 19 miles long, joining the Black Sea with the Sea of Marmora, called also the Strait of Constantinople. It is defended by a series of strong forts; and by agreement of the European powers no ship of war belonging to any nation shall pass the Bosporus without the permission of Turkey. Over this channel (about 3,000 feet wide) Darius constructed a bridge of boats on his Scythian expedition. The Cimmerian Bosporus

Bosquet

was the name given by the ancients to the strait that leads from the Black Sea into the Sea of Azov. There was also, anciently, a kingdom of the name of Bosphorus, so called from this strait, on both sides of which it was situated.

Bosquet, Marie Joseph (bos-kā'), a French military officer, born in Pau, in 1810. In 1829 he entered the Polytechnic School, and, in 1833, became a sub-lieutenant in the artillery. In 1835, he went with his regiment to Algeria, where he began to distinguish himself. Between 1836 and 1848 he had passed through the successive ranks of captain, chef-de-bataillon, lieutenant-colonel, and colonel, when, in that year, he was appointed by the Republican Government general of brigade. In 1854 the Emperor Napoleon III. raised him to the rank of general of division, and enrolled him in the staff of the army of Marshal St. Arnaud. He was with the French army in the Crimea, where he greatly distinguished himself, and was wounded in the assault on the Malakoff Tower at the siege of Sebastopol. In 1856, he was made a Marshal of France, and a Senator. In 1859, he was appointed to a command in the war against Austria. He died in 1862.

Boss, an elevated or thickened portion, usually around an aperture, or a swage or stump used in shaping sheet metal. In Gothic architecture it is the protuberance in



A BOSS IN ST. GILES' CHURCH, EDINBURGH.

a vaulted ceiling formed by the junction of the ends of several ribs, and serving to bind them together; usually elaborately carved and ornamented.

Boss, Lewis, an American astronomer, born in Providence, R. I., Oct. 26, 1846; was graduated at Dartmouth College, in 1870; astronomer of the Northern Boundary Survey for the determination of the line between the W. part of the United States and British America; and, since the completion of that work, Director of the Dudley Observatory, Albany, N. Y. He was chief of the United States party sent to Chile in 1882 to observe the transit of

Bossut

Venus; was elected a member of the National Academy of Science, in 1889, and an honorary foreign associate of the Royal Astronomical Society, in 1890. He is best known for his work upon star declinations, undertaken in connection with his work on the boundary survey, which is the most complete investigation of the kind ever executed.

Bossuet, Jacques Bénigne (bos-ü-ä'), a French theologian, born in Dijon, Sept.



JACQUES BÉNIGNE BOSSUET.

27, 1627. At the age of 15 he entered the College of Navarre, where he studied Greek and the Holy Scriptures, read the ancient classics, and investigated the Cartesian philosophy. In 1652 he was ordained priest, and made a canon of Metz, where his piety, acquirements and eloquence gained him a great reputation. In 1670 he was appointed preceptor to the Dauphin, and in 1681 he was raised to the see of Meaux. He drew up the famous propositions adopted by the assembly of French clergy, which secured the freedom of the Gallican Church against the aggressions of the Pope. In his latter years he opposed Quietism, and prosecuted Madame Guyon; and when his old friend Fénelon defended her he caused him to be exiled. He was unrivaled as a pulpit orator, and greatly distinguished for his strength and acumen as a controversialist. The great occupation of his life was controversy with the Protestants. He died in Paris, April 12, 1704.

Bossut, Charles (bos-sü'), a French mathematician, born near Lyons, Aug. 11, 1730; was furthered in his early studies by Clairant and D'Alembert, and was, from 1752 till the Revolution, professor at

Mézières, and, under the Empire, in the Polytechnic Schools at Paris. In the compulsory retirement that followed the Revolution he wrote his famous "Essai sur l'Histoire Générale des Mathématiques." He died in Paris, Jan. 14, 1814.

Bostan, El, a town of Asiatic Turkey; in the vilayet of Aleppo; on the Jihan. The Egyptian Sultan, Bibars, here defeated the allied Turks and Mongolians in a great battle in 1277. Pop. 6,500.

Bostanji, a class of men in Turkey, originally the Sultan's gardeners, but now also employed in several ways about his person, as mounting guard at the seraglio, rowing his barge, etc., and likewise in attending the officers of the royal household.

Boston, a city, capital of the State of Massachusetts; the commercial metropolis of New England; and the fifth city in population in the United States according to the Federal census of 1900. It is built at the W. end of Massachusetts Bay, and comprises Boston proper, East Boston, South Boston, Roxbury, Dorchester, Charlestown, Brighton, West Roxbury, and adjoining territory, giving it, in 1900, an area of about 40 square miles. Old Boston, or Boston proper, occupied a peninsula of about 700 acres, of uneven surface, and originally containing three hills, known as Beacon, Copp, and Fort. These hills caused the early settlers to call the place Trimountain, since changed to Tremont. Boston, East Boston, Charlestown, and South Boston contain the slips of the ocean steamers. Extending about two miles along the harbor and separated from Boston proper by an arm of it, is South Boston, containing large railroad docks and warehouses. Several bridges across Charles river connect the city with Charlestown and Cambridge. The harbor is an indentation of Massachusetts bay, embracing about 75 square miles, with numerous arms, and containing many islands presenting picturesque views. The population of the city, according to the Federal census of 1900, was 560,892, and, according to the census of 1910, 670,585.

Topography.—In the portion of the city lying in old Boston, the streets are noticeably narrow and very irregular. Much has been done toward straightening them since the great fire of 1872. The sections built up on the recovered land of Back Bay are far more regular and handsome in appearance. The Back Bay region has become the most aristocratic part of the city, Commonwealth avenue, 240 feet wide, being one of the handsomest thoroughfares in the country. The financial center of the city is State street; the most noteworthy general retail stores are on Washington, Tremont, and Winter streets; the largest boot and shoe markets in the world are on High and adjacent streets; the wholesale drygoods

establishments are on Franklin, Chauncey, Summer, and neighboring streets; and many of the most popular stores are on Park and Boylston streets. The most popular drives are to Brookline, around Chestnut Hill Reservoir, and through and beyond Franklin Park. The suburbs of the city are exceedingly attractive to the visitor, because of their natural beauty and notable buildings.

Municipal Improvements.—The city has a waterworks system which cost about \$22,250,000. The reservoirs have a storage capacity of 7,850,000,000 gallons, and the water is distributed through about 690 miles of mains. There are in all 480 miles of streets, of which over 370 miles are classed as paved. The sewerage system has upward of 490 miles of pipe. The city is lighted by both gas and electricity, at a cost of over \$650,000 per annum. The average annual cost of the police department exceeds \$1,393,000, and that of the fire department, \$1,200,000. The annual death rate averages 21.08 per 1,000. The net income of the city in 1899–1900 was \$30,969,813, and the net expenditure, \$29,777,897. Street car lines (nearly all electric) traverse the principal streets and extend to the various suburbs. There is also an underground rapid transit system, locally termed the Subway, which has been in successful operation for several years. The Subway is a broad, winding tunnel, or, more properly speaking, a complex network of tunnels, under the very heart of the city. It is nearly two miles long, with a uniform depth of 14 feet; was built and is owned by the city; and cost \$3,618,000. All lines of cars in Boston pass through the Subway, bringing their passengers to and from every section of the city and its wide stretching suburbs. The motive power for driving the cars and lighting and draining the tunnels is electricity.

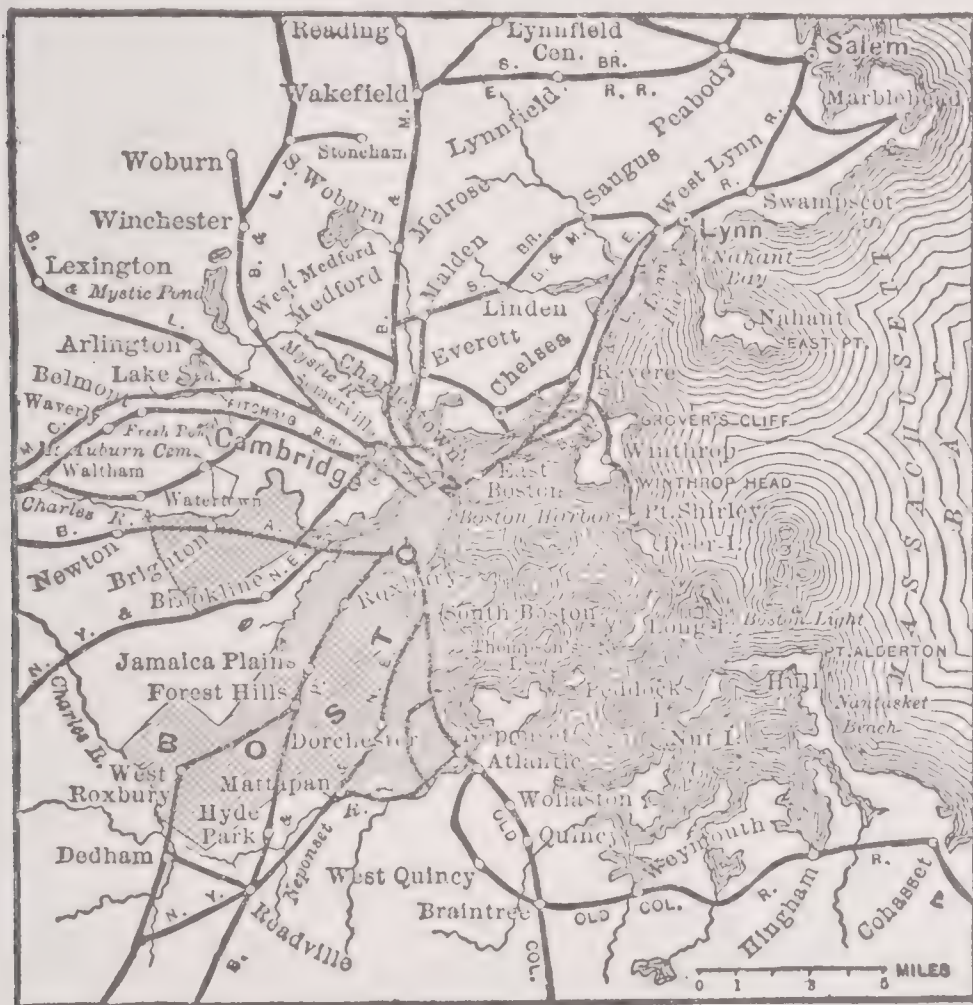
Public Parks.—Boston is especially noted for its magnificent park system, which at the close of the fiscal year of 1899 had cost \$15,196,320, of which \$6,540,138 was for land, and \$8,656,182 for construction. At that time the area of the system was 2,308 acres; there were 38.45 miles of driveways, 70 miles of walks, and 8.7 miles of mall. Among the attractions of the system are the Common, a park of 84 acres in the heart of the city; the Public Garden, separated from it by Charles street, and comprising 22 acres; the Back Bay Fens; the Jamaica Pond; Bussey Park; the Arnold Arboretum; Marine Park at City Point; and the Charles River Embankment. In the Common is a Soldiers' and Sailors' Monument, erected near the site of the famous Old Elm, which was destroyed in a gale in 1876. In the Public Garden are an equestrian statue of Washington, a bronze statue of Edward Everett, a statue of Charles Sum-

Boston

its bound volumes alone in the central library and its branches exceeding 800,000 in 1900, and its collection of pamphlets aggregating about 350,000. In State street is the massive United States Custom-house, built of granite in the form of a Greek cross, which cost, when completed in 1849, \$1,076,000. The Old State-house, erected in 1748, at the head of State street, contains an historical museum in its upper floors, and business establishments in its lower. The City Hall, one of the most striking buildings of the city, on School street, is built of white Concord granite in the Italian Renaissance style, and is surmounted by a dome over 100 feet high. What is considered the most interesting building, historically, in the United States, next to Independence Hall in Philadelphia, is Faneuil Hall, known as "The Cradle of Liberty" erected in 1742, destroyed by fire in

1761, rebuilt in 1768, and remodeled to its present size in 1805. The basement of the building is now used as a market, and the second floor for large public gatherings. The Music Hall, on Hamilton place and Winter street, is one of the finest and most commodious structures of its kind in the country, and near it is Horticultural Hall, an attractive building of white granite, which is used for floral exhibitions, fairs, and other public purposes. Occupying the site of the Old Redoubt on Breed's Hill, in the Charlestown district, is the famous Bunker Hill Monument. (see BUNKER HILL). In the Charlestown district also is located the United States Navy Yard, which, among other objects of interest, contains the largest rope walk in the country, and an immense dry dock.

census of 1900 the city had 7,247 manufacturing establishments, employing \$143,311,376 capital and 80,982 persons; paying \$48,298,309 for wages and \$99,557,019 for materials used; yielding products of an aggregate value of \$206,081,767. The principal industries, according to the value of products, were printing and publishing (\$19,081,495); the manufacture of refined sugar and molasses (\$15,746,547); foundry and machine shop products (\$9,371,928); men's clothing in factories (\$8,601,431); malt liquors (\$7,518,668); carpentering (\$6,879,632); masonry, brick,



temple is a Gothic structure belonging to the Young Men's Christian Union. The Society of Natural History has a handsome building in Berkeley street, and near it is the exceedingly interesting quarters of the Massachusetts Institute of Technology. The Museum of Fine Arts, with priceless collections of statuary, casts, Egyptian antiquities, paintings, and engravings, in Copley Square, is a red brick building with rich terra cotta ornamentations. The new building of the Public Library, which was occupied in 1895, is, next to the Library of Congress, the largest one in the country,

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Boston

and stone (\$4,976,230); bakery products (\$4,566,953); women's clothing, in factories (\$4,455,184); and boots and shoes, in factories (\$3,882,655).

Commerce.—In the fiscal year ending June 30, 1900, the imports of merchandise aggregated in value \$72,195,939, and the exports, \$112,195,555. The movement in gold and silver was, imports, \$134,602; exports, \$27,884. The calendar year 1899, despite the absence of many of the largest freight carriers, broke the record of the city in the line of its foreign trade up to that time; the total deliveries of freight for export by the railroads to the shipping aggregated 1,877,776 tons, an increase over the total of the previous year of 123,487 tons.

Banks.—On Sept. 7, 1899, there were reported 41 National banks in operation, having a combined capital of \$39,600,000; circulation, \$5,710,990; individual deposits, \$147,376,589; resources, \$302,910,605; reserve, \$56,957,524; and surplus, \$14,409,200. There were also 17 savings and 16 cooperative banks in operation. The exchanges at the United States Clearing-house, in the year ending Sept. 30, 1899, aggregated \$6,784,183,997; the second largest in the country, and an increase in a year of \$1,529,911,838.

Boston

schools (largely estimated) 12,681; and the average daily attendance in public day schools were 74,936. There were 1,777 regular teachers; 215 buildings used for public school purposes; and public school property of an estimated value of \$12,000,000. The receipts and expenditures of the year were \$3,090,334. The institutions for higher education include Boston College (Roman Catholic), opened in 1872; Massachusetts Institute of Technology (non-sectarian), opened in 1865; Boston Normal School; Massachusetts Normal Art School; Kindergarten Training School, and Training Schools for Nurses at the Almshouse and Hospital, City Hospital, Children's Hospital, Massachusetts General Hospital, Massachusetts Homœopathic Hospital, New England Baptist Hospital, New England Deaconess' Home and Hospital, New England Hospital for Women and Children, St. Elizabeth's Hospital, Somerville Hospital, and Women's Charity Club Hospital. In the public school system, there were 12 high schools, and of various secondary schools there were 12.

Churches.—The city has upward of 300 churches and chapels, the denominations most numerous represented being the Roman Catholic (48); the Congregational (42); the Protestant Episcopal (41); the



TRINITY (PROTESTANT EPISCOPAL) CHURCH.

Education.—Boston is widely noted for the number and high character of its educational institutions. At the close of the school year 1897-1898, the children of school census age aggregated 83,097; the enrollment in the public day schools was 85,320, and in the private and parochial

Baptist (39); the Methodist Episcopal (36), and the Unitarian (28). A number of the edifices are noteworthy for their historical associations and beauty. The new Old South Church, on Boylston and Dartmouth streets, has an ornate interior and a tower 248 feet high. Trinity Church

Boston

(Protestant Episcopal) is one of the largest and most beautifully decorated churches in the country. It was completed in 1877, at a cost of \$750,000. The First Baptist Church is built in the form of a Greek cross with a campanile 176 feet high, surrounded near the top with a frieze containing colossal statutes in high relief. The Old South Church on Washington and Milk streets was built in 1729, and, during the Revolutionary War was occupied in turn by the Americans and British. The Cathedral of the Holy Cross, built in the mediæval Gothic style, and with a high altar of marble and onyx, is the largest church edifice in New England. Christ Church, near Copp Hill, from which Paul Revere's signal light was displayed, is the oldest church in the city, having been erected in 1722.

Charitable Institutions.—The charitable institutions in the city include, beside the hospitals previously mentioned, the Perkins Institution for the Blind, Soldier's Home, United States Naval Hospital, Marine Hospital, House of Industry, Alms-house, Reformatory, House of Correction, Lunatic Asylum, Parental School, and State Prison. There are also many institutions conducted by religious and other organizations.

Finances.—On Jan. 31, 1900, the total debt of the city and county was \$86,966,579; the sinking funds held, \$27,679,063; and the net debt was \$59,267,517. The assessed valuations for 1900 were, real estate, \$902,486,700; personal property, \$226,644,062—total, \$1,129,130,762, the highest aggregate ever reached. The tax rate was \$14.70 per \$1,000. On the above date the borrowing capacity of the city, under the laws of 1885, was \$6,878,409, and under those of 1891, \$2,474,255. Bonds to the amount of \$1,458,850 inside of the debt limit had been authorized, but were not then issued.

History.—Boston was settled in 1630, by a party of Puritans from Salem. It was named after a town in Lincolnshire, England, from which most of the colonists had come. In 1632 the first meeting house was erected, and in 1635 a public school was built. In the same year the first grand jury in the country met here. A memorable massacre occurred here in 1770, and in 1773 several cargoes of English tea were thrown overboard in the harbor, by citizens exasperated by the imposition of taxes. During the early part of the Revolution the British were quartered in the town. The battle of Bunker Hill was fought on Breed's Hill, within the present city limits, June 17, 1775. Washington forced the British to evacuate in 1776. The city charter was granted in 1822, and in 1872 a great fire broke out in the business portion of the city and destroyed about 65 acres of

Boston Mountains

buildings. This part of the city was soon rebuilt, and, since then, Boston has been one of the most prosperous cities in the United States. THOMAS N. HART.

Boston, a seaport in Lincolnshire, England, 107 miles N. E. of London. Its name is a contraction of Botolph's town, and it is commonly supposed to occupy the site of the Benedictine Abbey founded on the Witham by St. Botolph in 654, and destroyed in 870 by the Danes. The modern town consists chiefly of four good streets, two on either side of the river, here crossed by a handsome bridge. The parish church of St. Botolph measures 283 by 99 feet, and is one of the largest without transepts in England. In 1843 the restoration of the church was commenced, the work continuing 10 years, and over \$50,000 being expended. A chapel to the memory of the Rev. Thomas Cotton, at one time Vicar of Boston, was erected at the expense of the inhabitants of the city of Boston, Mass. A promenade by the river is tastefully laid out, with a people's park, public gardens, and recreation ground adjoining. Boston has also a free grammar, charity, national, and other schools, a guildhall, covered markets for fish, fowls, butter and eggs, a workingmen's college, and school of art. The clearing of the river of silt, the formation of a new channel in 1881, and the opening of a new dock in 1884, have greatly promoted the trade of Boston. The chief exports are coal, machinery, corn, and wool; and the imports consist of timber, maize, cotton seed, and general merchandise. The river and canals furnish communication with Lincoln and several other towns. Boston is a great market for cattle and sheep, and has manufactures of canvas, sail cloth, ropes, sacking, beer, iron, brass, leather, bricks, whiting, and hats, with some ship building. Foxe, the martyrologist, and Herbert Ingram, founder of the "Illustrated London News," to whom a statue was erected in 1862, were natives of Boston. Since the Distribution of Seats Act (1885) Boston returns only one member to Parliament. Pop. of municipal borough (1851) 14,733; of Parliamentary, 17,518; (1891) 14,593 and 18,711; (1901) 15,667 and 20,456.

Boston College, an educational institution in Boston, Mass.; founded in 1864; under the auspices of the Roman Catholic Church and conducted by Jesuit Fathers; has grounds and buildings valued at over \$400,000; income, \$20,000; volumes in the library, 35,000; scholarships, over 50; professors and instructors, about 25; average number of students, 750.

Boston Mountains, a mountain range in Western Arkansas, extending into the Indian Territory; highest summits, 3,000 feet above the sea.

Boston Tea Party, The, a famous exploit preceding the American Revolution. In order to make as emphatic a protest as possible against the British crown's policy of taxing imports, a party of Bostonians, disguised as Indians, threw into the water on the night of Dec. 16, 1773, the cargoes of three English tea ships that had just arrived in the harbor. Enraged at this act, Parliament passed (March, 1774) the Boston Port Bill, taking away from that town the privileges of a port of entry from June 1, 1774, on. This bill aroused much indignation in the colonies and was an important factor in precipitating the outbreak of hostilities.

Boston, The, a single screw, steel, protected cruiser of the United States Navy; 3,189 tons displacement; length, 270 feet 3 inches; breadth, 42 feet; mean draft, 17 feet; horse power, 4,030; main battery, six 6-inch and two 8-inch breech loading rifles; secondary battery, two 6-pounder and two 3-pounder rapid-fire guns, two 1-pounder rapid-fire cannons, two 47-millimeter Hotchkiss revolving cannons and two Gatlings; speed, 15.6 knots; crew, 19 officers and 265 men; cost, \$809,923.44. The "Boston" was with Admiral Dewey's fleet and took a prominent part in the battle of Manila, May 1, 1898.

Boston University, a co-educational institution in Boston, Mass.; organized in 1869 under the auspices of the Methodist Episcopal Church; has two departments, the Colleges of Liberal Arts, and of Agriculture, for which a preliminary collegiate education is not a qualification; three, the Schools of Theology, Law and Medicine, for students who have taken a course in liberal arts; and a department for post graduate work in language, philosophy and science, known as the School of All Sciences. There is a special affiliation between the School of All Sciences and the National University at Athens, Greece, and the Royal University in Rome, Italy. The university has buildings valued at over \$1,600,000; aggregate endowment funds, over \$2,000,000; volumes in the libraries, upward of 60,000; professors and instructors, 150; students in all departments, about 2,000; scholarships, 110; fellowships, 2; graduates, over 7,000.

Boswell, James, a Scotch biographer; the son of Lord Auchinleck; born in Edinburgh, Oct. 29, 1740. He was educated at Edinburgh, and studied law there and at Glasgow, and early displayed literary tastes. In 1763, when on a visit to London, he was introduced to Dr. Johnson, and though this first meeting was not very hopeful for the future, a warm friendship soon sprang up between them. In 1765, in view of becoming a member of the Scottish bar, Boswell

went to study law at Utrecht, and before returning he visited Berlin, Switzerland, Paris, Italy, Corsica, etc., and made the acquaintance of Voltaire, Rousseau, and Paoli, who was then at the head of the Corsican party of independence. Returning in 1766 he was admitted an advocate, but the practice of his profession was little to his taste. In 1768 he published a history of Corsica, with a lively account of his own experiences in the island. The same year he again met Johnson in London, and his intercourse with him was kept up by many subsequent visits to the metropolis; while Johnson himself went to Scotland in 1773, when the pair made their famous journey to the Hebrides.

This year also Boswell became a member of the famous Literary Club, with various members of which, such as Burke and Reynolds, he was on terms of intimacy. In 1769 he had married, but he continued mainly dependent on his father till the latter's death in 1782, when he succeeded to the estate. In 1784 he met Johnson for the last time at a dinner at Sir Joshua Reynolds's. Two years after (1786) came out his "Journal of a Tour to the Hebrides with Samuel Johnson, LL. D." Having latterly been admitted to the English bar, he went on circuit and held for a year or two the recordership of Carlisle; and from 1788 onward he mostly resided in London. In 1791 appeared his "Life of Johnson," a work which he had been long preparing, and which at once gave readers the same delight as it has ever since inspired. A second and enlarged edition came out in 1793. By this time Boswell's health had greatly suffered from his too convivial habits, and he died in London May 19, 1795, having been a widower since 1790.

Boswell was a singular compound of sense and folly, of genuine ability and foible bordering on craziness. His good nature was universally admitted; his vanity and want of self-respect and self-control were his most evident faults. His weaknesses were easily seen, but the man who enjoyed the sincere affection of Dr. Johnson and the enduring friendship of Burke and Reynolds had better stuff in him than appeared to the superficial observer. His "Life of Johnson" is such a masterly performance as only genius for life-portraiture could have produced. Among editions of the life may be mentioned that of Croker (10 vols.), and those of Rev. A. Napier (Bohn's "Standard Library," 6 vols.), and Dr. Birkbeck Hill (Clarendon Press, 6 vols.), all containing the "Tour." See Macaulay's "Essay," and the much more humane and penetrating "Essay" of Carlyle. Boswell left two sons. The elder, ALEXANDER, born in 1775, succeeded to the family estate, sat for a year or two in Parliament, and was created a

baronet in 1821. He wrote several well-known Scottish songs, and issued reprints of rare old works in the Auchinleck library. In 1822 he met his death in a duel with a Mr. Stuart, against whom he had made some severe attacks in a political journal. JAMES, the second son, born in 1779, died in 1822, was the editor of an improved edition of Malone's Shakespeare, generally known as the "Variorum Shakespeare" (21 vols. 1821); he was also the author of a "Memoir" of Mr. Malone.

Botallack, the name of a famous mine on the W. coast of Cornwall, England, 8 miles N. of Land's End. The works are on the edge of the cliff; part of the underground workings (abandoned in 1875) extended 2,448 feet beneath the sea. The mine has been wrought for both tin and copper.

Botanic Gardens, establishments in which plants from all climates are cultivated for the purpose of illustrating the science of botany, and also for introducing and diffusing useful or beautiful plants from all parts of the world. Until modern times their sole design was the cultivation of medicinal plants. In Great Britain the chief gardens are those of Kew, Edinburgh, and Dublin. On the European continent the chief are the Jardin des Plantes at Paris, founded 1634; and those of Berlin, Copenhagen, Florence, etc. In the United States the chief are those of New York, Washington, Philadelphia, and Cambridge.

Botany (Gr. *botanē*, fodder, herb, plant), or **Phytology** (Gr. *phyton*, plant, and *logos*, discourse), the science which treats of the vegetable kingdom. It thus forms one of the two great divisions of biology, or the science of organization and life, the other being zoölogy.

Plants may be studied from several different points of view. The consideration of their general form and structure, and the comparison of these in the various groups from the lowest to the highest, constitute morphology. The study of the outer form is called external, that of the inner structure, internal morphology. Physiology treats of their functions and of the life processes of the plant as a whole. Systematic botany considers the arrangement of plants in groups and sub-groups according to the greater or less degree of resemblance and genetic relationship between them. It comprises taxonomy, or the principles of classification; terminology, dealing with the technical nomenclature for the various parts of plants; and phytography, or the proper principles of plant description. Geographical botany tells of their distribution on the surface of the earth, while palæobotany or fossil botany affords an explanation of plant life in the successive geological strata which make up the earth's

crust. Economic botany comprises the study of the products of the vegetable kingdom as regards their use to man. Vegetable teratology treats of monstrosities or departures from normal type in the vegetable kingdom, and the nosology of plants comprises a systematic account of the diseases, both general and special, to which they are subject. Various other terms, such as organography, organogeny, etc., are in occasional use as names of portions of botanical science, but most of these are either unnecessary or so variously used as to become misleading. No generally accepted arrangement of the divisions of botany yet exists.

The simplest plants are very minute, and can only be studied by use of the compound microscope. A little rain-water which has been standing some time when thus examined is found to contain a number of roundish green objects, each of which is an individual plant, consisting of one cell only, with an external limiting membrane or cell wall of a substance known as cellulose, within which is granular, viscid protoplasm. The protoplasm contains special chloroplasts to hold the green coloring matter, chlorophyll, and also an oval darker body, the nucleus. *Protococcus* (or *Hæmatococcus*) *pluvialis*, as this little plant is called, though so simple, is yet able, by virtue of the living protoplasm, to take up food from the water around it; to work that food up into more cellulose and protoplasm so as to increase in size; and, finally, to produce new individuals, more *protococci*, by a process of cell division. If we imagine *Protococcus* to elongate considerably and be repeatedly divided across by cell walls, we get a row or filament of cells, a very common form among the low orders of plants; the masses of green threads seen floating in ditches in the spring and summer consist of such a filamentous plant called *Spirogyra*. Or we may have a single flat sheet of cells, as in the delicate green sea weed *Ulva*. Increased complexity of structure is exemplified in many of the ordinary sea weeds, the stalk and more or less flattened expansions of which are several to many cells thick, the external cell layers differing somewhat in structure from the internal. But we cannot distinguish in any of these between a stem, leaf, or root, as we can, for instance, in the more highly differentiated fern. Plants in which such a distinction cannot be drawn are called *Thallophytes*, and their whole body a *thallus*. *Thallophytes* can be divided into two classes: *Algæ* and *Fungi*. The former are distinguished by the presence of the green coloring matter *chlorophyll*, which is of vital importance in the physiology of the plant; sometimes the green color is obscured by the presence of a brown or red compound, as in the brown and red sea weeds. The *Fungi* contain no *chlorophyll*, and also differ in being com-

posed of numbers of delicate interlacing tubes or *hyphæ*, often forming, as in the mushroom, quite large and complicated structures. *Lichens* are an interesting class between *Algæ* and *Fungi*, inasmuch as they are built up of an alga and a fungus, which live together and are mutually dependent on each other — the alga supplying the fungus with organic food and receiving from it dissolved salts and water as well as shelter in the fungus body. The host-plants on which the lichen *fungi* depend for their existence are very small (one- or few-celled *algæ*), and are completely enclosed within the mycelium of those *fungi*.

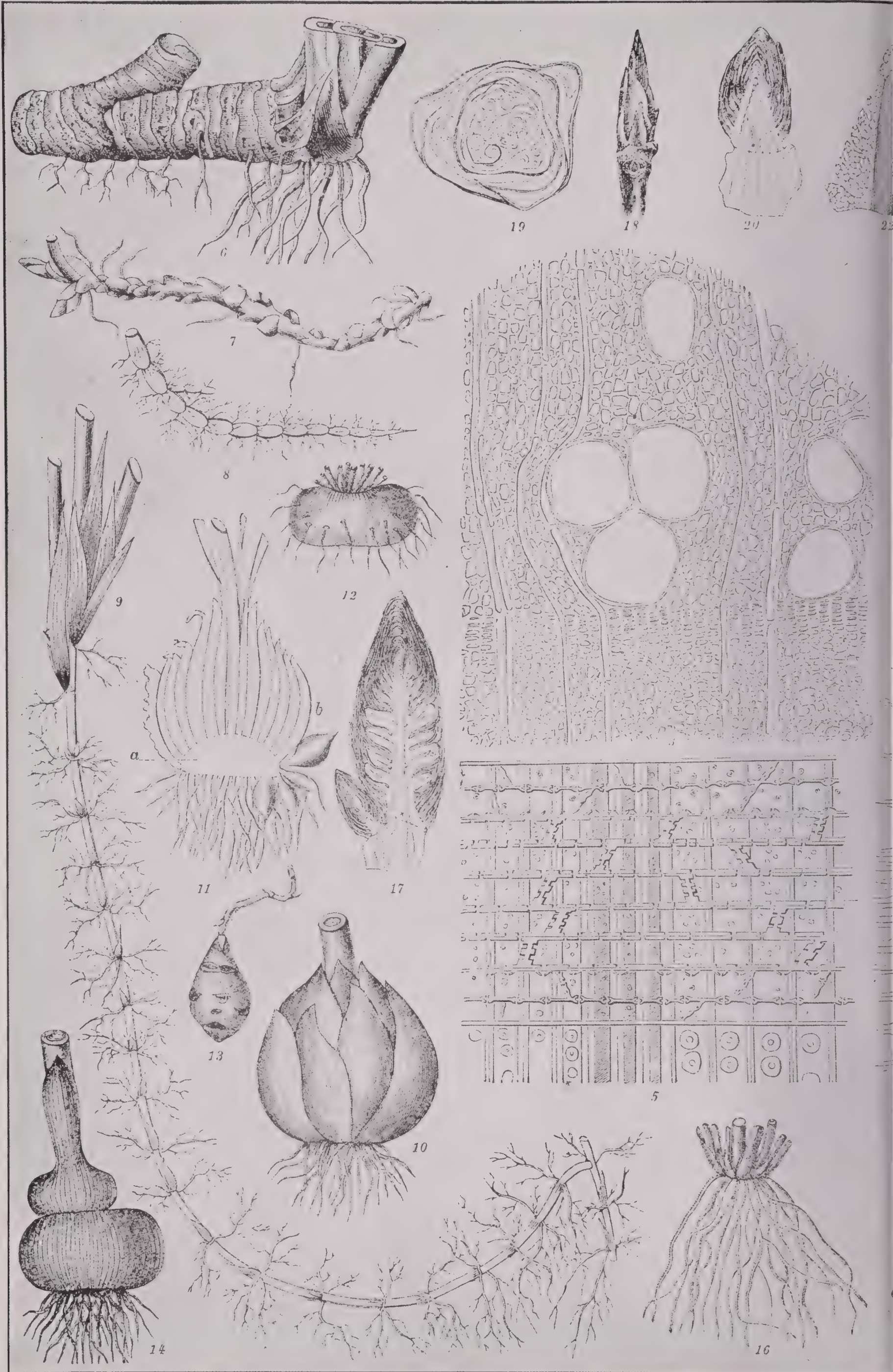
Going a step higher we reach the *Hepaticæ* or liverworts, in which we can trace a transition from the thallus-plants or *Thallophytes*, to the stem-plants or *Cormophytes*. Above these are the mosses, where, for the first time, we distinguish a clear differentiation of the part of the plant above ground into a stem and leaves borne upon it. The stem is attached to the soil by delicate colorless hairs — root-hairs, but though these perform the office of roots they are quite distinct in origin and structure from the roots of higher plants. The structure of mosses is very simple, and the leaves are usually thin plates of cells. In them we note what is known as an alternation of generations. The moss plant proper is the *Gametophyte* or sexual generation, and it produces male organs, *antheridia* and female organs, *archegonia*. By the fertilization of the *oosphere* of the latter by the *antherozoids* of the former a cell is produced capable of generating into a new plant. This new plant is, however, quite distinct from the moss plant. It consists of a stalk and capsule or case containing spores; from the spore develops a mass of entangled thread-like bodies called *protonema*, from which moss plants proper will in due course be budded off. It is therefore a sporophyte or asexual generation. Rising still higher to the fern-like plants, including the Ferns proper, *Equisetums* (horse-tails), and *Lycopods* (club-mosses), we notice a great advance in complexity both of external form and internal structure. The leaves are large, often much branched, the stem stout and firm, while instead of the few simple hairs which was all the indication of a root system to be found in the moss, there are well-developed true roots. Microscopic examination of sections of stem, leaf or root show great differences in structure between various groups of cells; there is, in fact, marked differentiation of tissues. A tissue is a layer, row, or group of cells which have all undergone a similar development; by differentiation of tissues we mean that various layers, rows, or groups have developed in different ways, so that we can make out and mark by distinctive names the elements

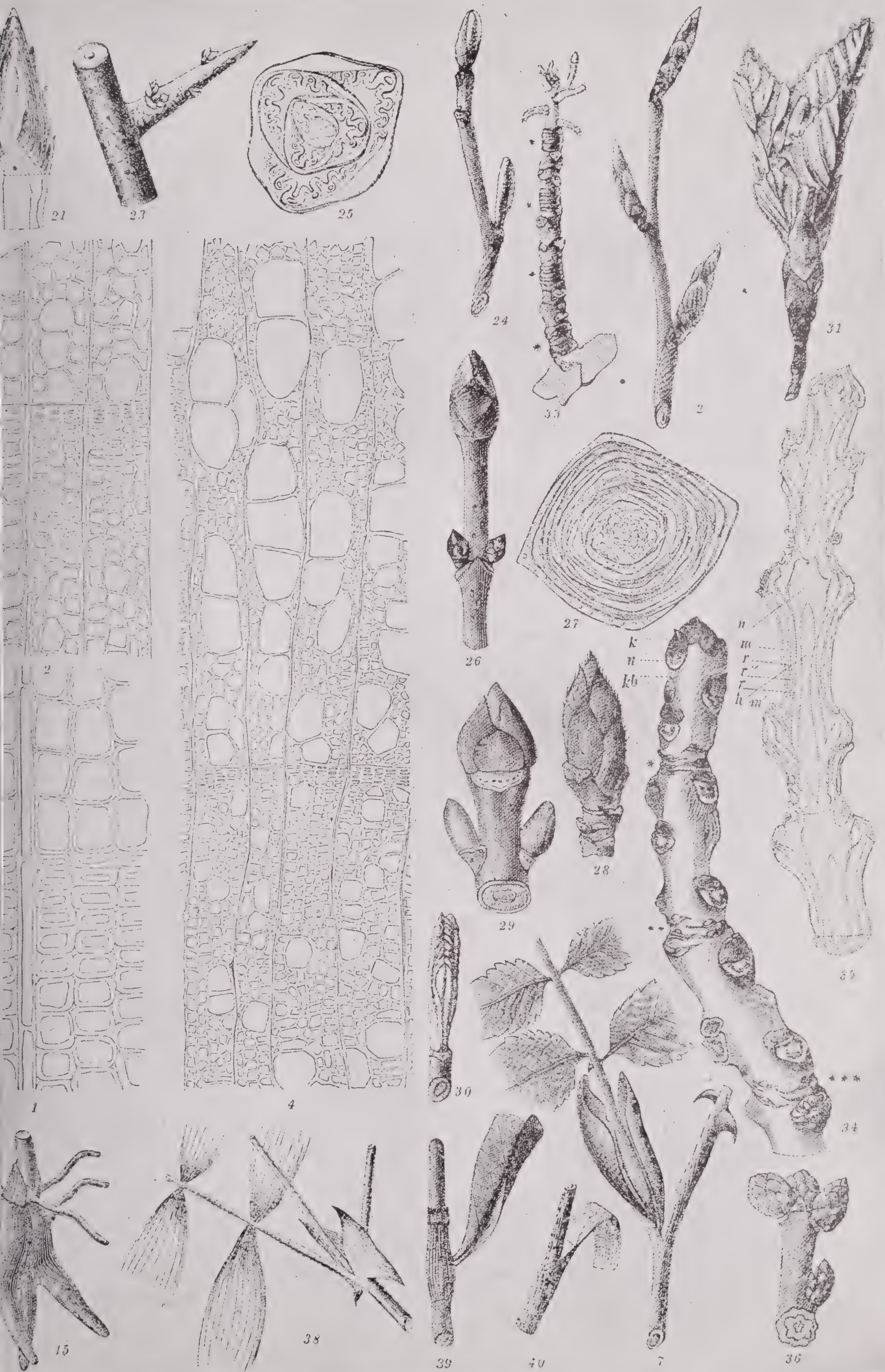
of which a stem or leaf is built up. The structure of *Thallophytes* and mosses is very simple, but in the ferns, besides other well-marked tissues, we meet with one of so great importance in the higher plants, and so constantly present, that it is used as a distinctive characteristic of all the plants above the mosses. Ferns and flowering plants which contain this vascular tissue are known as vascular plants, in contrast to the *Thallophytes* and mosses, or cellular plants, where it is not found. Microscopical examination of a very thin longitudinal slice of the stem, root, or leaf-stalk of a vascular plant shows bundles of long cells running lengthwise, the walls of which are not uniformly thin, as in the cells making up the groundwork of the portion examined, but are covered with curious markings which are seen to represent local thickenings of the walls, thin places, or pits, being left between them. These cells, which are quite empty, are the wood cells; they are placed end to end, and when, as frequently occurs, the end walls separating the cavities of two cells become absorbed, a wood vessel is formed. Near the elements of the wood, but differing greatly from them in their delicate unchanged walls and thick viscid contents, are the bast vessels, or sieve tubes, so called from the end-to-end communication between two cells being established, not by absorption of the whole wall, but by its perforation at numerous spots forming a sieve arrangement. This combination of wood and bast vessels forms the essential part of what is therefore known as vascular tissue (see Plate III). In the ferns and their allies a well-marked alternation of generations also exists, but with this difference from the mosses, that the plant proper or the prominent generation is the asexual one or the sporophyte. On the back of the frond of a fern there will be seen at the proper season a series of small brown bodies called *sori*. Each sorus contains a number of still smaller *sporangia* or spore cases, which again inclose the spores. From these spores on germination there develops the gametophyte or sexual generation, which in this case is called a *prothallium*. These prothallia are small liverwort-like bodies which produce on the under-surface antheridia and archegonia, by means of which a fern-plant is again produced. In most of the ferns, horse-tails, and club-mosses the spores are all of one kind in each species, and the prothallia are developed entirely outside them; but in the higher vascular cryptogams, including the *Marsileaceæ*, *Salvinaceæ*, *Selaginelleæ*, and *Isoëtææ*, we find male and female spores produced in each species and a gradually increasing inclosure of the prothallium within the spore. The larger spores, the female or *macrospores*, produce prothallia bearing only archegonia, while the small male *microspores*

BOTANY.—ROOTS, LEAF-BUDS, WOODY TISSUE, &c.

FIG.

1. Cross-section of the wood of the Spruce Fir.
2. Cross-section of the Lime Tree.
3. Cross-section of the Ash.
4. Cross-section of the Aspen.
5. Radial longitudinal section of the wood of the Spruce.
- 6-9. Rhizomes.
- 10, 11. Bulbs.
- 12, 13. Tubers.
- 14, 15. Corms.
16. Fibrous Root.
- 17-36. Figures illustrative of growth and structure of Leaf-buds and young Shoots.
- 37, 38. Stipules of Leaves.
39. Ochres.
40. Ligula of Grass.





produce prothallia bearing only antheridia.

Phanerogams, or flowering plants, represent the highest group of plants: Seed plants, or *Spermaphyta*, is a better term, as they differ from those already described in the production of a seed in which the embryo is completely inclosed. The much greater variety in form and structure seen in them as compared with the ferns justifies us in regarding them as the highest group in the vegetable kingdom; but botanists are now agreed in considering the old classification of plants into *phanerogamia* and *cryptogamia* as wrong in placing groups of very different rank on the same level. In flowering plants the process of inclosing the prothallium within the megaspore is carried further, and the prothallia themselves, both male and female, become minute, transformed, and in a sense degenerate. The megaspores are now known as embryo sacs and the *megasporangia* as ovules; and in the angiosperms these ovules are themselves inclosed in a chamber called an ovary. The microsporangia are the pollen sacs, inclosing the microspores, now called pollen-grains. The sporophylls or leaf-like bodies on which the two kinds of spores were formed take the characteristic forms of stamens (the male sporophylls) and carpels (the female sporophylls). Moreover, by the confining of the growth of these stamens and carpels to definite parts of definite shoots, by their arrangement in whorls or spirals, and by surrounding them with protective envelopes, the calyx and corolla, the flower proper is produced. Hence the reason of the name flowering plants. They are divided into two classes. (1) Those in which the seed is developed on an open leaf, termed a carpel, and called therefore *Gymnosperms* (Gr. *gymnos*, naked, and *sperma*, seed); and (2) those in which the seed is developed in a closed chamber or ovary, formed by the folding together of one or more carpels, and called accordingly *Angiosperms* (Gr. *angion*, vessel). To the former belong the *Conifers* (*Coniferæ*)—pines, firs, yew, larch, spruce, cypress, etc.—and the exotic orders of *Cycads* (*Cycadeæ*) and *Gnetaceæ*; to the latter the rest of our trees and the enormous number of field and garden plants which are not ferns or mosses. Angiosperms again are subdivided into Monocotyledons, where the embryo or young plant contained in the seed has only one primary leaf or seed leaf; and Dicotyledons, where an opposite pair of such leaves is present. This distinction between one-cotyledoned and two-cotyledoned plants is the index to many other important differences of structure, such as the nature and arrangement of the vascular bundles, the veining and shape of the leaves, the number of parts in the flower whorls, etc. Like the vascular cryptogams, Phanerogams are differentiated into a shoot portion above the ground, consisting of a

stem bearing leaves, and a subterranean root portion. Both stem and root are often copiously branched, so that one individual may cover a large area both above and below ground. Stem, leaves, and roots all show great variety in form and adaptation. The embryo, or rudimentary plant (see Plate II., figs. 56–61) contained in the seed, consists of a very short axis or stem, bearing one (in Monocotyledons), two (in Dicotyledons), or several (in many Gymnosperms) primary leaves, the cotyledons, above which it terminates in a little bud or plumule, while below them the axis passes into the primary root or radicle. When the seed germinates, the radicle is the first to protrude between the separating seed coats, and, growing downward, fixes itself in the soil. Then the plumule grows out, accompanied or not, as the case may be, by the cotyledons, which have hitherto concealed and protected it, and by rapid growth soon develops into a stem bearing leaves. The stem produces buds and branches, and continues growing throughout the life of the plant; but while in Gymnosperms and Dicotyledons it also continually increases in thickness through its whole length, Monocotyledons are distinguished by the fact that when once the stem has reached a certain thickness its diameter usually remains unchanged. The same rule applies to the branches. The cause of this difference is found in the internal structure. In the Gymnosperm and Dicotyledon (see Plate III.) a transverse section in a very young stage has the following appearance: Starting from the outside we have: (1) A single protective layer of cells with thick external walls, the epidermis. (2) Inside this, and forming what is called the cortex, are a number of thin-walled cells arranged like bricks in a wall, or touching only at their rounded edges, and leaving intercellular spaces. Such an arrangement, where the cells are not much longer than broad, is called a *parenchyma*. (3) Within the cortex is a ring of vascular bundles, each consisting essentially of a little group of bast vessels toward the outside and wood vessels on the inside, separated by a single layer of cells, the cambium layer. (4) Within the ring of bundles is the pith, of parenchyma like the cortex, and united to it by strands of similar parenchymatous cells passing between the bundles and known as medullary rays. As the young stem grows, however, the cambium between the bundles starts a development of fresh bast, parenchyma, and wood, so that instead of a number of separate bundles there is a complete vascular ring. The cambium ring remains in active growth throughout the whole life of the plant, and by producing new bast on the outside and wood on the inside causes continual increase in thickness. The epidermis which would of course soon give way

beneath the strain of the growth inside, is replaced by a protective layer by the bark, development of which keeps pace with increase in diameter. Now in the young monocotyledonous stem, instead of a few bundles arranged in a ring separating pith from cortex, a great number are scattered through the whole internal parenchymatous tissue, so that we cannot distinguish any pith at all. The bundles, moreover, have no cambium layer, so that when once formed their development is complete, and there is no increase in thickness. Such bundles are described as closed, while those of dicotyledonous plants are known as indefinite or open bundles. Stems, which may be simple or branched, are either aerial or subterranean. Aërial forms are, (1) erect, as the trunks of trees, or the more slender stems of most herbaceous plants, or the hollow culms of grasses; (2) prostrate, as the creeping runners of the strawberry; (3) ascending, when they rise obliquely upward; (4) decumbent, trailing but ascending at apex; (5) creeping, prostrate and rooting at intervals; or (6) climbing, in which case they may either twine round a support, like the hop; or hold on by means of prickles, like the bramble; or more usually by tendrils, as in the vine; or, finally, by roots given off from the stem, as in the ivy. Examples of subterranean stems are, (1) the rhizome (Plate I., figs. 6-9), a horizontal stem sending forth aërial shoots from its upper and roots from its lower surface, as in the iris, the peppermint, the sand sedge, etc.; (2) the tuber (Plate I., figs. 12-13), a much-swollen fleshy underground branch, like the potato, the eyes of which are buds; (3) the bulb (Plate I., figs. 10-11), a very short undeveloped stem with overlapping fleshy leaves, as in the lily and the onion; (4) the corm or solid bulb (Plate I., figs. 14-15), a sort of bulb in which the main body consists of the thickened axis, the scales being few and small, as in crocus, colchicum, etc.

Branches proceed from buds which are formed in the autumn in the axils of the leaves, that is, at the point where the leaf or leaf-stalk is joined on to the stem; they remain dormant through the winter, and grow out into new shoots in the spring. These buds are simply contracted shoots in which, though the leaves have been produced as usual, the axis, owing to weather conditions, has not elongated; and when in the spring this elongation is resumed the bud takes on the ordinary form of the shoot (Plate I., figs. 17-36). Branching by dichotomy or forking, that is, by the division of an apex into two, is common among cryptogams, but in flowering plants it is almost unknown. Branches usually arise from the sides of the parent shoot, just behind the growing point, or, as it is called, in *acropetal* succession.

The leaf is borne on the stem; its tissues, epidermal, cortical, and vascular, are continuous with those of the stem; but it is distinguished by the fact that its growth is limited, and thus it soon reaches the normal size and stops growing. The places where leaves come off from the stem are called nodes. There is great variety both in the position and form of leaves. Their position is said to be radical when they are all borne close together at the base of the stem, as in the dandelion; or cauline, when they are borne on the upper parts; in the latter case they may have a whorled arrangement, where several come off at the same level in a circle round the stem, as in the herb Paris and goose grass; or opposite, where two stand on opposite sides at each node, as in the gentians, lilac, etc.; or alternate, where only one comes off at the same level. The study of leaf arrangement is known as *phyllotaxis*. A leaf may be stalked or sessile; if sessile, the blade is joined directly on to the stem. The stalk is known as the petiole, the flattened expanded blade as the lamina. The leaf may be simple (Plate II., figs. 1, 2, 3, 4, etc.) or compound (Plate II., figs. 7 and 8). A simple leaf cannot be divided without tearing the lamina; while a compound leaf is made up of independent leaflets, which may all come off from the same point as in the horse chestnut, which is the *digitate* or *palmate* form (Plate II., fig. 5); or may be arranged along a continuation of the petiole, as in the ash, which is the *pinnate* form of a compound leaf (Plate II., figs. 7-8). The ternate leaf may be regarded as an intermediate form; in it there are three leaflets springing from nearly the same point, as in the strawberry. A simple leaf, or a leaflet of a compound leaf, is described in respect of shape, tothing, etc., by various terms. In shape it may be (1) linear, as in grasses; (2) lanceolate, or lance-shaped; (3) elliptical; (4) ovate, or egg-shaped (Plate II., fig. 2); (5) orbicular, or circular; (6) cuneate, or wedge-shaped; (7) spatulate, as in the daisy; (8) cordate, or heart-shaped; (9) reniform, or kidney-shaped; (10) sagittate, or arrow-shaped; (11) hastate, or halberd-shaped, etc. As regards its apex, it may be acute (Plate II., fig. 2), obtuse (Plate II., fig. 1), emarginate or notched (Plate II., fig. 7), etc.; and its edge may be entire or untoothed (Plate II., fig. 1); serrate (Plate II., fig. 2), with small sharp teeth pointing forward; dentate, when the teeth point outward; crenate, with rounded teeth; sinuate, with wavy outline; incised or jagged, when irregularly toothed, etc. When the incisions of the edge penetrate deeper, the leaf becomes lobed (Plate II., fig. 3), and this lobing may be, according to the venation of the leaf, pinnate or palmate. The deeper lobings may be called

pinnatifid, pinnatipartite, or pinnatisect (Plate II., figs. 4 and 6). At the foot of the petiole of the leaf in many plants, such as the rose, the peas, and the vetches, two small leaf-like bodies, called stipules, are found. Leaves with stipules are described as stipulate; others are exstipulate (Plate I., figs. 37-40). The tissue of the lamina is traversed by vascular bundles, which are continuous through the petiole with those of the stem. The infinite variety of their ramifications is the cause of the often very characteristic venation of the leaves. In Dicotyledons the veins and veinlets usually form a sort of network, and the leaves are then known as net-veined or reticulated. In Monocotyledons, on the other hand, the main veins usually run in a sort of parallel manner along the length of the leaf, and are connected by cross veinlets forming a kind of lattice work; these are called parallel-veined leaves. Net-veined leaves, again, may have the main veins arranged in a palmate manner, when they are called palmately-veined, or in a pinnate manner, when they are described as pinnately-veined, the main central vein being called the midrib of the leaf. Leaves are said to be deciduous when they fall annually, as they do in the most common forest trees; or persistent when they last longer, as in the firs, laurels, etc. Leaves or leaflets are often very much modified or metamorphosed; thus the spines of the cactus are metamorphosed or modified leaves; many tendrils, such as those of the pea tribe, are leaflets; the curious pitchers of some plants are modified leaf-stalks. When we consider the flower we shall find that its various members are all more or less modified leaves.

In Dicotyledons and Gymnosperms the primary root or radicle after emerging from the seed continues to grow vigorously, often with copious lateral branching, forming an extensive root system; but in Monocotyledons it soon perishes, and its place is taken by roots developed from the base of the stem; such roots are called adventitious, or, more properly in this case, secondary. Adventitious roots occur also in Dicotyledons, as in creeping stems like the strawberry, which bears buds at intervals from which new shoots are formed and roots given off. The clinging roots of the ivy are also adventitious. There are many forms of roots: some are large and woody, as those of trees; others fibrous, as in grasses (Plate I., fig. 16); or they may be greatly swollen, forming tap-roots, such as the fleshy globose root of the turnip, or the conical one of the carrot. Such fleshy developments are due to the plant storing up a quantity of reserve food material in the first year on which to draw in the second, when it will want to expend all its energy in flowering and fruiting. The potato, which is a swollen stem, answers the same purpose. The

mistletoe and other parasites give off sucker-like roots which penetrate into the tissues of their host.

As to their reproduction, plants may be asexual, that is, not requiring the coöperation of two distinct (male and female) elements to produce a new individual; or sexual, when two such elements are necessary, and a process of fertilization takes place in which the female cell is impregnated by one or more male cells, and the cell resulting from the fusion of the two gives rise by very extensive growth and division to a new individual; or, as in many cryptogams, they may reproduce their species both asexually and sexually, or in more or less regular rotation. In the very lowest plants, like *Bacteria*, only asexual reproduction is known, but in most *Thallophytes* both forms occur. In the higher forms of these latter numbers of small cells called spores or conidia are produced which on germination give rise to a plant similar to that which bore them. In the sexual process the contents of a male organ (usually called an *antheridium*) escape and impregnate the oösphere, or female cell contained in the female organ (usually known as an *archegonium*). The fertilized oösphere is termed an oöspore, and by growth and division gives rise to a plant like that on which it was produced. In mosses and fern-like plants both sexual and asexual reproduction occur; but here, as explained above, the life history of the plant is divided into two stages, one in which it exists as an asexual individual, another in which it is sexual. What we call a fern is in reality the sporophyte or asexual individual producing spores. The spores when set free germinate on a damp surface and produce not a new fern plant, but a tiny green heart-shaped cellular expansion, called a prothallium, attached to the substratum by delicate root-hairs. Microscopical examination of its under surface reveals the sexual organs (the antheridium) producing motile male cells, which escape, pass into the female organ, and fertilize the oösphere, which then becomes the oöspore. The oöspore does not produce a new prothallium, but a fern plant like the one with which we originally started. The cycle is thus complete.

The flower (Plate II., figs. 27-38) of a seed plant is a shoot modified for purposes of reproduction. A buttercup, for instance, consists of a number of modified leaves borne in several whorls on the somewhat expanded top of the stalk, the receptacle or thalamus. Dissection of the flower shows: (1) An outer whorl of five green or greenish-yellow leaves, very like ordinary foliage leaves; these are the sepals, and together make up the calyx. (2) An inner whorl of five yellow leaves, composing the corolla, each leaf being a petal; this is the most conspicuous part of the flower. (3) More

or less protected by the petals are a great number of stamens, arranged in circles, each consisting of a slender stalk or filament capped by an anther, a little case containing the dry powdery pollen. The stamens are really much modified leaves; collectively they form the *andræcium*. (4) The rest of the receptacle right up to the apex is also covered by very much modified seed-like leaves, spirally arranged, the carpels, forming the pistil or *gynæcium*. Each carpel consists of a basal portion, the ovary, in which is contained an ovule, and of a terminal beak-like portion, the style. The *andræcium* and *gynæcium*, being the parts directly concerned in reproduction, are distinguished, as the essential organs of the flower, from the calyx and corolla, which are only indirectly so concerned, though of great importance in the process. The ovule (Plate II., figs. 43-59) contained in the ovary is equivalent to the spore, or rather spore case, produced by the fern, but instead of escaping and producing an independent sexual individual it remains in the ovary, where processes go on within it corresponding to those resulting in the formation of the free and independent prothallium of the fern, and finally an oösphere is produced. Pollen from the stamen of the same or another plant has meanwhile been brought on to the special receptive portion of the style known as the stigma, where it protrudes a long tube which reaches right down through the style to the ovule. This tube contains the male nucleus; it comes into close contact with the oösphere and fertilizes it. The oösphere then becomes an oöspore, which by growth and division forms the embryo or new plant, while still included in the coats of the ovule. The ovule thus becomes the seed, which ultimately leaves the mother plant, bearing with it the embryo.

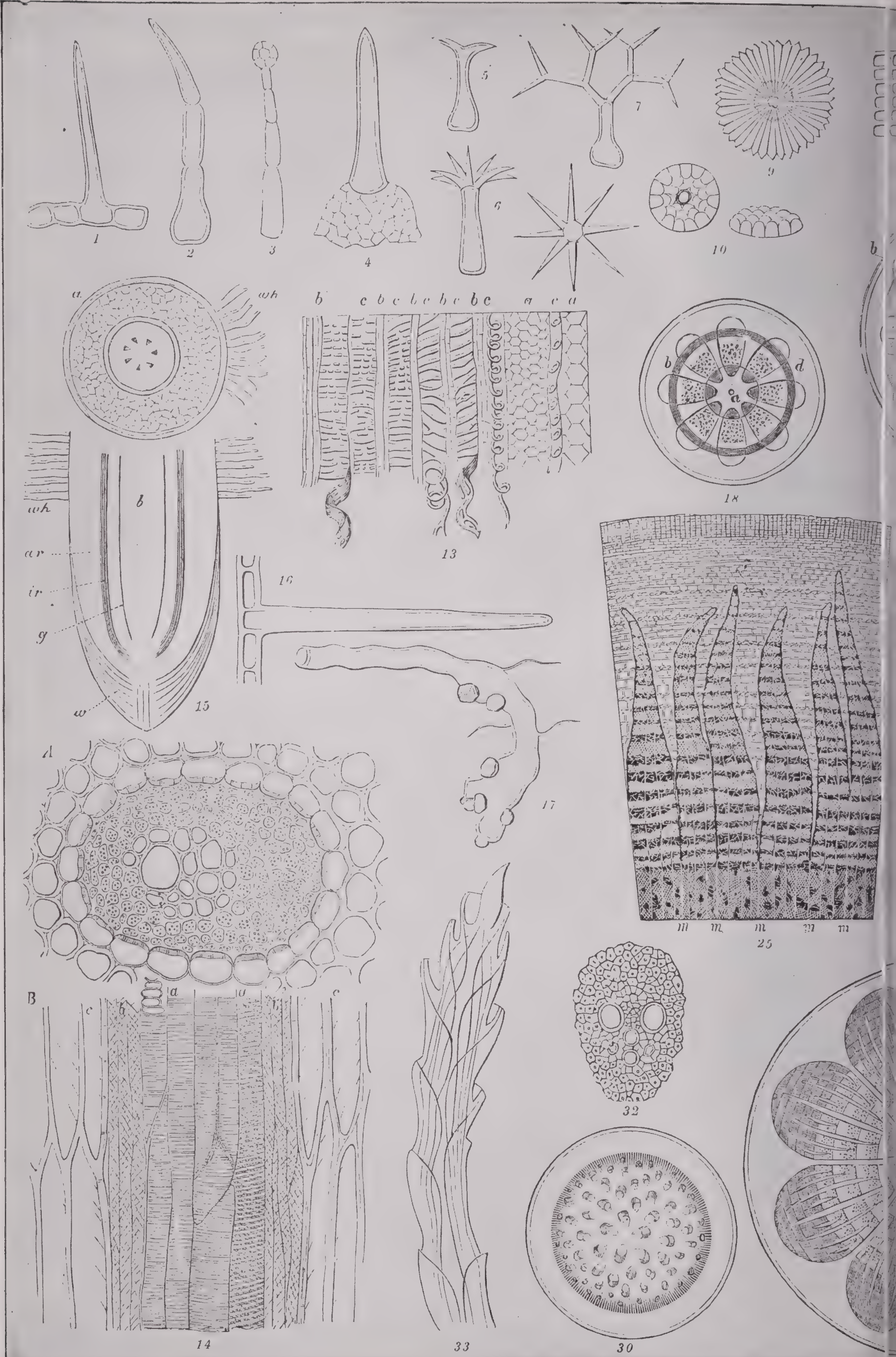
In the buttercup the members of each whorl of leaves composing the flower spring from the receptacle quite independently of each other and of those of adjoining whorls. In many flowers, however, cohesion takes place between the similar members of a whorl; thus the petals frequently cohere to a greater or less distance from their base, and two great divisions of the Dicotyledons depend on this condition, namely, *Poly-petalæ*, where the petals are free, as in the buttercup and poppy; and *Gamopetalæ*, with more or less coherent petals, as in the harebell and primrose. Likewise the calyx may be, as in the buttercup, *polysepalous* (or *chorisepalous*) or *gamosepalous*; and similarly the *gynæcium*, instead of being composed of free carpels as in the buttercup, the *apocarpous* condition, may be formed by the cohesion of several carpels into one- to several-chambered compound ovary, as in the snap-dragon, when it is said to be *syncarpous*. A *gynæcium* of

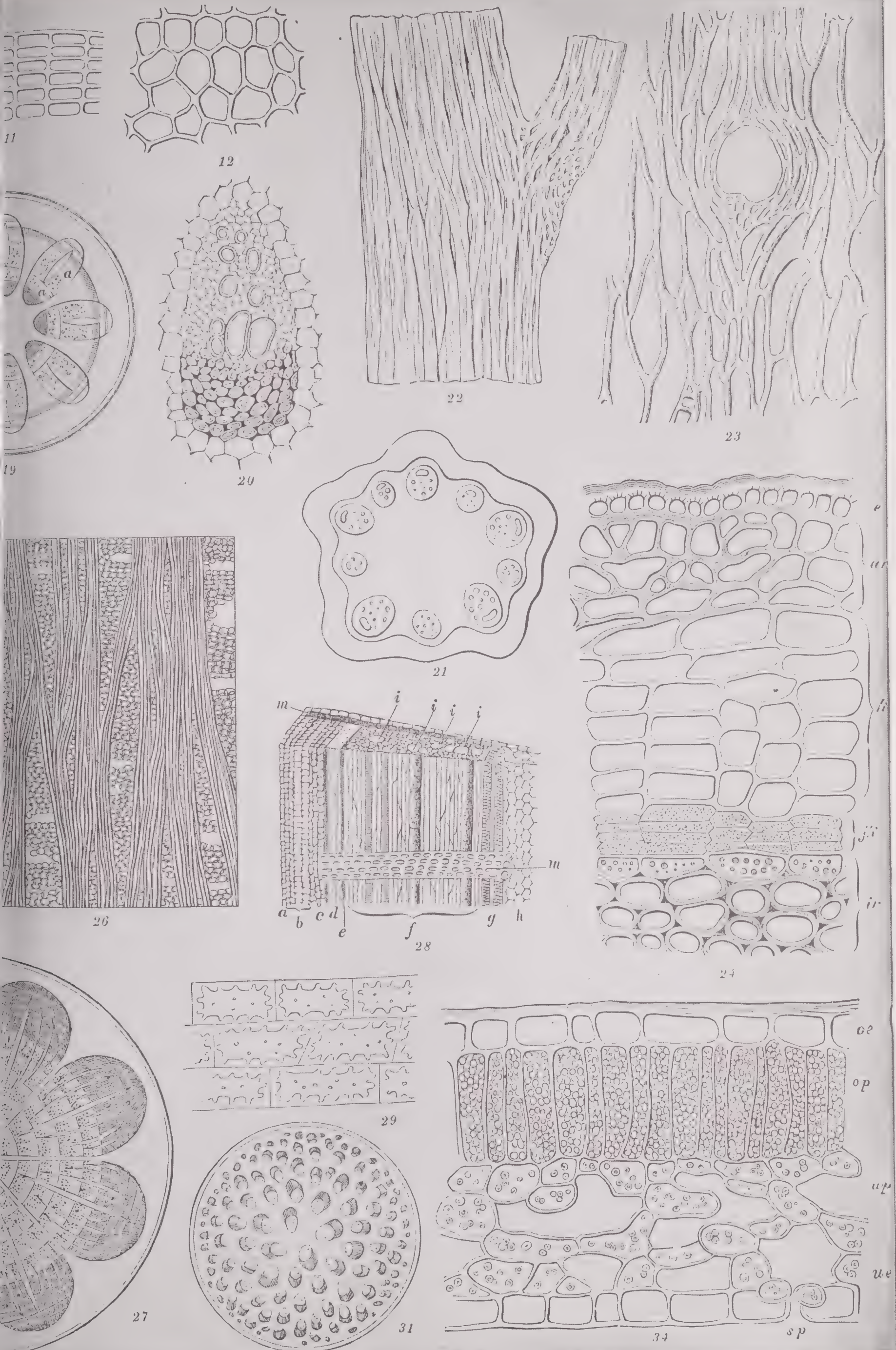
only one carpel must of necessity be apocarpous, but in such a case the term *monocarpellary* is often used to describe it. The stamens of a flower are described as *syngenesious* when, as in the whole order of *Compositæ*, the anthers are united while the filaments are distinct. When they are united by their filaments, they are described as *monadelphous*, *diadelphous*, *polyadelphous*, etc., according to the number of groups so formed. Adhesion also occurs between members of different whorls; thus the stamens are frequently inserted on the base of the petals, so that if we pull off a petal a stamen comes with it; and sometimes, as in orchids, the *andræcium* and *gynæcium* are adherent, forming a column or *gynostemium*. If the other floral whorls are inserted on the receptacle beneath the pistil they are said to be *hypogynous* and the pistil superior, as for instance in the poppy; if, on the other hand, as in the fuchsia, they spring from the top of the ovary, they are said to be *epigynous* and the pistil inferior. At the base of each petal of the buttercup, on the inner surface, a small nectary will be noticed. It is from these nectaries or honey glands that bees obtain their honey, and in the process of obtaining it they are dusted by the pollen if the anthers are mature. This pollen they carry in the course of their wanderings to other members of the same species having the pistil ready for fertilization. Plants fertilized thus by the aid of insects, or in a similar way by the wind (as in many trees), are said to be cross-fertilized, the former being distinguished as insect-fertilized or *entomophilous*, and the latter as wind-fertilized or *anemophilous*. In the ordinary buttercup very few of the carpels are mature before all the stamens have shed their pollen, and thus, though self-fertilization is possible and does occur, cross-fertilization is much the commoner method; such a plant is described as *protandrous* or *proterandrous*. Similarly, a plant whose stigmas are mature before the anthers is *proterogynous*. The inflorescence of a plant is its mode of flower-bearing, but is also often used of the flower clusters themselves. It is of two general types, indeterminate and determinate. In the former only the lateral axes or pedicels terminate in flowers, while the central axis or rachis does not; in the latter, flowers terminate both the central and lateral axes. In the first the lower or outer flowers are the first to expand, and thus this mode is known as the ascending or centripetal; the latter being, on the contrary, descending or centrifugal. The chief special forms of the first type are (1) the raceme (Plate II., fig. 11), a simple cluster having the flowers on somewhat equal stalks or pedicels springing from a more or less elongated rachis or main axis; (2) the corymb

BOTANY.—STEM STRUCTURE, &c.

FIG.

- 1-10. Epidermal Appendages.
- 11, 12. Outer Bark of Birch.
- 13. Longitudinal section of vascular bundle in the Balsam.
- 14. Cross and Longitudinal sections of vascular tissue in a Fern.
- 15. Cross and Longitudinal sections of young Alder root.
- 16, 17. Root-hairs.
- 18, 19. Ideal cross-section of a Dicotyledonous stem.
- 20. Cross-section of a vascular bundle in a Dicotyledonous stem.
- 21. Cross-section of stem of Clematis.
- 22, 23. Net-work of Vessels from stem of Sow-thistle.
- 24. Cross-section of Black Currant Bark.
- 25, 26. Cross and longitudinal sections of liber in Lime-tree.
- 27. Ideal section of a Dicotyledonous stem.
- 28. Ideal structure of Exogenous stem.
- 29. Medullary ray of Oak.
- 30, 31. Ideal cross-section of Endogenous stem.
- 32. Cross-section of a Monocotyledonous vascular bundle.
- 33. Longitudinal section of Root stock of Iris.
- 34. Vertical section of Beech Leaf.





(Plate II., fig. 10), in which the pedicels are of such lengths as to make the cluster flat-topped or nearly so; (3) the umbel (Plate II., fig. 23), like the last, but with an extremely short rachis and nearly equal pedicels, which thus appear to come from one point; (4) the head (Plate II., fig. 18), a globular group of flowers either sessile or very shortly pedicellate; (5) the spike (Plate II., fig. 12), like a head, but with a longer axis. To the determinate type belong (1) the cyme (Plate II., fig. 24), a general term for any centripetal inflorescence; (2) the glomerule (Plate II., fig. 25), a head formed on the determinate type; (3) cymose, racemes, spikes, etc. Other terms are employed, of which the most important is panicle, either restricted to a compound raceme or used of any open, much-branched flower cluster. In connection with flowers and inflorescences we often find special forms of leaves called bracts (Plate II., fig. 10), which are sometimes large and very like ordinary foliage leaves, but are in other cases smaller and membranous, or scaly. A circle of bracts around the base of a head or umbel is known as an involucre (Plate II., figs. 18 and 23). A particular form of inflorescence is sometimes persistent throughout an entire order, as the compound umbel in *Umbelliferae*, and the head in *Compositae*.

An important characteristic is the fruit, which is the result of fertilization on the ovary. While the changes are going on by which the ovule becomes the seed the ovary also grows, often enormously, and forms the pericarp, which surrounds and protects the seed or seeds. The pericarp consists of an outer layer or epicarp, a middle layer or mesocarp, and an inner or endocarp. The outer usually forms the skin of the fruit; the two others may be succulent as in the berry, or the mesocarp only may be succulent and the endocarp hard and stony as in the plum. Besides the embryo the seed contains a store of food material on which the young plant feeds during the first stages of its growth, and the seed itself is surrounded by a coat called the testa derived from the ovule. This consists of albuminous, starchy, or fatty matter. In what are called albuminous seeds, as those of palms, the seed is chiefly composed of food material in which is embedded a small embryo; the edible part of a cocoanut is the albuminous reserve material. In other seeds, like the bean, the fleshy cotyledons have already absorbed this food material into themselves, and the seedling draws on its own cotyledons for support; these seeds are known as exalbuminous. Many terms are used to describe various forms of fruits; of these the most important are (1) the legume (Plate II., fig. 71), a pod which dehisces or opens when ripe by both sutures, as in peas and the whole family of *Leguminosae*; (2)

the follicle, a pod dehiscing by one suture only, as in marsh marigold; (3) the capsule, a loosely used term, denoting the dehiscent, compound pod; (4) the siliqua (Plate II., fig. 70), a sort of narrow two-valved capsule, as in lady's-smock and many other of the *Cruciferae*; (5) the silicula, a short siliqua, as in shepherd's-purse and other crucifers; (6) the samara or key (Plate II., figs. 64, 65), an indehiscent, winged, one-seeded fruit, as in elm, birch, maple, etc.; (7) the achene, a small, hard, dry, one-seeded, indehiscent fruit, as in the buttercup and other ranunculaceous plants; (8) the nut, differing from the last-named in its larger size, and in being compound and many-ovuled in its unfertilized condition, though single-seeded and one-celled when ripe, as in beech, oak, and other trees; (9) the drupe, a stone fruit like the cherry or plum; (10) the berry, a fruit with a fleshy pericarp, as the grape, gooseberry, etc.; (11) the strobilus or cone, the characteristic fruit of coniferous trees; (12) the sorosis of the mulberry and (13) the syconus of the fig are multiple fruits, or an inflorescence in fruit.

It was stated above that the ovule might be fertilized by pollen from the same flower or from another plant; experiment has shown that the latter produces better results, both as regards quality and quantity of seed, and the vigor of the seedlings. That is, cross-fertilization is preferable to self-fertilization, and the various, often extremely curious, shapes of a flower and its parts are mainly for the purpose of ensuring the former and preventing the latter.

Many flowers contain both stamens and pistil; these are termed bisexual or hermaphrodite; while others contain stamens or pistils only, such are said to be unisexual. When both male and female flowers occur on the same plant the species is *monœcious*, like the hazel; while it is *diœcious* if the separate sexes are borne on different individuals, as is the case in the hop.

Plants which, like the sunflower, pass through all the stages from germination to production of fruit and seed in one season, and then perish, are called annuals; if two years are required, as with the turnip and onion, they are called biennials; while perennials last several to many years, during which they may flower and seed many times. In some plants only the rootstock is perennial, the parts of the plant above ground dying away each year.

Physiology.—A plant is built up chiefly of four elements: carbon, hydrogen, oxygen, and nitrogen, with small quantities of sulphur and phosphorus and some mineral matter. Substances containing these must therefore form the food. A green plant can take up its carbonaceous food in a very simple form by means of the green *chlorophyll* con-

tained especially in its leaves. This absorbs some of the sun's rays, and by virtue of the energy represented by the light so absorbed the protoplasm can obtain the carbon from the carbonic acid gas present in the atmosphere, and work it up into the organic substances, which constitute the plant substance. This process of transformation of inorganic matter into organized material, or of organized into more highly organized materials, is known as assimilation or *anabolism*; and the opposite process, which also goes on in living organisms, is called *catabolism*. The two together, regarded as phases of one continuous process, are known as *metabolism*. An animal, having no *chlorophyll*, has to use more complex carbon-containing compounds, in fact those which have already been worked up in the vegetable kingdom. The other items of the food are obtained from the water and mineral salts in the soil, the salts being brought into solution and absorbed with large quantities of water by the roots. The leaves are the laboratory where the food is worked up into the complex compounds which form the plant substance, and to raise the crude material from the absorbing roots to the leaves there is an upward current of liquid through the stem. This is known as the transpiration current; it travels in the wood cells and vessels. A much larger quantity of water is absorbed than is required as food; this is got rid of by transpiration, that is, by giving off of water vapor through the stomata of the leaves. This is evident if a plant be placed under a glass shade in the sunlight, the vapor given off becoming condensed on the glass. The complex compounds elaborated in the leaves are returned to all parts of the plant, especially where growth, or storage of reserve material, is taking place, by means of the other constituent of the vascular bundle, the bast tissue.

Fungi and a few seed plants contain no *chlorophyll* and cannot therefore get their carbonaceous food from the carbonic acid gas of the atmosphere, but have to live on decaying vegetable or animal matter, when they are termed *saprophytes* (Greek *sapros*, rotten), like mushrooms, or on living plants or animals, when they are called parasites; such are for example the rust of corn, potato disease, and all those *bacteria* which produce infectious disease. Plants, like animals, breathe; respiration goes on both day and night, and is represented by the absorption of oxygen from, and the return of carbonic acid gas to the atmosphere. If we prevent a plant from breathing, that is, keep it in an atmosphere containing no free oxygen, it will sooner or later die.

Systematic Botany.—In botany, as in zoölogy, individuals which closely resemble each other form collectively a species. Where existing differences are considered too mi-

nute to constitute differences of species the set of individuals in which they occur ranks as a variety of the species. Species which, though having each some distinctive peculiarity, yet on the whole resemble each other, constitute a genus. Assemblages of genera agreeing in certain marked characters form families or natural orders. The names of the orders are generally formed on the type of *Rosaceæ*, the rose order, *Ulmaceæ*, the elm order, etc. Classes, such as Monocotyledons and Dicotyledons, contain a large number of natural orders. The older systems of classification were based largely on the uses of plants, for they were studied simply from a medicinal or generally economic point of view. In 1682, however, John Ray discovered the differences between Monocotyledons and Dicotyledons, and published an arrangement of plants founded on their structural forms, especially on the characters afforded by the seeds; this formed the basis of the natural system of classification, one, that is, which brings together those genera and families which a careful comparative study of the whole structure and development shows to be most nearly related. Linnæus did not recognize Ray's great primary divisions, and his system (1735) is a purely artificial one, since it takes account of a few marked characters afforded by one or two sets of organs, and does not propose to unite plants by their natural affinities. He divides *Phanerogams* into 23 classes, chiefly according to the number and character of the stamens; each class is subdivided into orders based on the number and character of the styles. To the 23 classes of *Phanerogams* he added a 24th class by the title of *Cryptogamia*. Owing to the exclusive part played by the sexual organs this arrangement is known as the sexual system. The great value of Linnæus's work was his careful scientific revision and adjustment of all the known genera, and his introduction of the binomial system of nomenclature, in which every species has a double name, that of the genus to which it belongs coming first, then that of the species; thus *Bellis perennis* L. is the daisy, and the name shows that the species *perennis* of the genus *Bellis* is the plant in question. The L. which follows indicates that we mean the plant so named by Linnæus. The sexual system is now only of historic interest. By the sagacity of the Jussieus the genera of Linnæus were more or less naturally grouped under Ray's primary division; and by the subsequent labors of De Candolle, Robert Brown, Lindley, and many others we have attained to a fairly natural system, according to the latest edition of which, the "Genera Plantarum" of Bentham and Hooker, all our great collections are arranged.

The *Angiosperms* are subdivided as follows:

BOTANY.—LEAVES, FLOWERS, FRUITS.

FIG.

- 1-8. Forms of Leaves.
- 9-26. Forms of Inflorescence.
- 27-38. Structure of the Flower and Form of the Floral Envelopes.
- 39-42. Structure of the Pistil.
- 43-50. Structure of Anthers and Pollen Grains.
- 51-55. Process of Fertilization and Embryo Formation.
- 56-59. Structure of the Seed and Embryo.
- 60-61. Embryo Plants.
- 62-76. Forms of Fruits.





Class I. MONOCOTYLEDONS.—Contains 34 natural orders arranged in seven series.

Class II. DICOTYLEDONS.

Sub-class 1.—Polypetalæ
(petals free.)

2.—Gamopetalæ
(petals united).

3.—Apetalæ
(petals absent).

Series 1. Thalamifloræ.—Stamens inserted on the thalamus. Contains 33 natural orders.

2. Discifloræ.—Thalamus expanded within the calyx into a cup-like disk from which the stamens spring. Contains 22 natural orders.

3. Calycifloræ.—Stamens epigynous, or inserted on the edge of the cup-like receptacle. Contains 27 natural orders.

Contains 45 natural orders.

Contains 36 natural orders.

In the most recent classification (that of Engler, "Die Natürlichen Pflanzenfamilien") this has been greatly altered, and the *Apetalæ* no longer form a single group.

Distribution of Plants.—The subject of the distribution of organic beings on the surface of the earth has acquired a vastly increased interest and been treated from an entirely new point of view since the general acceptance of the theory of development. Previously many of the most curious and striking facts in the distribution of animals and plants were generally regarded simply as isolated phenomena, calling for no really scientific explanation. At the present day existing animals and plants are looked upon as the descendants of a comparatively small number of ancestral types, and questions of distribution are discussed with reference to ancestry, descent, and genetic relationship. It is also recognized that the distribution of plant and animal life is derived from that of earlier geological epochs, and can only be accounted for by taking into consideration the great geographical and climatic changes that have taken place in past ages. Many tracts of land which are now separated by water we know to have been united in earlier times, and thus the possession by them of identical or similar floras and faunas need excite no surprise. But many of our existing plants possess greater facilities for dispersal than might readily be believed. Seeds, for instance, may be transported to considerable distances by water, in the stomachs of birds, and in various other ways; others have appendages provided with hooks, by means of which they can adhere to the bodies of animals, or with wings, parachute-like structures, etc., which enable them to move through the air to some distance from the plant which produced them. Each species has usually a more or less determinate area to which it is confined, but in many cases this area is broken up into discontinuous patches; and for each kind of plant we may assign an approximate center of distribution. The extent of the range from this center is determined by such conditions as temperature, moisture, geographical features, the presence of other plants, etc. One of the most important of these conditions is the altitude above the sea-level; mountains have special floras, and many of these alpine

also occur in the Arctic circle. The special mode in which a species is distributed throughout its area is determined by various physical and chemical circumstances, such as the nature of the soil, exposure, etc. Some plants grow equally well in any kind of soil, others grow in all soils but prefer one special kind, while still others cannot grow except on a particular variety of soil. The first of these kinds is most adapted for wide distribution, while the last includes species of limited range.

Another important factor in the distribution of vegetable life is the influence of man. Man has considerably extended the range of several species of plants, sometimes consciously by cultivation, at other times unintentionally. On the other hand he has made many species either quite or almost extinct, particularly those hurtful to cultivated food plants. Not a few cultivated exotics have now firmly established themselves in a wild state in various parts of Great Britain, and several indigenous species are dying out owing to indiscriminate collecting, drainage operations, etc. Bentham gave a classical explanation of the subject of plant distribution in accordance with the more modern views. In his presidential address of 1869 to the Linnæan Society he distinguished three chief regions of vegetation, and divided them into several subregions. The first of these, the Northern, includes Europe, North Central Asia, and part of North America, and is characterized by such plants as the needle-leaved *Coniferæ*, catkin-bearing or amentaceous trees (willow, hazel, birch, oak, etc.), the *Ranunculaceæ* or crowfoot tribe, the *Cruciferae* (including turnip, stock, mustard, wallflower, etc.), the clovers and their allies, and other herbs. It includes three types, namely, the Cold or Alpine-Arctic, the Intermediate or Temperate, and the Hot or Mediterraneo-Caucasian. The second or Tropical region includes Africa, large part of America, part of Asia (India, China, Malaysia), and part of Polynesia, and is distinguished by many arborescent species of polypetalous dicotyledons and by large monocotyledonous forms. The Southern or Austral type comprises, according to Bentham, four types, all characterized by *Res-tiaceæ*, *Ericaceæ*, *Proteaceæ*, single-leaved *Papilionaceæ*, etc. These are (1) the Andine or Antarctic-Alpine type, including the

genera *Fuchsia*, *Gaultheria*, *Calceolaria*, etc., and extending throughout the andine region of South America, part of the W. of North America and of Eastern Asia, and portions of Australasia; (2) the Australian type, distinguished chiefly by the gum trees (*Eucalyptus*), the grass tree (*Xanthorrhoea*), *Banksia*, *Hakea*, *Dryandra*, *Acacias*, *Epacrideæ*, etc.; (3) the South African type, a rich flora in proportion to the area over which it extends; and (4) a type represented in California, Mexico, the Argentine Republic, parts of South Africa and New Zealand, etc.

Of subsequent attempts to divide the surface of the earth into botanical regions the most notable are those of Engler and Pruden, who have elaborated Bentham's system. Careful observation has shown that no species of flowering plant grows in all parts of the world, that only about 18 have a range of about equal to half the surface of the earth, that only about 120 have a range equal to one-third of the surface, that among the 135 with largest area none are woody, and the great majority belong to the temperate and cold parts of the Northern Hemisphere, and that in proportion to the number of existing species there are more Monocotyledons with an extensive area than Dicotyledons. The flora of any part of the world depends very largely on its height above sea-level, and in ascending mountains, particularly in tropical countries, we pass through more or less clearly-defined vertical zones of vegetation. The following belts are usually found in the tropics: (1) The evergreen forest with palms, creepers, and many climbing plants; (2) a region in which the trees lose their leaves in the dry season or may be almost entirely absent; (3) the mountain forest, chiefly of Dicotyledons; (4) the coniferous forest of pines, deodars or cedars; (5) the zone of rhododendrons or other shrubs; (6) the region of small woody Alpine perennials; (7) the zone of lichens. These vertical zones also correspond very closely to horizontal belts extending from the equator to the poles. The following may be given as a bathymetrical distribution of *Algæ* on the sea coasts of Europe: (1) A green sea weed region above or about high-water mark; (2) a brown sea weed zone, between high and low-water mark, characterized chiefly by species of *Fucus*; (3) a zone of red sea weeds or *Floridææ* below low-water mark; (4) Plankton or floating, free-swimming *algæ* such as *Diatoms* and *Peridineæ*.

History.—The science of botany is of comparatively recent growth. Before the time of Linnæus very little botanical work of a really scientific character had been accomplished, but since his time the progress has been continuous and rapid, especially during the last half century. The first

writer on plants of whom we know anything was Aristotle, and several of his disciples carried his researches further. Of these the chief was Theophrastus, from whom we have two works, "Peri Phyton Historia" (Researches on Plants) and another, in which he describes about 500 species. Four centuries later, in the early years of our era, Dioscorides described rather more species, and made a rude attempt at classification based on the uses of the plants enumerated. The only other ancient writer of note on botany was the elder Pliny, who, like his predecessors, confined his attention to plants useful, or supposed to be useful, in medicine. For many centuries nothing more was done, but at length in the 16th century, owing to various causes, several investigators did valuable work. Among these are Brunfels (1470–1534), Tragus or Jerome Bock (1498–1554), Fuchs (1501–1566), Aretius (1505–1578), Valerius Cordus (1515–1544), Conrad Gesner (1516–1565), Lobelius (1538–1616), de l'Ecluse or Clusius (1525–1609), Dodoeus or Dodonæus (1518–1586), and Andreas Cesalpinus (1519–1603). The last-named, in a work entitled "De Plantis Libri XVI." (1583), enumerated 840 species, and classified them according to the characters of the fruit and seeds, thus marking a great advance toward more modern arrangements. The greatly developed maritime activity of the 16th century contributed greatly to the extension of the knowledge of plant life by introducing to Europeans many of the plants of foreign countries, and it was during this period that botanic gardens began to be formed. Jean Bauhin (1541–1616) and his brother Gaspard (1560–1624) published valuable works on plants; and among other notable botanists of the 17th century are John Parkinson (1567–1645); Robert Morison (1620–1683), who developed Cesalpinus' system; John Ray (1628–1704), author of the very important "Methodus Plantarum" (1682) and "Historia Plantarum Generalis" (1686–1688), in which he first made the division into Monocotyledons and Dicotyledons, and advanced in several other ways toward the system now adopted; Joachim Jung (1587–1657); Rivinus (1652–1723), who used the binomial nomenclature; Pierre Magnol (1638–1715), and Joseph Pitton de Tournefort (1656–1708), who founded a botanical classification which obtained a wide acceptance for a considerable period, though its primary division was into trees and herbs.

In the 17th and 18th centuries several botanists added considerably to our knowledge of plants by studying their minuter structure and physiology with the aid of the microscope. Among these were Nehemiah Grew (1628–1711), Malpighi (1628–1694), Camerarius, Leeuwenhoek (1632–1723), Perrault (1613–1688), Denis Dodart (1634–

Botany Bay

1707), Stephen Hales (1677-1771), Charles Bonnet (1720-1793), Duhamel de Monceau, Senebier (1742-1809), Kolreuter, and Sprengel. Various attempts to found better systems of classification were made by Burkhart (1676-1738), Boerhaave (1688-1738), and others, but none succeeded in securing general approval till the appearance of the famous sexual system of Karl Linné or Linnæus (1707-1778). His system is explained in his "Systema Naturæ." (1735), and his "Fundamenta Botanica" (1736); and in his "Flora Lapponica" (1737) he was the first compiler of a regular flora. His classification of the vegetable kingdom, though purely artificial in its character, was so convenient that it soon became generally adopted; and it was not till the natural system now in use had reached some degree of completeness that it was abandoned. Of this natural system the founder may be said to be Bernard de Jussieu (1697-1777), who arranged the plants in the royal gardens of France according to such a plan; and since his time it has been modified and developed by his nephew, Antoine-Laurent de Jussieu (1748-1836), Augustin Pyrame de Candolle (1778-1841), Robert Brown (1773-1858), John Lindley (1799-1855), Endlicher (1804-1849), Adolphe Brongniart, and others, and is now practically fixed for a long time to come by Bentham and Hooker in their great work, "Genera Plantarum" (1862-1883). During the 19th century, and especially in the latter half of it, enormous progress was made in the study of vegetable anatomy, histology, and physiology, and cryptogamic botany was carried to great perfection. This was mainly due to the great improvement of the microscope, but much of the work done was inspired by the wider conceptions introduced into the science by the work of Darwin, Wallace, and other scientific evolutionists.

Botany Bay, a bay of New South Wales, Australia, 5 miles S. of Sydney. It was discovered by Captain Cook, on his first voyage, in 1770, and named by him from the great number of new plants found in its vicinity. In 1787 it received England's first penal colony in the East; and, though it was supplanted the very next year by Port Jackson, yet it long continued to be the popular designation, not merely of this penal settlement, but of the Australian convict settlements generally.

Botany Bay Gum, a gum resin produced by the *xanthorrhœa hastilis*, or *resinifera* of Australia.

Bot Fly, a stout bodied, hairy fly, with antennæ inserted in rounded pits, and with rudimentary mouth parts, developing from thick, spiny maggots, which are parasites in cattle, horses, sheep, etc. The ox bot (*hypodermis bovis*) appears from June to September, the maggots or larvæ occurring

Bothriocephalus

during May and in the summer in tumors on the backs of cattle, until in July they fall to the ground; they remain in the pupa case from 26 to 30 days. The maggots of the horse bot fly hang by their mouth hooks to the walls of the horse's stomach, and cause great annoyance to the animal.

Both, John and Andrew, two Dutch painters; natives of Utrecht. To perfect themselves in their art they went to Rome, where they remained several years. Claude Lorraine became the model of the elder, John, and his brother excelled in figures after the manner of Bamboccio; and thus qualified, they continued to assist each other until the death of Andrew, at Venice. John returned to Holland, where he continued to paint landscapes; but the death of his brother continually preying upon his mind, he died in 1650, five years after him. Their pictures are much admired and sought after, and command high prices.

Botha, Louis, a Boer commander, born in Greytown, Natal, about 1864. He began life as a farmer, and, as a young man, had a share in the establishment of the Transvaal Republic. Later he fought in the Kaffir campaign. He was elected to the Volksraad at Pretoria. Upon the outbreak of the Boer war with England in 1899, he was given a subordinate command; upon the death of General Joubert, in 1900, he became commander of the Boer forces; won notable victories at Spion Kop and Colenso; and became the first premier of the South African Union in 1910.

Bothie, a booth, a cottage, a hovel (usually in the agricultural districts), in which rights of occupation seem to be about equally exercised by man and beast, and no attempt is made at privacy for the opposite sexes.

Bothie System, a term used in the British newspapers in discussing the degraded condition of the agricultural population in some districts, the phrase arising from the conjunction of affairs described in the preceding article.

Bothnia, the name formerly given to a country of Northern Europe, extending along the E. and W. shores of the Gulf of Bothnia, the E. portion now being comprised in Finland, and the W. in Sweden.

Bothnia, Gulf of, the N. part of the Baltic Sea, which separates Sweden from Finland; length about 450 miles, breadth 90 to 130, depth from 20 to 50 fathoms. Its water is but slightly salt, and it freezes in the winter, so as to be passed by sledges and carriages.

Bothriocephalus, a genus of cestoid worms (*q.v.*), found abundantly in the intestines of predaceous fishes, and one species of which (*B. latus*) is sometimes found in the

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intestinal canal of man. It belongs to the same family as the tapeworm (*q.v.*), but is distinguished from it by having its segments broader than they are long; by wanting the four discs that surround the head of the tapeworm, and having in their place two lateral longitudinal openings; and by having the sexual organs on one of the flat surfaces of each segment instead of at the edges of the segments. The two longitudinal openings (whence the worm receives its name, from *bothrion*, a little pit, and *kephalē*, the head), do not appear to be organs of nutrition, but merely a kind of suckers by which the worm is enabled to attach itself to the intestines of the animal it infests, while it is nourished by absorption throughout its whole length. Although mostly found in the bodies of predaceous fishes, this parasite is capable of being transmitted to all vertebrate animals, and especially does it infest those birds that live upon fish. It has been observed by some scientists that this worm is common where the *Tænia* or true tapeworm is rare, and *vice versa*.

Bothwell, a village of Lanarkshire, Scotland, situated on the N. bank of the Clyde, in Bothwell parish, about 8 miles E. of Glasgow. About a mile distant from the village is Bothwell Bridge, the scene of one of the most memorable events in Scottish history. The Covenanters, numbering from 4,000 to 5,000 men, having taken possession of the bridge, were attacked, on June 22, 1679, the bridge forced, and their army totally routed by the royal troops commanded by the Duke of Monmouth. Near the village is the magnificent ruin of Bothwell Castle.

Bothwell, James Hepburn, Earl of, known in Scottish history by his marriage to Queen Mary; born about 1526. It is believed that he was deeply concerned in the murder of Darnley, Mary's husband, and that he was even supported by the queen. He was charged with the crime and tried, but, appearing along with 4,000 followers, was readily acquitted. He was now in high favor with the queen, and with or without her consent he seized her at Edinburgh, and carrying her a prisoner to Dunbar Castle prevailed upon her to marry him after he had divorced his own wife. The nation was aroused; a confederacy was formed against him; and in a short time Mary was a prisoner in Edinburgh, and Bothwell had been forced to flee to Denmark, where he died in 1576.

Botocodus, the most barbarous of the Indian tribes of Brazil, inhabiting the East Coast range, between the Rio Pardo and Rio Doce. The name is derived from the Portuguese, *botoque*, bung hole, with reference to their under lip, pierced to hold a disc of wood, sometimes $3\frac{3}{4}$ inches in

Botta

diameter. They generally go quite naked, and have no fixed settlements, but in their wanderings through the country keep the routes open by means of bridges of creepers woven into ropes. Their food includes anything not absolutely poisonous that will stay their hunger; even soft earth is eaten. Their speech is entirely distinct from that of the other Indian nations; they have no religion, properly speaking, but are abjectly afraid of spirits, and pay a certain worship to the moon as creator of the world. Ungovernably passionate, they often commit outrageous cruelties; but through systematically cruel treatment they have been almost annihilated.

Bo Tree, the *figus religiosa*, pipal, or sacred fig tree of India and Ceylon, venerated by the Buddhists and planted near their temples.

Botrychium, a genus of ferns belonging to the order *ophioglossaceæ* (adder's tongues). The capsules, which are subglobose and sessile, are clustered at the margin and on one side of a pinnated rachis; the frond is pinnate, with lunate pinnæ and forked veins. *B. lunaria*, or common moonwort, occurs in dry mountain pastures in Europe. *B. virginicum*, an American species, is called the rattlesnake fern, from its growing in such places as those venomous reptiles frequent.

Botta, Anne Charlotte Lynch, an American author, born in Bennington, Vt., Nov. 11, 1815; was educated in Albany, N. Y.; began her literary career in Providence, R. I., and, removing to New York city, married Prof. Vincenzo Botta, in 1855. From the time of her marriage to her death her house was a favorite center of literary and art circles. Her publications included a collection of poems, many essays, reviews and criticisms, and "A Handbook of Universal Literature." She was a sculptor of much merit, and was influential in promoting the establishment of Barnard College for Women. She died in New York city, March 23, 1891.

Botta, Carlo Giuseppe Guglielmo, an Italian historian, born near Canavese, in the Piedmontese, Nov. 6, 1766. For his sympathy with the French Revolution he suffered imprisonment two years, and then went to France, where he entered the military service as surgeon. He afterward held several offices of responsibility under the Empire and the restored monarchy. Besides numerous minor works in French, he published in Italian (1809) a "History of the War of Independence of the United States of America;" and (1824) a "History of Italy from 1789 to 1814," in four volumes. He also continued "Guicciardini" from 1535 to 1789 (10 vols.). He died in Paris, Aug. 30, 1837.

Botta

Botta, Paul Emile, a French traveler and archæologist, born in Turin, Dec. 6, 1802; was appointed French Consul at Alexandria in 1833. He undertook a journey to Arabia in 1837, described in his "Relation d'un Voyage dans l'Yémen." He discovered the ruins of ancient Nineveh in 1843 while acting as consular agent for the French Government at Mosul. As the result of his investigations he published two important works—one on the cuneiform writing of the Assyrians ("Mémoire de l'Écriture Cunéiforme Assyrienne"), and the other upon the monuments of Nineveh ("Monuments de Ninive," 5 vols. folio, with drawings by Flandin, Paris, 1846–1850)—the latter of which is a work of great splendor, and marks an era in Assyrian antiquities. He died in Achères, March 29, 1870.

Botta, Vincenzo, an Italian-American scholar, born in Piedmont, Nov. 11, 1818. He was elected to the Sardinian Parliament in 1849. In 1853 he settled in the United States and was appointed Professor of the Italian Language and Literature in the University of New York. He published "Dante," "Modern Philosophy in Italy," and other studies. He died in New York city, Oct. 5, 1894.

Bottesini, Giovanni, an Italian violinist, born in Crema, in Lombardy, Dec. 24, 1823. A concert tour, begun in 1840, and extending to the United States, established his fame as the greatest master of the double bass fiddle. From 1846 he was director of Italian opera in Havana, Paris, Palermo and Barcelona, and, in 1864, began a series of compositions which included four operas and an oratorio. His best work, however, was his "Méthode Complète de Contrebasse." He died in Parma, in 1889.

Botticelli, Alessandro (bot-ti-chel'lē), a Florentine artist, born in 1440. He studied painting under Lippi, whose manner he successfully imitated, and was one of the earliest engravers, having learned the art from Baldini, and applied it to the illustration of Dante's works, printed in 1488. Two pictures of his, "Venus Rising from the Sea," and "Venus Adorned by the Graces," are highly spoken of. He died in 1515.

Böttger (bet'ger), or **Böttiger, Johann Friedrich**, a German alchemist, the inventor of the celebrated Meissen porcelain, born in Schleiz, Feb. 4, 1682. His search for the philosopher's stone or secret of making gold led him into many difficulties. At last he found refuge at the court of Saxony, where the Elector erected a laboratory for him, and forced him to turn his attention to the manufacture of porcelain, resulting in the invention associated with his name. He died in Dresden, March 13, 1719.

Botts

Böttiger, Karl August (bet'ē-ger), a German archæologist, born in Saxony, June 8, 1760. After studying at Leipsic, he became director of the gymnasium at Weimar, and it was here that, while he enjoyed the society of Goethe, Schiller, Wieland, and other distinguished men, he began his literary career. In 1814 he was appointed chief inspector of the Museum of Antiquities, in Dresden, where he continued to reside to the end of his life. Among his most important works are "Sabina, or Morning Scenes of a Wealthy Roman Lady," "Paintings on Greek Vases," "Thoughts on the Archæology of Painting," etc. He died in Dresden, Nov. 17, 1835.

Bottle, a vessel with a relatively small neck adapted to hold liquids. The first bottles were of leather (Josh. ix: 4). Such leathern bottles are mentioned by Homer, Herodotus and Vergil, as being in use among the Greeks, Egyptians and Romans, as they still are in Spain, Sicily, Africa, and the East. Earthenware bottles followed (Jer. xiii: 12); these are generally furnished with handles, and are called flasks. Modern bottles are chiefly of glass, and glass bottles have been found at Pompeii. They are blown into the requisite shape, the whole process of manipulation being divided among six persons.

Bottle Gourd, a gourd, *lagenaria vulgaris*, called also the white pumpkin. The Hindus cultivated it largely as an article of food. There are several varieties. One is the sweet bottle gourd; another is used as a buoy in swimming across Indian rivers, transporting baggage, etc.

Bottle Nose, a cetacean, the bottle nosed whale (*hyperoödon bidens*), very destructive to food fishes, and of comparatively little economic value itself. It is the prime aversion of fishermen.

Bottomry, a contract by which the owner of a vessel borrows money on the security of the bottom or keel, by which, a part being put for the whole, is meant the ship itself. If the ship is lost the lender loses all his money. If, on the contrary, it returns in safety, he receives back the principal, with interest at any rate which may be agreed upon between the parties, and this was allowed to be the case even when the usury laws were in force. Bottomry is sometimes corrupted into bummaree.

Bottle Tree (*delabechea rupestris*), a tree of Northeastern Australia, order *sterculiaceæ*, with a stem that bulges out into a huge, rounded mass. It abounds in a nutritious mucilaginous substance.

Botts, John Minor, an American legislator, born in Dumfries, Va., Sept. 16, 1802. He studied law and, in 1833, entered the Virginia legislature. He was elected to Congress in 1839 and was frequently re-

Boucher

elected. Upon the outbreak of the Civil War he asserted his devotion to the Union, and, in 1862, he suffered imprisonment on that account. After the war he published "The Great Rebellion, Its Secret History, Rise, Progress, and Disastrous Failure;" was one of Jefferson Davis' bondsmen; and attended the Convention of Southern Loyalists, in Philadelphia. He died in Culpepper, Va., Jan. 7, 1869.

Boucher, François (bö-chā'), a French painter, was born in Paris, Sept. 29, 1703; studied at Rome, and became a member of the Academy (1734), and painter to Louis XV. (1765). He was an artist of much ability, and equally facile in the production of figure or landscape pictures. The



FRANÇOIS BOUCHER.

number of his pictures and drawings is said to have exceeded 10,000; he also executed engravings. At his death, May 30, 1770, he was Director of the French Academy.

Bouches-du-Rhone (bösh-dü-rōn; "Mouths of the Rhone"), a Department of the S. of France, in ancient Provence. Chief town, Marseilles. Area, 2,025 square miles, of which about one-half is under cultivation. The Rhone is the principal river. The climate is generally very warm; but the Department is liable to the *mistral*, a cold and violent N. E. wind from the Cevennes ranges. Much of the soil is unfruitful, but the fine climate makes the cultivation of figs, olives, nuts, almonds, etc., very successful. The manufactures are principally soap, brandy, olive oil, chemicals, vinegar, scent, leather, glass, etc. The fisheries are numerous and productive. Pop. (1906) 765,918.

Boucher de Crèvecœur de Perthes, Jacques (bö-shā də krāv-kēr də pārt'), a

Boudinot

French anthropologist and writer, born in Réthel, Sept. 10, 1788. Through his father, an active botanist, he came under the notice of Napoleon, and was employed in numerous missions to Italy, Germany, Austria, and Hungary. From the Restoration he lived at Abbeville and there he died, Aug. 5, 1868. He wrote travels, poems, and an early apology for free trade; but only his works on the archæology of man are of consequence now. The first, "On the Creation" (5 vols., 1839-1841), already brought him some reputation, but his long investigations on stone weapons and other remains of early human civilization in the Tertiary and older Quaternary Diluvial strata made him famous. His most striking discovery was that of a fossil human jawbone in the quarries of Moulin-Quignon, near Abbeville, in 1863. Other works of great value are "Celtic and Antediluvian Antiquities" (3 vols., 1846-1865), and "Antediluvian Man and His Works" (1860).

Boucicault, Dion (bö-sē-kō'), a dramatic author and actor, born in Dublin, Dec. 26, 1822; educated at London University. He produced his first dramatic work, "London Assurance," before he was 19 years old. It was signally successful, and its success determined his career in life. Once embarked in the profession of a play writer, Boucicault produced piece after piece in rapid succession, and greatly increased the reputation which his first attempt had brought him. "Old Heads and Young Hearts," "Love in a Maze," "Used Up," "Louis XI.," "The Corsican Brothers," "The Streets of London," "Flying Scud," "After Dark," "The Shaughraun," "Kerry," and "Rescued," are the most popular of his works. Several of these are stock pieces at our theaters; and to playgoers the mere enumeration of their names will show that Boucicault distinguished himself equally in comedy, farce and melodrama. When he went upon the stage, as he soon did, he added a high reputation as an actor to the reputation he had previously gained as an author. From 1853 to 1860 he was in the United States, where his popularity was scarcely less than it had been in England. On his visit to England, in 1860, he produced a play, "The Colleen Bawn," which proved among the most successful of modern times. He died in New York city, Sept. 18, 1890.

Boudinot, Elias (bö'di-not), a distinguished American patriot and philanthropist, born in Philadelphia, May 2, 1740; was President of the Continental Congress (1782), and first President of the American Bible Society (1816-1821). He wrote "The Second Advent of the Messiah," "The Age of Revelation," a reply to Thomas Paine, "The Star in the West," an attempt to identify the American Indians with the

Boufflers

Ten Lost Tribes of Israel. He died in Burlington, N. J., Oct. 24, 1821.

Boufflers, or Bouflers (bö-flär'), **Louis François, Duc de**, Marshal of France, born Jan. 10, 1644. He learned the art of war under such renowned generals as Condé, Turenne and Catinat. His defense of Namur against King William, of England, and of Lille, against Prince Eugene, are famous, and he conducted the retreat of the French at Malplaquet with such admirable skill as quite to cover the appearance of defeat. He died in Fontainebleau, Aug. 20, 1711.

Boufflers, Stanislas, Marquis de, a French poet, born in Nancy, May 31, 1738. He was reputed to be a son of Stanislas II. of Poland. While an ecclesiastical student he wrote, in prose, the story of "Aline, Queen of Golconda," for which Stanislas awarded him a pension of 40,000 livres. Quitting the ecclesiastical career, he entered the military service and rose to the rank of major-general. Meanwhile he was earning the plaudits of the gay world by his erotic verses. He was one of the *émigrés* of 1792, but returned to France in 1800. His "Complete Works" were published in two volumes, in 1813. He died in Paris, Jan. 18, 1815.

Bougainville, Louis Antoine de (bö-gan-vêl'), a French navigator, born in Paris, Nov. 11, 1729. At first a lawyer, he afterward entered the army and fought bravely in Canada, under the Marquis of Montcalm, and it was principally owing to his exertions, in 1758, that a body of 5,000 French withstood successfully a British army of 16,000 men. After the battle of Sept. 13, 1759, in which Montcalm was killed and the fate of the colony decided, Bougainville returned to France and served with distinction in the campaign of 1761, in Germany. After the peace he entered the navy, and became a distinguished naval officer. In 1763 he undertook the command of a colonizing expedition to the Falkland Islands, but as the Spaniards had a prior claim the project was abandoned. Bougainville then made a voyage round the world, which enriched geography with a number of new discoveries. In the American War of Independence he distinguished himself at sea, but withdrew from the service after the Revolution. He died in Paris, April 31, 1811.

Bougainville Island, an island in the Pacific Ocean, belonging to the Solomon group (area, 4,000 square miles), and under German protection. It is separated from Choiseul Island by Bougainville Strait.

Bougainvillæa (from Bougainville, the French navigator), a genus of *nyctaginaceæ* (nyctagos). They are natives of the tropics and sub-tropics of both hemispheres,

Bougie

although they have been transplanted to hothouses and gardens in the milder temperate climates.

Bough, Samuel, a Scotch landscape painter, born in Carlisle, Jan. 8, 1822. He received hints from various painters, but never obtained any systematic art instruction. In 1845 he was a scene painter in Manchester, and later in Glasgow, where Daniel Macnee encouraged him to become a landscape painter; and he shortly produced several sketches in Cadzow Forest, and "Shipbuilding on the Clyde." Among the more important of his oil pictures are "Edinburgh from the Canal" (1862); "Holy Island" (1863); "In the Trossachs" (1865); "The Vale of Leith" (1866); "Kirkwall Harbor" (1867); "Borrowdale," "St. Monance," "London from Shooter's Hill" (1872). His "Royal Volunteer Review" (1860), is in the National Gallery of Scotland. His best oil pictures are spirited and expressive in touch, and possess a fine sense of atmosphere; but he frequently painted carelessly and hurriedly, and produced much, especially during his later years, that was unworthy of his brush. His numerous water colors are of more uniform excellence; they are strongly influenced by the example of David Cox, and are especially remarkable for the delicate gray tones of their skies. In 1857 Bough was elected A. R. S. A., and in 1875, R. S. A. He settled in Edinburgh, in 1855, where he died, Nov. 19, 1878. A collection of over 200 of his works was brought together in the Glasgow Institute in 1880.

Boughton, George Henry, an English-American landscape and *genre* painter, born near Norwich, England, in 1834. His parents came to the United States in 1839, and settled in Albany. He studied art without a master, and, in 1853, went to London and Paris to continue his studies. After 1861, he resided in London. His best pictures are "The Idyl of the Birds," "The Scarlet Letter," "Puritans Going to Church" and "The Return of the May Flowers." He became a National Academician in 1871 and a Royal Academician in 1896. He died Jan. 19, 1905.

Boughton, Willis, an American educator, born in Victor, N. Y., April 17, 1854. He was graduated at the University of Michigan, and, since 1892, has been Professor of Rhetoric and English Literature at Ohio University. He has won note in the work of university extension. His writings include "Mythology in Art" and "History of Ancient Peoples."

Bougie (bö-zhē), a port of Algeria, on the Bay of Bougie, 120 miles E. of Algiers. Bougie was the Saldæ of the Romans, and, in the 5th century, was a chief seat of the Vandals; under the Arabs it was raised to such importance that it was called Little

Bougie

Mecca, and was the *entrepôt* of the trade between Christendom and North Africa; but after various vicissitudes, it had sunk to a small village in 1833, when the French captured the place. Their extensive works have since rendered it a strong fortress, and a commercial center of some value. Pop. (1906) 17,540.

Bougie, a smooth, flexible, elastic, slender cylinder, designed to be introduced into the urethra, rectum or esophagus, in order to open or dilate it in cases of stricture or other diseases. It is formed either solid or hollow, and is sometimes medicated. It was originally made of slips of waxed linen, coiled into a cylindrical or slightly conical form by rolling them on a hard, smooth surface. Bougies for surgical purposes are said to have been invented by Aldereto, a Portuguese physician. They were first described in 1554 by Amatus, one of his pupils. The slender forms of bougies are adapted for the urethra, the larger for the rectum, vagina, and œsophagus. An armed bougie is one with a piece of caustic fixed at its extremity. When an instrument such as is described *supra* is made of metal and is inflexible it is called a catheter or sound—the former if hollow and the latter if solid.

Bouguer, Pierre (bö-gā), a French mathematician and astronomer, born in Brittany, Feb. 16, 1698. He was associated with Godin and La Condamine in an expedition to the South American equatorial regions to measure the length of a degree of the meridian. The main burden of the task fell upon Bouguer, who performed it with great ability, and published the results in his "Théorie de la Figure de la Terre." He also invented the heliometer, and his researches about light laid the foundation of photometry. He died in Paris, Aug. 15, 1758.

Bougereau, William Adolphe (bögr-rō'), a French painter, born in La Rochelle, Nov. 30, 1825. After a youth of hardship courageously endured he succeeded in reaching Paris, where he was educated at the studio of Picot, and at the Beaux Arts. In 1850 he gained the Prix de Rome, and went to Italy to study. His first great success was "The Body of St. Cecilia Borne to the Catacombs" in the Salon of 1854. His subjects were chiefly ideal, idyllic and religious. He was a thorough draftsman, and was thought to excel in the painting of flesh. He died Aug. 20, 1905.

Bouilhet, Louis (bö-lyā'), a French poet, born in Cany, May 27, 1822. He first achieved fame with "Melænis, a Story of Rome" in the time of the Cæsars, and "The Fossils," a series of delineations of antediluvians. His versified dramas, "Mme. de Montarcy" (1856); "Dolorès" (1862); and especially "The Conspiracy of Am-

Boulainvilliers

boise," are elegant in style, rich in imagery, perfect in melody, but lack compactness of structure and are open to moral censure. The same faults are found in his comedies, "Uncle Million" (1861); "Faustine" (1864); and especially in his posthumous "Mdlle. Aïssé." He died in Rouen, July 19, 1869.

Bouillé (bö-yā'), **François Claude Amour, Marquis de**, a French general, born in Cluzel, Nov. 19, 1739; entered the army at the age of 14 and served with distinction in Germany during the Seven Years' War. In 1768 he was appointed governor of the island of Guadeloupe, and afterward commander-in-chief of all the French forces in the West Indies. When war broke out in 1778, he successively took from the British, Dominica, Tobago, St. Eustache, Saba, St. Martin, St. Christopher's, and Nevis. Louis XVI. nominated him a member of the Assembly of Notables in 1787-1788; in 1790 he was made commander-in-chief of the army of the Meuse, the Saar, and the Moselle. His decision of character prevented the dissolution of the army and the outbreak of civil war. For his share in the attempted escape of Louis XVI. he had to flee from France. In 1791 he entered into the service of Gustavus III., of Sweden, and afterward served in the corps of the Prince of Condé. He rejected a proposal, made in 1793, that he should take the chief command in La Vendée; and went to England, where his advice in West Indian affairs was useful to the government, and where he wrote his "Mémoires sur la Révolution Française." He died in London, Nov. 14, 1800.

Bouillon (bö-yōn), originally a German duchy, now a district in Belgium, 9 miles wide and 18 long, on the borders of Luxembourg and Liège, a woody and mountainous tract, with some 21,000 inhabitants. The small town of Bouillon was once the capital of the duchy, which belonged to the famous Crusader, Godfrey of Bouillon.

Bouilly, Jean Nicolas (bö-yē'), a French poet, born in Condraye, Jan. 4, 1763. He made his debut with the comic opera, "Peter the Great" (1790). For a few years he was judge and prosecuting attorney at Tours, and then was called to Paris to assist in organizing the primary school system. He was a man of ancient Roman virtue, and his character is reflected in all his works. His comedies and comic operas (music by the first masters) were eminently successful as well in Germany as in France, particularly these: "The Abbé de l'Epée," "The Two Days," "Mme. de Sévigné." He also wrote "Stories for French Children" and "Counsels to My Daughter." He died in Paris, April 14, 1842.

Boulainvilliers (bö-lan-vē-yā'), **Henri Comte de**, French author, descended from an

Boulak

ancient family in Picardy, born in St. Saire, Normandy, Oct. 11, 1658. He resigned the military profession, and devoted himself to the investigation of the genealogy of the ancient families of France. His writings, which are pervaded by extreme aristocratic sentiments, were first published after his death. The most valuable of them are "History of the Government of France" (3 vols., 1727); "History of the Peerage of France and the Parliament of Paris" (2 vols., 1753); and "Abridged Chronological History of France" (3 vols., 1753). He died in Paris, Jan. 23, 1722.

Boulak, a town of Lower Egypt, a suburb and port of Cairo. It has cotton, sugar, and paper factories. Pop. 10,000.

Boulanger, Georges Ernest Jean Marie (bö-län-zhā'), a French soldier, born in Rennes, April 29, 1837. After a successful career in Algeria and in the East he became Minister of War, in 1886, and the fact that a new man was in possession of that portfolio was speedily felt. He introduced many needful reforms, insisted on the adoption of a repeating rifle and caused important experiments to be made with high explosives. In the ministerial crisis of 1887 he lost his portfolio, and was appointed to the command of the 13th Army Corps, but was retired March 28, 1888. In January, 1889, he was elected Deputy to the National Assembly by 81,000 majority, in consequence of which the Floquet ministry resigned. In August, 1889, he was charged with embezzlement, treason and conspiracy, and found guilty by the Senate; the elections in the 12 cantons were annulled, and he was sentenced to deportation. He died in Brussels, Sept. 30, 1891.

Boulanger, Gustave Rodolphe Clarence, a French painter, born in Paris, April 25, 1824. He had a wide reputation as a painter of classical subjects; received the Prize of Rome in 1849; was decorated with the Legion of Honor, in 1865, and died in Paris, Sept. 22, 1888.

Boulder, city and county-seat of Boulder co., Col., on Boulder Creek and the Union Pacific and other railroads; 29 miles N. W. of Denver, the State capital. It is in a noted gold, silver, and coal mining and an agricultural and stock raising region, at the E. base of the Rocky Mountains. It received a city charter in 1882; is the seat of the State University; and has 3 National banks, daily and weekly periodicals, and a property valuation of over \$1,000,000. The famous Boulder cañon is a local object of wide interest to the tourist. Pop. (1890) 3,330; (1900) 6,150; (1910) 9,539.

Boulder, a large, rounded block of stone, which, whether lying loose on the surface of the ground or imbedded in the soil, is of different composition from the rocks adjacent to which it now rests, and must, there-

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fore, have been transported from a lesser or greater distance. From the last mentioned facts, boulders are often called erratic blocks or simply erratics.

Boulder Clay, a clay stratified or unstratified, belonging to the boulder formation.

Boulder Formation, a formation consisting of mud, sand, and clay, more frequently unstratified than the reverse, generally studded with fragments of rocks, some of them angular, others rounded, with boulders scattered here and there through the mass. As much of the material has been transported from a greater or less distance, it is sometimes called drift. The old name diluvian, being founded on now abandoned hypotheses, has become obsolete. The formation exists only from the Poles to about 40° of latitude, unless where the Alps or other high mountains in warmer climes have originated boulder formation of their own. The nearer the Poles one travels the larger are the erratic boulders. The rocks on which they rest are furrowed and scored with lines, as if ice with stones projecting from its surface had heavily driven over them. Fossils, where they exist, indicate a very cold climate.

Boulevard (böl-vär), a French word formerly applied to the ramparts of a fortified town, but when these were leveled, and the whole planted with trees and laid out as promenades, the name boulevard was still retained. Modern usage applies it also to many streets which are broad and planted with trees, although they were not originally ramparts. The most famous boulevards are those of Paris.

Boulogne (bö-lon-ye or bö-lön), or **Boulogne-sur-Mer**, a fortified seaport of France, Department of Pas de Calais, at the mouth of the Liane. It consists of the upper and lower town. The former is surrounded with lofty walls, and has well planted ramparts; the latter, which is the business part of the town, has straight and well built streets, and is semi-English in character, many of the sign-boards being in English, the shops having an English air, and much English being spoken. In the castle, which dates from 1231, Louis Napoleon was imprisoned in 1840. Boulogne has manufactories of soap, earthenware, linen and woolen cloths; wines, coal, corn, butter, fish, linen and woolen stuffs, etc., are the articles of export. Steamboats run daily between this place and England, crossing over in two or three hours. Napoleon, after deepening and fortifying the harbor, encamped 180,000 men here with the intention of invading England at a favorable moment; but, upon the breaking out of hostilities with Austria, in 1805, they were called to other places. Pop. (1906) 51,201.

Boulogne, a village of France, Department of the Seine, between the Seine and

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the wood of the same name (the well known Bois de Boulogne), 4 miles W. of Paris, and forming a suburb of the French metropolis, by means of the *chemin de fer de ceinture*, or girdle railway. Boulogne is handsome; the adjoining Bois is, in the summer season, the favorite promenade of the Parisian fashionables. The Château de Madrid, in this wood, built by Francis I., was demolished in the reign of Louis XVI.; and only a small part now remains of the Château de la Muette, some time occupied by Louis XV.

Boulton, Matthew, an English mechanician, born in Birmingham, Sept. 3, 1728. He engaged in business as a manufacturer of hardware, and invented and brought to great perfection inlaid steel buckles, buttons, watch chains, etc. In 1762 he added to his premises by the purchase of the Soho, a barren heath near Birmingham, where he established an extensive manufactory and school of the mechanical arts. The introduction of the steam engine at Soho led to a connection between Boulton and James Watt, who became partners in trade, in 1769. He died in Soho, Aug. 16, 1809.

Bounty, a grant or benefaction from the Government to those whose services directly or indirectly benefit it, and to whom, therefore, it desires to accord some recompense, or at least recognition. In law and commerce, it is a premium paid by a government to the producers, exporters or importers of certain articles, or to those who employ ships in certain trades. This is done either with the view of fostering a new trade during its infancy, or of protecting an old one which is supposed to be of special importance to the country. In 1890, Congress passed an Act providing for a premium to be paid to the producers of cane, beet and sorghum sugar by way of bounty. This bounty was in the nature of a contract (made with each and every person in the United States engaged in the cultivation of such varieties of sugar), providing that, in the event their produce attained a given standard of saccharine strength, they should receive the bounty provided therefor by the appropriation from the Treasury. This act greatly stimulated the sugar producing industry of the country, and large amounts of money have been invested, and a larger amount of sugar has been produced in the United States during the years that have followed the passage of the act than in any equal period in the history of the country.

Bounty Jumper, a term used during the Civil War in the United States to denote one who enlisted in the United States military service to secure the bounty paid by the Government for volunteers, and then deserted. Some of these enterprising individuals carried on a regular business of enlisting in one place under a certain name,

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hurrying to the front, receiving the bounty, deserting at once upon its receipt, and re-appearing in some other place under a different name, only to re-enlist and repeat the process. The risks were great, but as the bounty was, in some cases, quite large, the practice found many votaries.

Bouquet, Jean Claude (bö-kā'), a French mathematician, born in 1819, and, in 1839, was admitted to both the Polytechnic and Normal Schools. In 1865, he became Professor of Mathematics in the Faculté des Sciences of Lyons. He was then called to Paris, where he taught special mathematics at the Bonaparte Lyceum, and subsequently at the Louis-le-Grand Lyceum. In 1873 he was appointed Professor of Mechanics at the Sorbonne, and was elected member of the Academy of Sciences in 1875 in the place of M. Bertrand. He also received the decoration of the Cross of the Legion of Honor. He died in 1885.

Bouquet de la Grye, Jean Jacques Anatole (-grā), a French hydrographical engineer, born in Thiers, May 20, 1827. He became a member of the Institute; commander of the Legion of Honor, and a member of the Academy, elected in 1884. A project which he has long urged is to make Paris a seaport by means of a ship-canal up the Seine. He has written "Paris as a Seaport," "Notes on Soundings of the Sea," "A Hydrographic Study on the Bay of Rochelle," etc.

Bourbaki, Charles Denis Sauter, (bör-bä-kē), a French general, born in Pau, April 22, 1816; entered the army in 1836, and fought in the Crimea and Italy. In 1870 he commanded the Imperial Guard at Metz, from where he was sent to England, on a secret mission to the Empress. Under Gambetta he organized the Army of the North, and commanded the Army of the Loire. His attempt to break the Prussian line at Belfort, though ably conceived, ended in disastrous failure; in a series of desultory attacks on a much inferior force, Jan. 15-17, 1871, he lost 10,000 men. In the wretched retreat to Switzerland that followed on the 27th, reduced to despair by the ill success of his plans, he attempted to commit suicide. From 1873 to 1879, he commanded the 14th Army Corps at Lyons, and in 1881 he retired from active service. He died in Bayonne, Sept. 22, 1897.

Bourbon (bör-bôn'), an ancient French family which has given three dynasties to Europe, the Bourbons of France, Spain, and Naples. The first of the line known in history is ADHEMAR, who, at the beginning of the 10th century, was Lord of the Bourbonnais (now the Department of Allier). The power and possessions of the family increased steadily through a long series of Archambaulds of Bourbon, till, in 1272, BEATRIX, daughter of Agnes of Bourbon

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and John of Burgundy, married Robert, sixth son of Louis IX. of France, and thus connected the Bourbons with the royal line of the Capets. Their son, LOUIS, had the barony converted into a dukedom and became the first Duc de Bourbon. Two branches took their origin from the two sons of this Louis, Duke of Bourbon, who died in 1341. The elder line was that of the Dukes of Bourbon, which became extinct at the death of the Constable of Bourbon in 1527, in the assault on the city of Rome. The younger was that of the Counts of La Marche, afterward Counts and Dukes of Vendôme. From these descended ANTHONY of Bourbon, Duke of Vendôme, who, by marriage, acquired the kingdom of Navarre, and whose son, HENRY of Navarre, became Henry IV. of France. Anthony's younger brother, LOUIS, Prince of Condé, was the founder of the line of Condé. There were, therefore, two chief branches of the Bourbons—the royal, and that of Condé. The royal branch was divided by the two sons of Louis XIII., the elder of whom, LOUIS XIV., continued the chief branch, while PHILIP, the younger son, founded the House of Orleans as the first Duke of that name. The kings of the elder French royal line of the House of Bourbon run in this way: HENRY IV., LOUIS XIII., XIV., XV., XVI., XVII., XVIII., and CHARLES X. The last sovereigns of this line, LOUIS XVI., LOUIS XVIII., and CHARLES X. (LOUIS XVII., son of Louis XVI., never obtained the crown), were brothers, all of them being grandsons of Louis XV. Louis XVIII. had no children, but Charles X. had two sons, viz., LOUIS ANTOINE DE BOURBON, Duke of Angoulême, who was Dauphin till the Revolution of 1830, and died without issue in 1844, and CHARLES FERDINAND, Duke of Berry, who died, Feb. 14, 1820, of a wound given him by a political fanatic. The Duke of Berry had two children, (1) LOUISE MARIE THERESE, called Mademoiselle d'Artois; and (2) HENRI CHARLES FERDINAND MARIE DIEUDONNÉ, born in 1820, and at first called Duke of Bordeaux, but afterward Count de Chambord, who, was looked upon by his party until his death (in 1883) as the legitimate heir to the crown of France.

The branch of the Bourbons known as the House of Orleans was raised to the throne of France by the Revolution of 1830, and deprived of it by that of 1848. It derives its origin from Duke PHILIP I. of Orleans (died 1701), second son of Louis XIII., and only brother of Louis XIV. A regular succession of princes leads up to the notorious EGALITÉ ORLEANS, who, in 1793, died on the scaffold, and whose son, LOUIS PHILIPPE was King of France from 1830 to the Revolution of 1848. His grandson, LOUIS PHILIPPE, Count de Paris, born Aug. 24, 1838, died in London, Sept. 8, 1894. His son,

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ROBERT, Duke of Orleans, born in 1869, is the present head of the family, and the last male representative of the elder Bourbons, who unites in himself the claims of both branches to the throne of France.

The Spanish-Bourbon dynasty originated, when, in 1700, Louis XIV. placed his grandson, PHILIP, Duke of Anjou, on the Spanish throne, who became Philip V. of Spain. From him descends ALPHONSO XIII., born in 1886.

The royal line of Naples, or the Two Sicilies, took its rise, when, in 1735, DON CARLOS, the younger son of Philip V. of Spain, obtained the crown of Sicily and Naples (then attached to the Spanish monarchy), and reigned as Charles III. In 1759, however, he succeeded his brother, FERDINAND VI., on the Spanish throne, when he transferred the Two Sicilies to his third son, FERNANDO (Ferdinand IV.), on the express condition that this crown should not be again united with Spain. Ferdinand IV. had to leave Naples in 1806; but, after the fall of Napoleon, he again became King of both Sicilies under the title of Ferdinand I., and the succession remained to his descendants till 1860, when Naples was incorporated into the new kingdom of Italy.

Robert, Duke of Orleans, who, in 1894, became the head of the royal family of France, married, in 1896, the Archduchess Marie Dorothea, daughter of the Archduke Joseph, cousin of the Emperor of Austria. His mother was the Spanish Infanta Louise of Montpensier, and he has one brother and four sisters, the eldest of the latter being the Princess AMELIE, who is married to the King of Portugal, and the second, HELENA, who is married to the Duke of Aosta, nephew of the King of Italy.

The only uncle of the Duke of Orleans is the Duke of Chartres, born in 1840, and married to a daughter of the Prince of Joinville. The issue are two daughters and two sons, the eldest son being Prince HENRY, born in 1867; the eldest daughter, Princess MARIE, being married to Prince WALDEMAR of Denmark, and the second daughter, Princess MARGUERITE, being married (in 1896) to Patrice MacMahon, Duke of Magenta.

The only living grand uncle (son of King Louis Philippe) of the Duke of Orleans is FRANCIS, Prince of Joinville, born in 1818, married to a daughter of Pedro I. of Brazil, and has one daughter and one son, the Duke of Penthièvre, born in 1845.

The other grand uncles of the Duke of Orleans were: HENRY, Duke of Aumale, born in 1822, died (childless) in 1897; ANTHONY, Duke of Montpensier, born in 1824, died in 1890 (married, in 1832, a sister of Queen Isabella of Spain, and had a daughter, the wife of the Count of Paris, and a son, Prince ANTHONY, born in 1866, who married, in 1888, his cousin, the INFANTA EULALIE of Spain), and LOUIS,

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Duke of Nemours, born in 1814, died in 1896. He was the father of two daughters and two sons, the eldest son being the Count of Eu, born in 1842, married to a daughter of Pedro II. of Brazil, and, having three children, and the second son being the Duke of Alençon, born in 1844, and married to a Bavarian princess (who was burned in the Paris bazaar fire in 1897), and having two children.

By the death of the Count of Chambord, in 1883, the elder line of the Bourbons of France became extinct, and the right of succession merged in the Count of Paris, grandson of King Louis Philippe, representative of the younger, or Orleans, line.

Bourbon, Charles, Cardinal, a French prince and prelate; brother of Antoine de Bourbon, born in 1520; uncle to Henry IV., King of France. He was Archbishop of Rouen, Legate of Avignon, cardinal, peer of France, and member of the Council. In spite of family ties he ardently supported the Guises and the League, and was declared by that faction heir presumptive to the throne on the ground that his brother Antoine, through heresy, had forfeited his claim. On the death of Henry III. he was declared King, as Charles X., and was recognized by a majority of the *parlements*. Yet he was all the while a prisoner at Fontenay-le-Comte, and died there in 1590.

Bourbon, Charles, Duc de, or Constable of Bourbon, son of Gilbert, Count of Montpensier, born in 1489, and, by his marriage with the heiress of the elder Bourbon line, acquired immense estate. He received from Francis I., in the 26th year of his age, the sword of Constable, and in the war in Italy rendered important services by the victory of Marignano and the capture of Milan. After occupying, for years, the position of the most powerful and highly honored subject in the realm he suddenly fell into disgrace, from what cause is not clearly known. But it is certain that the intrigues of the court party, headed by the King's mother and the Duke of Alençon, were threatening to deprive him both of honors and estates. The Constable, embittered by this return for his services, entered into treasonable negotiations with the Emperor Charles V. and the King of England (Henry VIII.), and eventually fled from France to put his sword at the service of the former. He was received with honor by Charles, who knew his ability, and, being made general of a division of the Imperial Army, contributed greatly to the overwhelming defeat of Francis at Pavia. But the Bourbon found that Charles V. was readier to make promises to him than to fulfill them, and he returned, disappointed and desperate, to the command of his army in Italy, an army nominally belonging to the Emperor, but composed mostly of mercenaries, adventurers, and

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desperadoes from all the countries of Europe. Supplies falling short, and the Emperor refusing to grant him more, the Constable formed the daring resolve of leading his soldiers to Rome and paying them with the plunder of the Eternal City. On May 6, 1527, his troops took Rome by storm, and the sacking and plundering continued for months. But the Bourbon himself was shot as he mounted the breach at the head of his soldiers. He was but 38 years of age.

Bourbon, Louis Henri, Duc de, a French courtier; Prince of Condé, born in Versailles, in 1692. As Chief of the Council of Regency and superintendent of the King's education, he robbed the public treasury and extorted huge bribes. He was made Prime Minister in 1723, and persecuted the Protestants. He granted exorbitant privileges to the India Company, in which he held shares. He was entirely controlled by his mistress, the Marquise de Prie, who was, in turn, the tool of the Paris brothers. He died in Chantilly, Jan. 27, 1740.

Bourbon Whisky, a term applied to Kentucky whisky, made from a mixture of corn, rye and malt, of which the corn constitutes the larger part. In its distillation some of the oils and acids are allowed to remain. These, with age, undergo chemical action, and are converted into aromatic ethers, pleasant to the taste and agreeable to the stomach.

Bourdaloue, Louis (bör-dä-lö'), a Jesuit, and one of the greatest preachers France ever produced, was born in 1632. The extreme popularity of his sermons induced his superiors to call him to Paris to take the yearly course at their Church of St. Louis, where his eloquence attracted crowds of all ranks, and he became the favorite preacher of Louis XIV., who, on the revocation of the Edict of Nantes, sent him into Languedoc to convert the Protestants there. His style is represented by D'Alembert as solid, serious, and, above all, strictly logical. Toward the latter part of his life he quitted, or rarely ascended, the pulpit, and devoted himself to attending the sick, visiting the prisons and other works of charity; and died in 1704 universally lamented.

Bourdon (named after Mr. Bourdon, of Paris, who invented it in 1849), a barometer consisting of an elastic flattened tube of metal bent to a circular form and exhausted of air, so that the ends of the tube separate as the atmospheric pressure is diminished, and approach as it increases. The Bourdon is commonly known as the metallic barometer, although the aneroid is also metallic, and both holosteric.

Bourdon, Sebastien, a French painter, born in Montpellier in 1616. When only 18 he went to Rome, and, on his return to France executed his *chef d'œuvre*, "The

Crucifixion of St. Peter," for the Church of Notre Dame, Paris. In 1652 he repaired to Sweden, where Queen Christiana appointed him her painter. He was the friend of Claude Lorraine, whose style, as well as that of Sacchi and Caravaggio, he occasionally imitated with success. He died in 1671.

Bourgeois, a size of printing type larger than brevier and smaller than long primer, used in books and newspapers.

Bourgeois (börzh-wä'), **Baron Charles Arthur**, a French sculptor, born in 1838. He was a student of Duret and M. Guillaume. Among the more notable of his works are the "Arab Washerwoman" and the "Greek Actor," in bronze; "St. Agatha," "The Slave," and "Hero and Leander," in plaster; "The Delphic Pythos" and several busts in marble, and "St. Joachim" and "Religion," two stone figures for the Church of St. Eustache and the Church of the Sorbonne, respectively. He died in 1886.

Bourgeoisie (börzh-wä-zē'), a name applied to a certain class in France, in contradistinction to the nobility and clergy as well as to the working classes. It thus includes all those who do not belong to the nobility or clergy, and yet occupy an independent position, from financiers and heads of great mercantile establishments at the one end to master tradesmen at the other. It corresponds pretty nearly with the English term middle classes. Etymologically the word refers to the old class of freemen or burgesses residing in towns.

Bourges, an ancient city of France, capital of the department of Cher; situated at the confluence of the Auron and Yèvre; 124 miles S. of Paris. It is surrounded with ramparts, now laid out as promenades, and has crooked but spacious streets, and many houses built in the old style. The most noteworthy buildings are the cathedral, erected in the 13th century, and esteemed one of the finest Gothic structures in France; the churches of Notre Dame and St. Bonnet; the archiepiscopal palace; the Palais de Justice, an interesting old building otherwise, the house of Jacques Cœur (silversmith of Charles VII.); and the Hôtel l'Allemand, a chef-d'œuvre of the Renaissance. Bourges has a lyceum, a normal school, a public library, a museum, a general hospital, etc. It is an important military center, and has an ordnance foundry, arsenal, etc., and manufactories of leather, cloth, cutlery, etc. In the time of Julius Cæsar, who took the town in 52 B. C., Bourges was called Avaricum. In the Middle Ages it was capital of the province of Berri. The great fire of 1487, which destroyed 3,000 houses, gave the city a blow from which it never recovered. Pop. (1906) 44,133.

Bourget, Paul (bör-zhā'), a French novelist, born in Amiens, Sept. 2, 1852. After a brilliant course at the Lyceum of Clermont-Ferrand, where his father was Professor of Mathematics, and the Collège of Sainte Barbe, he graduated with high honors in 1872. He began to write in 1873, but it was ten years before he found his true work, though he contributed, the while, numerous articles to the magazines, and published three volumes of striking verse, "La Vie Inquiète" (1875); "Edel" (1878); and "Les Aveux" (1881). His "Essais" (1883) was the first indication of his strength. The second series, "Nouveaux Essais de Psychologie Contemporaine" (1886), was a singularly subtle and exceedingly searching inquiry into the causes of the pessimism which was then widely prevalent in France. Bourget's first novel, "L'Irréparable" (1884), was followed by "Cruelle Enigme" (1885); "Un Crime d'Amour" (1886); "André Cornelis" (1887), and "Mensonges" (1887). The keen insight into the hidden springs of human motive, and the marvelous subtlety of psychological analysis of these stories, together with their clearness and refinement of style, have lifted Bourget into the front rank of contemporary French novelists. His intimate knowledge of English and Italian life, and his travels in Spain and Morocco, gave him the materials for "Sensations d'Italie" (1891), and "Cosmopolis" (1892), and he recorded his impressions (1894) of travel in the United States. Other novels are "Le Disciple," "Notre Cœur," "La Terre Promise," "Un Saint," "Antigone," "The Disciple," etc. Their author was admitted to the Academy in 1894.

Bourinot, John George (bö-rën-ō'), a Canadian publicist, born in Sydney, Nova Scotia, Oct. 24, 1838. He was educated at Trinity College, Toronto; founded and edited the "Halifax Reporter," became clerk of the Dominion Parliament in 1880; was created a member of the Order of St. Michael and St. George in 1890; and in 1892 became President of the Royal Society of Canada. His publications include "The Intellectual Development of the Canadian People," "Constitutional History of Canada," and "Parliamentary Government in Canada." He died Oct. 12, 1902.

Bourke, John Gregory, an American military officer, born in Philadelphia, Pa., June 23, 1846. He was graduated at West Point in 1869, and saw much service against the Indians, rising through various grades to the rank of major. He became an expert in American ethnological lore; was a past President of the American Folklore Society, and wrote "Snake Dance of the Moquis," "Medicine Men of the Apaches" and other books. He distin-

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guished himself on the Mexican border. He was an officer of great courage and ability. He died in Philadelphia, Pa., June 8, 1896.

Bourmont (bör-môn'), **Louis Auguste Victor de Ghaisne, Comte de**, Marshal of France, born in Anjou, Sept. 2, 1773. He served as an officer under the Prince of Condé, and, from 1793 to 1796, was actively engaged in the anti-revolutionary struggle in La Vendée. Subsequently, he obtained the favor of the First Consul. Under the Empire he was soon raised to the rank of brigadier-general. In the campaigns of 1813 and 1814, he distinguished himself, particularly in the battle of Dresden, and by the defense of Nogent, on account of which Napoleon promoted him to the rank of a general of division. On March 31, 1814, he declared for the Bourbons, and received the command of a military division during the first Restoration; yet, on Napoleon's return, he went over to him. His evidence went a considerable way in bringing about the condemnation and execution of Marshal Ney. He received high military employment under Louis XVIII. Distinguishing himself in the Chamber of Peers as a zealous supporter of the King, he was appointed Minister of War in 1829, and, in this office, displayed great activity. When the expedition against Algiers was undertaken in April, 1830, he received the chief command of the troops, and the rapid success of the expedition was ascribed to his prudence and energy. For this he received the Marshal's baton on July 22, but, on the Revolution taking place in that month, he was superseded in his command, and went to England to share the exile of Charles X. He died in Anjou, Oct. 27, 1846.

Bourne, Edward Gaylord (börn), an American educator, born in Strykersville, N. J., June 24, 1860. He was graduated at Yale in 1883, and has been Professor of History at that institution since 1895, having previously instructed and lectured in history there. He has written "The History of Surplus Revenue," and is one of the editors of the "Yale Review."

Bourne, Hugh, founder of the sect of Primitive Methodists or Ranters, born in Staffordshire, England, April 3, 1772. In the course of his life he visited Scotland, Ireland, Canada, and the United States, where his ministrations were attended with great success. He died in Bemersly, Oct. 11, 1852.

Bourrienne, Fauvelet de (bör-yen'), a French diplomatist, born in 1769, and educated along with Bonaparte at the School of Brienne, where a close intimacy sprang up between them. Bourrienne went to Germany to study law and languages, but, returning to Paris in 1792, renewed his friendship with Napoleon, from whom he

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obtained various appointments, and, latterly, that of minister plenipotentiary at Hamburg. Notwithstanding that his character suffered from his being involved in several dishonorable monetary transactions, he continued to fill high State offices, and, in 1814, was made prefect of police. On the abdication of Napoleon he paid his court to Louis XVIII., and was nominated a Minister of State. The Revolution of July, 1830, and the loss of his wealth affected him so much that he lost his reason, and died in a lunatic asylum in 1834. His "Mémoires sur Napoléon, le Directoire, le Consulat, l'Empire et la Restauration" are valuable.

Bourse, an exchange where merchants, bankers, etc., meet for the transaction of financial business. Used especially of the Stock Exchange of Paris. In the United States the great exchange in Philadelphia is styled the Bourse.

Boussa (bö's'a), or **Bussang**, a city of Africa, in the Sudan, on the Niger, near where are rapids; about lat. 10° 40' N. It was here that Mungo Park met his death in 1805. Pop. est. 12,000 to 18,000.

Boussingault, Jean Baptiste Joseph Dieudonne (bö-san-gō'), a French chemist, born in Paris in 1802. He went to South America in the employment of a mining company, and made extensive travels and valuable scientific researches there. Returning to France he became Professor of Chemistry at Lyons in 1839, was made a member of the Institute, and then made Paris his chief residence. His works deal chiefly with agricultural chemistry, and include "Economie Rurale" (translated into English and German); "Mémoires de Chimie Agricole et de Physiologie," "Agronomie, Chimie Agricole, et Physiologie," etc. He died in 1887.

Boutelle, Charles Addison (bö-tel'), an American legislator, born in Damariscotta, Me., Feb. 9, 1839; served in the navy during the Civil War, entering as an acting master, and being promoted to lieutenant for gallantry in action. In 1870 he became the editor of the Bangor "Whig and Courier." He was elected to Congress in 1882, and held his seat till December, 1900, when he resigned, and was made a captain on the retired list of the navy. He was author of the bill (1890) authorizing the construction of the first modern battleships of the United States Navy. He died in Waverly, Mass., May 21, 1901.

Bouts Rimés (bö rē-mā'), (French, rhymed endings) are a kind of verse, the making of which forms a social amusement. Some one of the party gives out rhymes or endings of a stanza, and the others have to fill up the lines as they best may. Sup-

pose the rhymes prescribed are *wave, lie; brave, die*; the following are two of the ways in which the lines might be completed:

Dark are the secrets of the gulfling	wave,
Where, wrapped in death, so many heroes	lie;
Yet glorious death's the guerdon of the	brave,
And those who bravely live can bravely	die.
Whenever I sail on the	wave,
O'ercome with sea-sickness I	lie;
I can <i>sing</i> of the sea, and look	brave;
When I <i>feel</i> it, I <i>feel</i> like to	die.

These were once very popular, especially in France.

Boutwell, George Sewell, an American statesman, born in Brookline, Mass., Jan. 23, 1818; was admitted to the bar in 1836; served in the State Legislature in 1842-1851; Governor of Massachusetts in 1851-1852; was an organizer of the Republican Party in 1854; appointed the first commissioner of the newly established Department of Internal Revenue in 1862; a Representative in Congress in 1863-1869; one of the managers of the impeachment trial of President Johnson; Secretary of the Treasury in 1869-1873; and a United States Senator in 1873-1879. Besides numerous speeches he published "Educational Topics and Institutions" (1859); several works concerning taxation, and "The Constitution of the United States at the End of the First Century" (1896). He died Feb. 27, 1905.

Bouvard, Alexis (bö-vär'), a Swiss mathematician and astronomer, born in 1767; went to Paris about 1785 to study mathematics and astronomy, and in 1793 obtained a position in the Paris Observatory. He is celebrated for his researches in the theory of planetary motions, especially those of Jupiter and Saturn. Later he took up the theory of Uranus, and was the first to suggest that the discrepancies between the old and new observations could only be reconciled by the hypothesis of another undiscovered disturbing planet, an opinion which he retained till his death, three years before the discovery of Neptune.

Bouvard, Joseph Antoine, a French architect, born in Saint-Jean-de-Bournay, Feb. 19, 1840. He was a pupil of Constant Dufeux, whom he assisted in his work connected with the Panthéon, the Law School, and the Palace of the Luxembourg. He was appointed inspector of public works in Paris, and, in 1879, was city architect, making himself famous by his work on the Théâtre Lyrique, the Church of St. Lawrence and the barracks of the Republican Guard. He transformed the old grain market into a Bourse; constructed the railway stations of Sainte Étienne and Marseilles; was architect of the Pavilion of the City of Paris at the Exposition of 1878; and created the magnificent Central Dome of

that of 1889. He had charge of the decoration of Paris at the time of the visit of the Emperor of Russia, and won great popularity by the magnificence of the festivals which he arranged. In June, 1897, he was appointed director of the newly-created administrative direction of architecture and promenades. He was made an officer of the Legion of Honor in 1889. He took an important part in the preparation for the Universal Exposition of 1900, being director of architectural services and chief of the management of fetes, under M. Picard.

Bouvier, John, an American jurist, of Italian birth, born in 1787. His chief work was "Institutes of American Law." He also published a "Law Dictionary." He was made a Judge of the Court of Quarter Sessions in Philadelphia in 1838, and died there, Nov. 18, 1851.

Bovidæ, a family of ruminating animals, containing not merely the oxen, but many other animals now placed in other families. It was subdivided into *bovina cervina, giraffina, moschina*, and *camelina*; also, a family of ruminating animals, consisting of species with simply rounded horns, which are not twisted in a spiral manner. There are no lachrymal sinuses. It contains the genera *bos*, *bison*, *bubalus*, etc. *Ovibos* (musk ox), generally ranked under *bovidæ*, is by some placed with the *ovidæ*. The oldest known are various species of *bos*, *hemi-bos*, and *amphibos* in the Upper Miocene of India. The genera *bos* and *bison* are found in the Pliocene.

Bow, the name of one of the most ancient and universal weapons of offense. It is made of steel, wood, horn, or other elastic substance. The figure of the bow is nearly the same in all countries. The ancient Grecian bow was somewhat in the form of the letter E: in drawing it, the hand was brought back to the right breast, and not to the ear. The Scythian bow was nearly semicircular. The long bow was the favorite national weapon in England. The battles of Crecy (1346), Poitiers (1356), and Agincourt (1415) were won by this weapon. It was made of yew, ash, etc., of the height of the archer, or about six feet long, the arrow being usually half the length of the bow. The arbalist, or cross bow, was a popular weapon with the Italians, and was introduced into England in the 13th century, but never was so popular as the long bow. In England the strictest regulations were made to encourage and facilitate the use of the bow. Merchants were obliged to import a certain proportion of bow staves with every cargo; town councils had to provide public shooting butts near the town. Of the power of the bow, and the distance to which it will carry, some remarkable anecdotes are related.

Thus, Stuart ("Athenian Antiquities" i.) mentions a random shot of a Turk, which he found to be 584 yards. In the journal of King Edward VI. it is mentioned that 100 archers of the King's Guard shot at a 1-inch board, and that some of the arrows passed through this and into another board behind it, although the wood was extremely solid and firm.

Bow, in music, an appliance with which the strings of certain musical instruments of the viol class are set in vibration. It consists of a number of long horse hairs stretched upon an elastic rod, which are tightened by a nut and screw. It was originally curved, whence its name. The old form is still seen in the rebeck or rebab of Algeria.

Bow Bells, the peal of bells belonging to the Church of St. Mary-le-Bow, Cheapside, London, and celebrated for centuries. One who is born within the sound of Bow Bells is considered a genuine cockney.

Bowdich, Thomas Edward (bou'dich), an African traveler, born in 1790. In 1816 he led an embassy to the King of Ashanti, and afterward published an account of his mission (1819). Having undertaken a second African expedition, he arrived in the river Gambia, where disease put an end to his life in 1824.

Bowditch, Henry Ingersoll, an American physican, born in Salem, Mass., Aug. 9, 1808; received his degree at Harvard in 1832; was Professor of Clinical Medicine at Harvard in 1859-1867; chairman of the State Board of Health in 1869-1879; and President of the American Medical Association in 1877. He discovered the law of soil moisture as a cause of consumption in New England; introduced several new features in surgical treatment, and was author of many general and special works in medical science. He died in Boston, Mass., Jan. 14, 1892.

Bowditch, Henry Pickering, an American educator, born in Boston, Mass., April 4, 1840; was graduated at Harvard in 1861, and subsequently studied chemistry and medicine, and, after the Civil War, in which he reached the rank of major in the Union service, he took a special course in physiology in France and Germany. In 1871-1876 he was Assistant Professor of Physiology in the Harvard Medical School, and in 1876 was elected to the full chair. He is a member of the American Academy of Arts and Sciences, as well as of numerous medical societies, and has published many papers on physiological subjects.

Bowditch, Nathaniel, an American mathematician, born in Salem, Mass., March 26, 1773; published, in 1802, the "American Practical Navigator," a work of the highest value and utility. In 1814-1817,

appeared his translation of the "Mécanique Celeste" of Laplace, with an able commentary—a work which obtained for him admission as a Fellow to the Royal Society of London. He died in Boston, March 16, 1838.

Bowdler, Thomas, an English expurgator, born near Bath, July 11, 1754. At 16, he went to St. Andrews to study medicine, but graduated M. D. of Edinburgh in 1776, and, after some years of travel, settled in London, devoting himself mainly to charitable work. He lived for 10 years at St. Boniface, Isle of Wight, and for the last 15 years of his life at Rhyddings, near Swansea. In 1818 he published "The Family Shakespeare," in 10 volumes; in which nothing is added to the original text; but those words and expressions are omitted which cannot, with propriety, be read aloud in a family. The work had a large sale, and was long popular, spite of the ridicule it brought down upon the head of its overprudent editor, who had the happiness or unhappiness to add permanently to the English tongue the word bowdlerism as a synonym for senseless expurgation. The last years of Bowdler's life were given to the task of preparing a purified edition of Gibbon's "History." He died in Rhyddings, Feb. 24, 1825.

Bowdoin, James, an American patriot, born in Boston, Aug. 8, 1727. He was prominent in Massachusetts during the Revolution. He became governor of his State in 1785, and, in the following year, suppressed Shay's rebellion. Bowdoin College was named after him. He died in Boston, Nov. 6, 1790.

Bowdoin College, a co-educational institution in Brunswick, Me.; organized in 1794 under the auspices of the Congregational Church; has grounds and buildings valued at over \$400,000; productive funds exceeding \$1,860,000; scientific apparatus, over \$56,000; volumes in the library, over 94,000; ordinary income, about \$100,000; professors and instructors, over 60; students, about 500; graduates, over 6,000.

Bowell, Sir Mackenzie, a Canadian politician, born in Rickingham, Suffolk, England, Dec. 27, 1823. He went to Canada when 10 years old and learned the printing trade, becoming editor of the Belleville "Intelligencer." He served in the Canadian militia. After the Confederation he served in the Dominion House of Commons for 25 years. In 1878 he entered the MacDonald Cabinet, and in 1894, formed an administration of his own. He relinquished cabinet office in 1896, and in 1897 he declared his independence of all party affiliation.

Bowels. See ABDOMEN: DIARRHŒA: INTESTINES.

Bowen, Henry Chandler, an American editor and publisher, born in Woodstock,

Bowerbankia

Conn., Sept. 11, 1813. He received a common school education and entered business. In 1848 he helped found "The Independent," in New York, becoming, in 1861, its editor and proprietor, and making the paper famous for its advanced views on public topics. He died in Brooklyn, N. Y., Feb. 24, 1896.

Bowerbankia (from J. S. Bowerbank, an eminent naturalist, who flourished in the middle of the 19th century), a genus of *ascidioid polyzoa*, belonging to the family *vesiculariidae*. *B. imbricata* is found abundantly on the chains of vessels.

Bower Birds, the name given to certain birds of the genera *ptilonorhynchus* and *chlamydodera*, which are ranked under the family *sturnidae* (starlings). They are found in Australia. The English name is given because these birds are in the habit of building bowers as well as nests. The best-known species is *ptilonorhynchus holosericeus*.

Bowers, Elizabeth Crocker, an American actress, born in Ridgefield, Conn., March 12, 1830. She made her first appearance on the stage at the Park Theater, New York, in 1846, and in 1847 married David P. Bowers, and appeared as Donna Victoria in "A Bold Stroke for a Husband," in Philadelphia. She was a stock member of the Arch Street Company in Philadelphia until her husband's death in 1857. She remarried in 1860, and, in the next year, made a professional trip to England with great success. She returned to New York in 1863, and, after fulfilling several engagements, retired from the stage. In 1884 she returned to the stage in "La Charbonniere," and in 1886 began a series of performances with her own company at the 14th Street Theater in New York. She played with Rose Coghlan in "A Woman of No Importance," in 1893, and supported Olga Nethersole in her first appearance in the United States in 1894. Her last impersonation was that of Lady Margrave in "The New Woman" in the early part of 1895. She died in Washington, D. C., Nov. 6, 1895.

Bowery, The, a New York street. It begins at Chatham Square and terminates at Cooper Union. It was long famous for the resorts located along its length, but its character has undergone improvement.

Bowie, James, an American frontiersman, born in Burke county, Ga., about 1790. He took part in the revolt of Texas against Mexico, and fell in the Alamo massacre, March 6, 1836. He gave his name to the bowie knife.

Bowles, Francis Tiffany, an American naval constructor, born in Springfield, Mass., Oct. 7, 1858. He was graduated at the United States Naval Academy in 1879,

Bowling

and afterward became prominent in the work of reconstructing the United States navy. He was in charge of construction at the navy yards in Norfolk and Brooklyn; and was Chief Constructor of the navy from March 1901, till his resignation, Oct. 25, 1903.

Bowles, Samuel, an American journalist, born in Springfield, Mass., Feb. 9, 1826. He was editor and proprietor of the Springfield "Republican" and a prominent factor in public affairs. He wrote "Across the Continent" and "The Switzerland of America." He died at Springfield, Mass., Jan. 16, 1878.

Bowles, William Lisle, an English poet, born in King's Sutton, Northamptonshire, in 1762, where his father was vicar; was educated at Winchester and Oxford, where he gained high honors. In 1789 he composed a series of sonnets, by which the young minds of Coleridge and Wordsworth, then seeking for new and more natural chords of poetry, were powerfully affected to such an extent that Bowles is considered to have created, by his influence, the Lake School of poetry. In 1806 he issued a critical edition of Pope, which led to a memorable controversy (1809-1825), in which Byron and Campbell were his opponents. His other works include "The Grave of Howard" (1790); "Coombe Ellen" (1798); "The Battle of the Nile" (1799); "The Spirit of Discovery" (1804), his longest poem; and "St. John in Patmos" (1832). He died in Salisbury, April 7, 1850.

Bowling, an ancient English game, still extremely popular. It is played on a smooth, level piece of green sward, about 40 yards long, and surrounded by a trench about 6 inches in depth. A small white ball, called the jack, is placed at one end of the green, and the object of the players, who range themselves in sides at the other, is so to roll their bowls that they may lie as near as possible to the jack. Each bowl is much larger than the jack. The side which owns the greatest number of bowls next the jack, each bowl so placed constituting a point, carries off the victory. The game played in Scotland differs in several respects from that of England. Another form is a favorite game in the United States. It is played generally indoors, in an alley 50 to 65 feet in length and about 4 feet in width. At the farther extremity 10 pins, generally of ash wood, of about 1 foot in height, are set up in the form of a pyramid. The players roll wooden balls at these, and endeavor to knock down as many as possible at each throw. The pins when set up are termed a frame, and at each frame the bowler rolls three balls. The number of pins knocked down is registered, and the frame set up again for the next player.

Bowman, Sir William, an English anatomist and surgeon, born in Nantwich, July 20, 1816. He was surgeon to King's College Hospital, London, and Professor of Physiology and Anatomy in King's College, and was especially distinguished as an ophthalmic surgeon. He gained the Royal Society's royal medal for physiology in 1842. He was collaborator with Todd in the great work on the "Physiological Anatomy and Physiology of Man," and wrote much on ophthalmology. He was created a baronet in 1884. He died March 28, 1892.

Bowne, Borden Parker (boun), an American philosophical writer, born in Leonardville, N. J., Jan. 14, 1847. He was religious editor of the New York "Independent," 1875-1876, becoming Professor of Philosophy at Boston University in 1876. Works: "Philosophy of Herbert Spencer," "Metaphysics," etc. He died April 1, 1910.

Bowring, Sir John, an English linguist, author and diplomat, born in Exeter, Oct. 17, 1792; was a great traveler and a close student; and boasted that he knew 200 languages and could speak 100. In 1825 he became editor of the "Westminster Review," in which he advocated free trade by repeal of the Corn Laws in advance of Bright and Cobden. He was a member of Parliament in 1835-1837 and 1841-1847; was appointed on various commissions, to France, Switzerland, Italy, Syria, etc. In 1849 he was British consul at Hong-Kong; in 1854 was made plenipotentiary and later, governor, commander-in-chief and vice admiral of Hong-Kong and its dependencies and Superintendent of the Trade in China. In 1855 he concluded a treaty with Siam; he was knighted in 1854. He rendered great service to English literature by translating the popular poems and folk-songs of various nations. Among his works are "Specimens of the Russian Poets" (London, 1821-1823); "Ancient Poetry and Romances of Spain" (1824); "Specimens of the Polish Poets" (1827); "Servian Popular Poetry" (1827); "Poetry of the Magyars" (1830); "Cheskian Anthology" (1832); "The Flowery Scroll: a Chinese Novel" (1868); "The Oak: Original Tales and Sketches" (1869); and two important volumes of travel, "The Kingdom and People of Siam" (1857), and "A Visit to the Philippine Islands" (1859). He edited, with a biography (22 vols., London, 1838), the works of Jeremy Bentham, of whom he was a disciple and admirer; and wrote a number of books on political and social topics, and also hymns and poems. He died in Exeter, Nov. 23, 1872.

Bowsprit, a spar projecting forward from the bows of a vessel. It supports the jibboom and flying jibboom, and to the bowsprit and these spars the forestay, foretopmast stay, etc., are secured. It is tied down by the bobstays and by the gammoning. It

is staved laterally by the bowsprit shrouds. It rests upon the stem and the apron. The part which rests on the stem is the bed; the inner part from that point is the housing; the inner end is the heel; the outer end the head or bees seating. The gammoning is the lashing by which the bowsprit is secured to the knee of the head. The martingale is a spar depending from the bowsprit end, and is used for reeving the stays. The heel-chain is for holding out the jibboom, and the crupper chain for lashing it down to the bowsprit. The bowsprit has heel, head, fiddle or bees, chock, gammoning, bobstays, shrouds, martingale, and dolphin striker. Bowsprits are standing, that is, permanent, as in large vessels or sloops; or running-in bowsprits, as in cutters.

Bowstring Hemp (so called because the fibers of the leaves are used for bowstrings by the natives of the country where they grow), an English name for *sansevieria*, a genus of *liliaceæ*. It is called also African hemp. The species are stemless perennials, with whitish or yellowish green clusters of flowers. They are found in Africa and Southern Asia. *Sansevieria roxburghiana* is the moorva or marvel of India, the fibers of which are used in the manufacture of string.

Bow Window See BAY WINDOW.

Bowyer, Sir George, an English law writer, born near Oxford in 1811; called to the bar in 1839. Converted to Catholicism in 1850, he represented Dundalk in 1852-1868, and the county of Wexford in 1874-1880, when his Home Rule principles estranged him from the Liberal Party, and, in 1876, led to his expulsion from the Reform Club. He succeeded his father as seventh baronet in 1860. He was author of several able works on constitutional law and Catholic subjects. He died in London, June 7, 1883.

Box, the English name of *buxus*, a genus of plants belonging to the order *euphorbiaceæ* (spurge-worts). The common boxtree is *buxus sempervirens*. In its wild state it is a small tree. It is found all over the world in some form of species. It is an evergreen. A dwarf variety of the box is used as an edging along walkways in gardens. The leaves of the box are said to be poisonous to camels; the seeds have been used in intermittent fevers and some other diseases.

Box Elder, the English name of *negundium*, a genus of plants belonging to the order *aceraceæ* (maples). It resembles *acer*, but has pinnate leaves. The ash-leaved box elder, *negundium americanum*, rises to the height of 35 feet, and is an ornamental tree.

Boxers, members of a Chinese secret society which aims ostensibly at the expulsion of foreigners from China. The native name

for the organization is *I-ho-ch'uan*, usually rendered "Combination of Righteous Harmony Fists," and the like. The origin of the Boxers appears to have been due to fanatic opposition to Christian missionaries and to the encroachments of European powers upon Chinese territory. The events which precipitated the first demonstrations of the Boxers were the occupation of Kiao-Chau by Germany, the acquisition of Port Arthur by Russia, the taking of Wei-Hai-Wei by England, and the French seizure of Kwang-Chau. Thus the Boxer movement presents itself largely under the aspect of a patriotic uprising against foreign aggression, a fact which goes far to account for the rapidity and thoroughness of its operations in 1900.

Early in that year the native population in Shantung were found to be rallying around the standard of the Boxers and adopting its motto, "Uphold the dynasty, drive out the foreigners." The Diplomatic Corps at Peking called upon the Imperial Government to suppress the movement. This the court professed its readiness to do, although there was a suspicion, voiced by the British Minister, that the Empress Dowager had fallen under the influence of a native party led by Tung Fu-hsiang and Yu-hsien, and was temporizing with the Boxers. In May, 1900, the Boxers began a concerted movement upon the Chinese capital which, notwithstanding the protests of the Diplomatic Corps, remained unchecked by the military forces of the Empire. These forces being Manchu troops, their loyalty was open to question and their sympathies were alleged to be with the Boxer movement. This, at any rate, is the only explanation offered by the Chinese Government for its failure to cope with the uprising.

The situation had been rendered additionally threatening by the action of the allies in opening fire upon the forts at Taku. On June 17 the warships of the Powers were in force at that port; when fired upon by the Chinese they opened a bombardment. The demonstration before Taku had been deprecated by the United States commander, Admiral Kempff, who did not participate in the bombardment. His warning that hostilities would unite the Chinese against the foreigners was justified by events.

In June, 1900, Peking was reduced to a state of siege by the Boxers. The position of the foreigners in the capital became precarious. The entire Diplomatic Corps was cut off from communication with the outside world. In the emergency, the Powers hurried military and naval forces to the scene, and an international relief column, under the command of Admiral Seymour, of the British Navy, moved upon Peking. This force was, however, compelled to retreat, when a short distance beyond

Tien-Tsin, with a loss of 300 men. The position of the capital now became desperate. Cut off from communication with the rest of the world, Peking was a scene of turbulence and the center of wild rumor. It was reported that on July 7, the entire Diplomatic Corps had fallen a prey to Boxer fury. This rumor was later discredited, the aspect of affairs having been rendered incomprehensible by the receipt of a despatch purporting to emanate from United States Minister Conger, and bearing date July 18. According to this despatch the Diplomatic Corps had taken refuge in the British Embassy, where they remained in a state of siege by the Boxers, anticipating massacre unless speedily relieved.

Meanwhile the allies had concentrated their forces upon Tien-Tsin, capturing the place in the middle of July, but suffering severe loss. The 9th Regiment, United States Army, had many casualties, including the loss of its colonel and other officers. The movement had spread in all directions among the Chinese, who, on July 16, invaded Siberia. Russia at once proclaimed a state of siege in its Asiatic dominions. The Powers did not, as yet, give formal recognition to a state of war, chiefly in consequence of the attitude of the United States, which took the ground that the Chinese Government had been overpowered by an insurrectionary movement. On July 20, the Powers made a categorical demand to be placed in communication with their diplomatic representatives. The authorities at Peking professed their readiness to comply at the earliest possible moment. The international situation was more clearly defined on July 23, by the appeal of China to the United States for the good offices of the latter in dealing with the Powers. See CHINA.

Boxing. See PUGILISM.

Boxing the Compass, in seamen's phrase, the repetition of all the points of the compass in their proper order — an accomplishment required to be attained by all sailors.

Box Thorn, a genus of *solanaceæ* (night-shades). They are ornamental plants. The willow-leaved species, *lycium barbarum*, so called because it comes from Barbary, is valuable for covering naked walls or arbors. The European box thorn, *L. europæum*, which is spiny, is used as a hedge plant in Tuscany. The small shoots are said to be eaten in Spain with oil and vinegar.

Box Tortoise, a name given to one or two North American tortoises, genus *cistūdo*, that can completely shut themselves into their shell.

Boyacá, a Department of Colombia, touching Venezuela. In the W. it is mountainous; in the E. it has vast prairies, and is watered by the Meta and its tributaries. The Muzo emerald mine is the richest in the

Boyar

world, and the Department is rich in salt springs, coal, iron, plumbago, and copper ore. Area, 4,630 square miles; pop. (1905) 350,000. Capital, Tunja.

Boyar, Boiar, or Boyard, a name first used by the Bulgarians, Serbs and Russians, subsequently adopted by the Moldavians and Wallachians, and synonymous with *bojarin*, used by the Bohemians, Poles, and other Slavic tribes, to qualify the highest social condition; corresponding in certain respects to that of an English peer. In ancient Russia the boyars were the next after the princes of the blood. While Russia was still divided into several petty sovereignties, the boyars enjoyed the right of choosing for themselves, and for their dependents, the prince whom they wished to serve, and to leave the service at their pleasure, without any previous notification. Peter the Great wholly abolished their power and official privileges, and the name now remains only as a historical distinction, and a recollection of the past in families which once possessed the dignity. In Wallachia and Moldavia the boyars still exist; they form the council of the princes or *hospodars*, and exercise a preponderating influence over the people.

Boyce, William, an English composer, born in London in 1710; was a chorister at St. Paul's, and was appointed composer to the Chapel Royal, in 1736, and organist in 1758. He received the degree of Doctor of Music from Cambridge in 1749, and was master of the King's band from 1755. Boyce holds a high rank as a composer of church music, his two services and several of his anthems being still frequently performed. His songs include "Hearts of Oak," written for one of Garrick's pantomimes; and a miscellaneous collection of his songs and cantatas extended to six volumes. His best work is the serenata of "Solomon" (1743); his most valuable publication is a collection of the "Cathedral Music" of the two preceding centuries (3 vols., 1760). He died in Kensington, Feb. 7, 1779.

Boycotting, a practice which owes its name to Capt. C. C. Boycott (died June 21, 1897), of Lough Mask House, in Mayo, Ireland, and agent, in 1880, of Lord Erne, an Irish nobleman. The former gentleman having given offense about agrarian matters to the people among whom he lived, during the land agitation of 1880-1881, no one would gather in his crops. The case being reported in the "Press," about 60 Orangemen, belonging to the North of Ireland, each man carrying a revolver, organized themselves into a "Boycott relief expedition." The Government gave them a strong escort of cavalry, besides foot soldiers and constabulary, artillery also being added on the return journey. The crops were gathered in and sent away, and the Captain himself

Boyd

brought off to a region of greater security. The object of a boycott is to put a person outside the pale of the society, amid which he lives, and on which he depends; socially to outlaw him, to refuse to sell to, and decline to buy from, him; to refuse to work for or to employ him.

In the United States and in England the boycott is made use of by trade unionists as a strike measure. It has in some instances been enjoined by the courts. Laws prohibiting boycotting in terms have been enacted in Colorado, Illinois and Wisconsin, and laws which may fairly be construed as prohibiting boycotting have been passed in Alabama, Connecticut, Florida, Georgia, Maine, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, New Hampshire, New York, North Dakota, Oklahoma, Oregon, South Dakota, Texas, Utah, Vermont, and Wisconsin. In the following States it is unlawful for any employer to exact an agreement, either written or verbal, from an employé not to join or become a member of any labor organization, as a condition of employment: California, Colorado, Idaho, Indiana, Massachusetts, Minnesota, Missouri, New Jersey, New York, Ohio, and Pennsylvania.

Boyd, Andrew Kennedy Hutchison, a Scotch clergyman and author, born in Auchinleck, Ayrshire, Nov. 3, 1825; educated at King's College, London, and Glasgow University; was ordained in 1851, and was incumbent successively of the parishes of Newton-on-Ayr, Kirekpatrick-Irongray, in Galloway, St. Bernard's, Edinburgh, and at the university city of St. Andrews. He early became known as a contributor to "Fraser's Magazine," under the signature "A. K. H. B." Many of these contributions were reprinted in book form under the title, "Recreations of a Country Parson," of which three series appeared. In 1890 he was Moderator of the General Assembly of the Church of Scotland. He also published "Graver Thoughts of a Country Parson," "Counsel and Comfort Spoken from a City Pulpit," "Present-Day Thoughts," "Memorials of St. Andrew's Sundays" (1870); "Toward the Sunset" (1883); "What Set Him Right" (1885); "The Best Last" (1888); "Twenty-Five Years of St. Andrew's" (2 vols., 1895); "St. Andrew's and Elsewhere" (1895), etc. He died in London, Nov. 2, 1899.

Boyd, Belle, a Confederate spy, born in Martinsburg, W. Va., May 9, 1843. She rendered invaluable aid to the Southern cause by detecting the Federal plans of campaign and revealing them to the Confederates. Gen. "Stonewall" Jackson sent her a letter of thanks. She died at Kilbourn, Wis., June 11, 1900.

Boyd, Thomas Duckett, an American educator, born in Wytheville, Va., Jan. 20,

1854. He was graduated at Louisiana State University, and has held important posts in the educational institutions of Louisiana. Since 1896 he has been President of Louisiana State University.

Boyden, Seth, an American inventor, born in Foxboro, Mass., Nov. 17, 1788; was brought up on a farm, and attended a district school. Mechanically inclined, he spent much time experimenting in a blacksmith shop. His first invention was a machine for making nails, and in 1809 he undertook to manufacture both nails and files. Soon afterward he invented a machine for splitting leather, and in 1815, he took it to Newark, N. J., where he engaged in the leather business. In 1816 he invented a machine for cutting brads, and followed this by the invention of patent leather, which he manufactured till 1831, when he began making malleable iron castings, on a system of his own. In 1835 he turned his attention to steam engines; substituted the straight axle for the crank in locomotives; and invented the cut-off now used instead of the throttle valve. In 1849 he went to California, but was unsuccessful, and returned to New Jersey, where he applied himself to farming, and developed a variety of strawberry previously unequalled in size or quality. He died in Middletown, N. J., March 31, 1870; and, in 1890, a statue was erected to his memory in Washington Park, Newark, N. J., where he spent the greater part of his life.

Boyer (bō-yā'), **Alexis, Baron de**, a French surgeon, born in Uzereche in 1757. He was surgeon to Napoleon, who made him a baron. After the Restoration he remained in the service of Louis XVIII., Charles X., and Louis Philippe. In 1825 he was admitted to the Institute. His principal works are "Traité Complet d'Anatomie," and "Traité des Maladies Chirurgicales." He died in Paris, Nov. 25, 1833.

Boyer, Jean Pierre, President of the Republic of Haiti, was a mulatto, born in Port-au-Prince in 1776. He was educated in France, and, in 1776, entered the military service. After fighting against the British, under General Rigaud, leader of the mulattoes, and afterward under General Leclerc, he entered into a combination which had for its object the union of the negroes and mulattoes, and a complete emancipation of the colony. He was unanimously elected President of the Republic in 1818. He arranged the financial affairs, collected funds into the treasury, improved the administration, and encouraged arts and sciences. After the death of Christophe, he united the monarchical part of the island with the Republic in 1820; and, in 1821, the eastern district also, which had hitherto remained under the dominion of Spain; and he urgently sought the recognition of the inde-

pendence of the youthful State by France, which was obtained, in 1825, upon payment of an indemnity of 150,000,000 francs. Boyer carried on the government of the Republic of Haiti for 15 years from this time with the most perfect peace; but his policy, which was rather arbitrary, and directed to the object of depressing the negroes in favor of his own race, resulted in a victorious insurrection in 1843. Boyer fled to Jamaica. In 1848 he went to Paris, and died there, July 9, 1850.

Boyesen, Hjalmar Hjorth (boi'e-sen), an American novelist, born at Frederiksvärn, Norway, Sept. 23, 1848. After completing his university studies at Christiania, he came to the United States in 1869 and was editor of a Norwegian journal in Chicago. He returned to Europe in 1872 and studied Germanic Philology at Leipsic two years; then, returning to this country, he was Professor of German in Cornell University for six years, and then of Germanic Languages and Literature in Columbia College till his death. His story of Norwegian life, "Gunnar," published in the "Atlantic Monthly" (1873), and his "Idyls of Norway and Other Poems" (1883), gave proof of his rare imaginative faculty and his deep human sympathies. Besides these, he wrote "Tales from Two Hemispheres" (1875); "A Norseman's Pilgrimage" (1876); "Falconberg" (1878); "Goethe and Schiller: Their Lives and Works" (1878); "Ilka on the Hill-Tip" (1881, dramatized 1884); "Queen Titania" (1882); "A Daughter of the Philistines" (1883); "Story of Norway" (1886). Some of his works have been translated into German, etc. He was a founder of the New York Authors' Club. He died in New York, Oct. 4, 1895.

Boyle, Charles, the second son of Roger, Earl of Orrery; born in Chelsea, in 1676, and at 15 entered a nobleman at Christ Church, Oxford, under the care of Dr. Atterbury. While there, he published a new edition of the epistles of Phalaris. On leaving the university in 1700 he was chosen member for Huntingdon; and on the death of his brother succeeded to the earldom, and was soon after elected a Knight of the Thistle, and received the command of a regiment. In 1709 he was promoted to the rank of a Major-General, and sworn of the queen's privy-council; he was also envoy-extraordinary from the queen to the States of Flanders and Brabant, at the critical period of the treaty of Utrecht. Besides the edition of Phalaris, he published a comedy called "As You Find It." He died in 1731.

Boyle, David, a Canadian ethnologist, born in Greenock, Renfrewshire, Scotland, May 1, 1842. He went to Canada in 1856, and was first a blacksmith and then a teacher. He later took up geology and discovered the fossils *marchisonia boylei*, named in his honor. He has, for 15 years,

Boyle

been curator of the Archæological Museum at Toronto. He has written "Notes on Primitive Man in Ontario" and similar works.

Boyle, Richard, "THE GREAT EARL OF CORK," an English statesman, born in Canterbury in 1566. In 1588 he went to Dublin, with strong recommendations to persons in power, whose patronage he obtained. In 1595 he married a lady of fortune, whose death, a few years after, left him the possessor of property to the amount of \$2,500 a year. The state of Ireland at that time having rendered land very cheap, he took advantage of the circumstance to make some considerable purchases, among which was the estate of Sir Walter Raleigh, consisting of 12,000 acres, in the counties of Cork and Waterford, which he obtained on easy terms. King James I. appointed him Privy Councilor for Munster, and afterward for the Kingdom of Ireland; in 1616 he was made a peer of that realm by the title Baron Boyle of Youghal, and in 1620, he was created Viscount Dungarvan, and Earl of Cork. He was now at the height of his prosperity, living in his castle of Lismore in a style of grandeur more resembling that of a sovereign prince than of a private individual. In 1629 he was made one of the Lords Justices of Ireland, and in 1631 Lord Treasurer of that kingdom. He built and fortified towns and castles, and introduced among the people arts and manufactures; but he also put in force the severe laws of Queen Elizabeth against the Roman Catholics. In 1641 the Earl went to England as a witness against Lord Strafford, then under impeachment, having quarreled with that nobleman during his vice-royalty. Soon after his return home the insurrection of the Irish broke out, on which event he displayed his accustomed activity, enlisting his tenantry under the command of his sons, and taking other measures for the defense of the country; but he lived only



ROBERT BOYLE, M. D.

to see the commencement of the calamities of his adopted country. He died in 1643.

Boyle, Robert, a celebrated natural philosopher, born at Lismore, Ireland, in 1626; was the seventh son of Rich-

ard, the first Earl of Cork. After finishing his studies at Eton he traveled for some years

Boyne

on the Continent, till, in 1644, he settled in the manor at Stalbridge, Dorsetshire, which his father had left him. Here he devoted himself to scientific studies, to chemistry and natural philosophy in particular. He was one of the first members of the society founded in 1645, afterward known as the Royal Society. At Oxford, to which he had gone in 1652, he occupied himself in making improvements on the air pump, by means of which he demonstrated the elasticity of air. Although his scientific work shows an accurate, minute, and methodical intellect, in religious matters he was subject to melancholy and fanciful terrors. With the view of settling his faith he began the study of those Oriental languages which contain the origins of Christianity, and formed connections with such eminent scholars as Pococke, Clarke, Barlow, etc. He also instituted public lectures, known as the Boyle Lectures, "for proving the Christian religion against Atheists, Deists, Pagans, Jews, and Mohammedans, not descending to any controversies among Christians themselves." The first series was delivered by Richard Bentley. Samuel Clarke, Whiston, and F. D. Maurice have been among succeeding Boyle lecturers. He died in 1691, and was interred in Westminster Abbey.

Boyle, Roger, Earl of Orrery, brother of Robert Boyle, born in 1621. In Ireland he zealously supported the cause of Charles I., but, after the death of the King, he retired for a time from public life. At length he accepted a commission from Cromwell, whom he served with zeal and fidelity, and by whom he was highly esteemed. On the death of Cromwell he exerted himself with such dexterity to bring about the royal restoration that Charles II. rewarded him with the title of Earl of Orrery. He died in 1679.

Boyle's Fuming Liquor (so called from having been invented by Robert Boyle), a fetid, yellow liquid, obtained by distilling sal ammoniac with sulphur and lime. It is sometimes used in medicine under the name of *liquor fumans boylii*.

Boyle's Law, or **Mariotte's Law**, a law in physics to the effect that the volume of a gas will vary inversely to the pressure to which it is subjected, the temperature being constant.

Boyne, a river of Ireland, rises in the Bog of Allen, County Kildare, and flows N. E. through Meath to Drogheda, below which it enters the Irish Sea. It is navigable for barges up to Navan. The Boyne will ever be memorable in English history for the important victory gained on its banks about 3 miles above Drogheda, July 1, 1690, by the forces under the command of William III., over those of James II. Though James'

Boynton

personal courage was beyond all question, he, on this occasion, allowed the prudence of the sovereign to outweigh the impulses of the soldier. Of his troops 1,500 were killed and wounded, while William lost barely 500 men. In 1736 an obelisk, 150 feet high, was erected at Oldbridge, on the site of the battlefield, in commemoration of this victory.

Boynton, Henry Van Ness, an American soldier; born in West Stockbridge, Mass., July 22, 1835. He removed to Cincinnati, Ohio, in 1846, was graduated at the Kentucky Military Institute in 1858 and was retained in the faculty of that institution. On the outbreak of the Civil War he resigned his office, and, July 27, 1861, was commissioned major in the 35th Ohio Volunteers; was made lieutenant-colonel, July 19, 1863, and commanded the regiment at Chickamauga and at Missionary Ridge, where he was severely wounded. He also took part in other engagements, and was brevetted brigadier-general for gallantry at Chickamauga and Chattanooga. After the war he resided in Washington and was a newspaper correspondent. He published "Sherman's Historical Raid" (1875), a criticism of General Sherman's "Memoirs," based upon compilations from the files of the War Office. He headed the opposition in 1887 to President Cleveland's order for the return of the Confederate battle-flags. In 1894 he received a Congressional medal of honor for distinguished bravery at Missionary Ridge, and in 1898 he was appointed brigadier-general of volunteers for the war with Spain, and was in command of Camp Thomas, Chickamauga, after Aug. 15. He was chairman of the Chickamauga and Chattanooga Military Park Commission, and served as president of the board of education of the District of Columbia. He died in Atlantic City, N. J., June 3, 1905.

Boyton, Paul, an Irish-American swimmer; born in Dublin, June 29, 1848; served in the United States navy in 1863-1865, and was in the life-saving service in 1867-1869. He organized a life-saving brigade at Atlantic City, N. J. Boyton invented a rubber life-preserving suit, in which, in 1874, he leaped from a vessel off the coast of Ireland, and, after remaining seven hours in the water, reached land safely. On May 28, 1875, he crossed the English Channel in this suit, swimming across in 24 hours. In 1876 he made the run from the Bayou Goula to New Orleans, La., 100 miles, in 24 hours. In May, the same year, he descended the Danube from Linz to Budapest, 460 miles, in six days. Later he went from Oil City, Pa., to the Gulf of Mexico, 2,342 miles, in 80 days, being exposed at first to great cold and later to extreme heat. In November, 1879, he descended the Connecticut river from Canada to Long Island Sound.

Brabant

He commanded the Peruvian torpedo service in 1880-1881, was captured by the Chilians, and ordered to be executed, but escaped into the sea and was rescued. On Sept. 17, 1881, he started from Cedar Creek, Mont., to swim to St. Louis, Mo., and accomplished the long journey, 3,580 miles, Nov. 20. In 1888 he made a voyage down the Ohio river. He published an account of his adventures under the title "Roughing It in Rubber" (1886).

Bozrah, an ancient city of Palestine, E. of the Jordan, and about 80 miles S. of Damascus. It was the capital of Og, King of Bashan, and subsequently belonged to the tribe of Manasseh. Early in the Christian era it became a flourishing place, and was long a great emporium of trade. It is now a scene of ruins.

Bozzaris, Marcos (bots-zär'ēs), a Greek patriot, born in 1789. He was a Suliote, and distinguished himself by his devotion to his country, in defending it against the Turks. He fell in a night attack upon a body of the Turco-Albanian army, who were advancing with the view of taking Missolonghi, which he had successfully defended for a considerable time, Aug. 20, 1823.

Brabançonne (brab-än-sôn'), the national song of the Belgians, composed by the French M. Jenneval, and set to music by Campenhout. It was sung by the insurgents during the Revolution of September, 1830. Each verse of the Brabançonne ends with the refrain:

"La mitraille a brisé l'orange
Sur l'arbre de la liberté."

Brabant, the central district of the lowlands of Holland and Belgium, extending from the Waal to the sources of the Dyle, and from the Meuse and Limburg plains to the Lower Scheldt. It is divided between the Kingdoms of Holland and Belgium, into three provinces, (1) Dutch or North Brabant, area, 1,977 square miles, pop. (1906) 597,538; (2) Belgian Province of Antwerp, area, 1,095 square miles, pop. (1900) 819,159, and (3) the Belgian Province of South Brabant, area, 1,276 square miles, pop. (1900) 1,263,535. The country is generally a plain, gently sloping to the N. W., and is mostly fertile and well cultivated, agriculture and the rearing of cattle being the principal employment of the inhabitants. In the N. the inhabitants are Dutch; in the middle district, Flemings; in the S., Walloons. Southward of Brussels the language is French; northward, Dutch and Flemish. In the 5th century Brabant came into possession of the Franks, and, after being alternately included in and separated from Lorraine it emerged at length in 1190 as a duchy under a Duke of Brabant. It eventually came by marriage into possession of the Dukes of Burgundy, and passed with the

last representative of that line, Mary of Burgundy, to the House of Austria, and finally to Philip II. of Spain. In the famous revolt of the Netherlands, caused by the cruelties of King Philip and his agent, the Duke of Alva, North Brabant succeeded in asserting its independence, and, in 1648, it was incorporated with the United Provinces. South Brabant remained, however, in possession of the Spaniards, and at the Peace of Utrecht, in 1714, passed again, along with the other S. provinces of the Netherlands, to the imperial House of Austria.

Brabourne, Edward Huggessen Knatchbull-Huggessen, Lord, an English juvenile story writer, born in Kent, April 29, 1829. His literary fame is due mostly to his stories for children, including "Moonshine" (1871); "Tales at Tea Time" (1872); "Queer Folk" (1873); "River Legends" (1874), and many others. He died Feb. 6, 1893.

Braccio (brätch'ë-ō), **Fortebracci, Count of Montone**, an Italian free lance, born at Perugia, in 1368. From his early youth he was engaged in warfare, and had already given his sword to various causes, when in 1416 he obtained the sovereignty of his native city. The year after he held Rome for a time. Next he accepted from Queen Joanna of Naples the command of her land forces, and soon, for his services, was created Count of Foggia and Prince of Capua. In 1423, by the Queen's command, he was crowned at Perugia, as Prince of Aquila and Capua. His ambition now soared to the throne of Naples itself. He overran Campania and Apulia, and advanced into Calabria, but, in a battle before Aquila, was wounded and taken prisoner. Three days later he died, June 5, 1424.

Brace, Charles Loring, an American author and philanthropist, born in Litchfield, Conn., June 19, 1826. He graduated at Yale in 1846, and studied theology, but held no pastorate. He devoted himself to philanthropy in New York, and lectured, wrote, and worked to enlist aid for the children of the poor. His books include "Hungary in 1851" (New York, 1852); "Home Life in Germany" (1853); "The Norse Folk" (1857); "Short Sermons to Newsboys" (1861); "The Dangerous Classes of New York and Twenty Years' Work Among Them" (1872, 3d ed., 1880); "Free Trade as Promoting Peace and Good Will Among Men" (1879); "Gesta Christi" (1883), a review of the achievements of Christianity from the earliest days in bettering the moral and social condition of the world; and "To the Unknown God" (1889). He died in the Tyrol, Switzerland, Aug. 11, 1890.

Bracelet, a kind of ornament usually worn on the wrist, the use of which ex-

tends from the most ancient times down to the present, and belongs to all countries, civilized as well as uncivilized. Bracelets were in use in Egypt and among the Medes and Persians at a very remote period, and in the Bible the bracelet is frequently mentioned as an ornament in use among the Jews, both men and women. Among the ancient Greeks bracelets seem to have been worn only by the women. The spiral form was preferred, and very often made to assume the appearance of snakes, which went round the arm twice or thrice. Among the Romans it was a frequent practice for a general to bestow bracelets on soldiers who had distinguished themselves by their valor. Roman ladies of high rank frequently wore them both on the wrist and on the upper arm. Among the ancient heathen Germanic tribes they formed the chief and almost only ornament, as is shown by their being so often found in old graves. They seem to have been used by the men even more than by the women, and were the gifts by which an ancient German chief attached his followers to himself. So, in old Anglo-Saxon poems, "ring giver" is a common name for the lord or ruler.

Brachiopoda, animals with arm-like feet; one of the great classes into which the molluscular sub-kingdom of the animal kingdom is divided. The brachiopoda are bivalves, with one shell on the back of the animal, and the other in front; these are called dorsal and ventral valves. The two valves are never equal in size. They differ from the conchifera (called also *lamelli branchiata*), or ordinary bivalves, in uniformly having one side of the same valve symmetrical with the other. In technical language, the brachiopoda are inequivalve and equilateral, while the true bivalves are equivalve and inequilateral. The organization of the brachiopoda is inferior to that of the true bivalves. They are attached to bodies by a pedicle which passes as the wick does in an antique lamp, whence the older naturalists called them lamp shells. The shell is lined by an expansion of the integument or mantle. They are very important in a geological point of view, existing from the Cambrian rocks till now; but culminating apparently both in generic and specific development in the Silurian. In 1875 above 1,800 fossil species were known. In 1879 Dr. Alleyne Nicholson made a much higher estimate, considering that nearly 4,000 extinct species had been described. The recent species are comparatively few. They are all marine, occurring chiefly in the deep sea. The families are: (1) *Terebratulidæ*, (2) *spiriferidæ*, (3) *rhynchonellidæ*, (4) *orthidæ*, (5) *productidæ*, (6) *craniadæ*, (7) *discinidæ*, and (8) *lingulidæ*.

Brachypteræ (short winged), a name given to a family of web-footed birds, pen-

Brachyura

guins, auks, divers, guillemots, etc., in which the wings are short and the legs placed far back in the body. They are all strong divers and swimmers.

Brachyura, a sub-order of decapodous crustaceans, containing those families in which the abdomen is converted into a short jointed tail folding closely under the breast. The common edible crab (*cancer pagurus*) is a familiar example of this structure. The sub-order contains four families: (1) *Oxystomata*, (2) *oxyrhyncha* or *maiadæ*, (3) *cyclometopa* or *canceridæ*, and (4) *catometopa* or *ocypodidæ*.

Bracken, or **Brake**, a species of fern very common in the United States and Europe generally, and often covering large areas on hillsides and waste grounds. It has a black creeping rhizome, with branched pinnate fronds growing to the height often of several feet, and it forms an excellent covert for game. The rhizome is bitter, but has been eaten in times of famine. The plant is astringent and anthelmintic; when burned it yields a good deal of alkali. The rhizome of *pteris esculenta*, a native of New Zealand, was formerly a staple article of food among the Maoris.

Brackenbury, **Charles Booth**, an English soldier and military writer, born at Bayswater, Middlesex, Nov. 7, 1831. He served in the Crimean War in 1855; accompanied the Prussian army in the war with Austria (1866), and the Franco-Prussian War (1870-1871), and was with the Russian army in the Russo-Turkish War (1877-1878). His works include "European Armaments" (1867); "The Winter Campaign of Prince Frederick Charles in 1870-1871," "Reforms in the French Army" (1874), etc.

Bracket, an ornamental projection from a wall, used for the purpose of supporting a statue, bust, or the like. Brackets are either of stone, wood, or metal, and they are sometimes elaborately designed and carved. The term bracket is also employed in joinery, etc., to designate supports, in the form of a bent knee, of shelves, galleries, etc. Bracket is also generally applied to such gaslights as project from the wall.

Brackett, **Gustavus Benson**, an American pomologist, born in Unity, Me., March 24, 1827. He served in the Civil War, and, at its close, took up the study of horticulture and pomology. He served as an expert at the Paris Exposition (1878) and the Chicago World's Fair (1893), after which he became chief of the Division of Pomology in the United States Department of Agriculture.

Bract, a leaf growing upon the flower stalk. Those which occupy this situation have, as a rule a different size, form, and appearance from the ordinary leaves. There

Braddon

are cases, however, in which it is difficult to decide to which of these a particular foliaceous expansion is to be referred, and at times a yet greater uncertainty prevails as to whether one of those situated close to the flower is a bract or a sepal. The involucre in composite plants, the great spathe in *araceæ*, the paleæ of grasses, the scales of catkins, etc., are all bracts.

Bracton, **Henry de**, an English ecclesiastic and jurist, of whom but little certain is known save that he was a "justice itinerant," in 1264 became Archdeacon of Barnstaple and Chancellor of Exeter Cathedral, and died in 1268. He is memorable as one of the earliest writers on English law.

Braddock, **Edward**, a British soldier, born in Perthshire, Scotland, about 1695, entered the Coldstream Guards in 1710, and was appointed Major-General in 1754. Nine months later he sailed as commander against the French in America, and, with a force of nearly 2,000 British and provincial troops, reached the Monongahela, a branch of the Ohio, on July 8, 1755. Leaving the baggage behind, on the 9th he pushed forward with a chosen force to invest Fort Duquesne, on the present site of Pittsburg, Pa. On the right bank of the river his advance guard was attacked by a party of about 900 French and Indians from the fort. Braddock fell into no ambush; but the dense cover of the forest, of which the Indians immediately took advantage to surround his force, and his dogged insistence on his men fighting in line, instead of imitating the tactics of the foe, exposed the British as a helpless living target to a withering fire, to which they could make none but desultory and uncertain return. After two hours' fighting, in which Braddock, whose bravery was never called in question, had four horses shot under him, and was mortally wounded while vainly trying to rally his men, the survivors made a hasty retreat under Washington, Braddock's aide-de-camp, the only one of his staff who escaped unhurt. No less than 63 out of 86 officers, and 914 out of 1,373 men engaged, were either killed or wounded. The French loss was trifling. Braddock was carried from the field, and died July 13, 1755, at Great Meadows, about 60 miles from the scene of his fatal surprise.

Braddon, **Mary Elizabeth**, an English novelist, born in London in 1837. She very early showed a turn for literature, which she indulged by sending verses and other trifles to the magazines and newspapers. In 1860 she essayed a more sustained effort in a comediotta called "The Loves of Arcadia," which was brought out at the Strand Theater. Her first great success came with the publication, in 1862, of "Lady Audley's Secret," which instantly attained a great popularity, which has since been extended

Bradford

by the production of numerous works of the same order, such as "Aurora Floyd," "Eleanor's Victory," "Lovels of Arden," "Dead Sea Fruit," "Weavers and Weft," "Cloven Foot," "Mount Royal," "When the World Was Younger" (1897), etc. She is one of the most prolific writers of her day.

Bradford, a municipal and parliamentary borough and important manufacturing town in the W. Riding of Yorkshire, England. The more modern portion has well built streets, and, since 1861, most extensive street improvements have been carried out at a cost of about \$5,000,000. There is a large number of scientific, educational, and charitable institutions, among which are the new technical college, the free grammar school endowed by Charles II., the fever hospital, built at a great cost, and the almshouses of the Tradesmen's Benevolent Society. There are several public parks, and an extensive system of waterworks which afford a supply of about 10,000,000 gallons a day. Bradford is the chief seat in England of the spinning and weaving of worsted yarn and woolens. Pop. (1901) 280,161.

Bradford, a city in McKean co., Pa., on several railroads; 15 miles N. W. of Smithport, the county-seat. It is in an extensive coal, oil, and natural gas region, and is principally engaged in industries connected therewith, besides having machinery, chemical, boiler, and brick and tile works. The city has electric street railroads, daily and weekly newspapers, 3 National banks, large hospital, several libraries, and a property valuation of \$2,500,000. Pop. (1890) 10,514; (1900) 15,029; (1910) 14,544.

Bradford, Alden, an American historian and journalist, born at Duxbury, Mass., Nov. 19, 1765; originally a Congregational minister he became Secretary of State of Massachusetts (1812-1824), and editor of the "Boston Gazette" (1826). He wrote "History of Massachusetts, 1764-1820," "History of the Federal Government," etc. He died in Boston, Oct. 26, 1843.

Bradford, Joseph, an American journalist and dramatic author, born near Nashville, Tenn., Oct. 24, 1843. His real name was WILLIAM RANDOLPH HUNTER. Besides satirical verses he wrote a number of poems which were highly esteemed, especially those on the death of Victor Hugo and of General Grant. His plays, "Our Bachelors," and "One of the Finest," were very successful and are still popular. He died in Boston, Mass., April 13, 1886.

Bradford, Royal Bird, an American naval officer, born in Turner, Me., July 22, 1844. He was graduated at the United States Naval Academy in 1865, and received promotion through various grades to the rank of Commander. He has made a specialty

Bradlaugh

of equipment, and since 1897 has been Chief of the Bureau of Equipment at the Navy Department in Washington.

Bradford, William, an American painter, born in New Bedford, Mass., in 1827. He entered business early in life, but abandoned it for art. His subjects were the ice fields of the North Atlantic, and well known works of his include "Crushed by Icebergs," "Arctic Wreckers," "Land of the Midnight Sun," and "Sunset in the North." He died in New York city, April 25, 1892.

Bradford, William, an American colonial governor and author, born in Austerfield, Yorkshire, England, in March, 1588. He was one of the signers of the celebrated compact on the Mayflower; and, in 1621, on the death of the first governor, John Carver, was elected to the same office, which he continued to fill (with the exception of a brief period when he declined re-election) until his death. His administration was remarkably efficient and successful, especially in dealing with the Indians. His "Diary of Occurrences," covering the first year of the colony, was published in 1622. He left a number of religious compositions in verse; and historical prose writings of great value, the most important being his "History of the Plymouth Plantation" from the formation of the society in England, in 1602, down to 1647. He died in Plymouth, Mass., May 9, 1657.

Bradford Clay, the middle member of the upper division of the Lower Colites as developed in the West of England. It nearly corresponds in age with the limestones of the Great Oolite, but is generally a pale, grayish clay with little calcareous matter, though inclosing bands of impure limestone.

Bradford-on-Avon, or **Great Bradford**, an ancient town of England, in Wiltshire, beautifully situated 28 miles N. W. of Salisbury, on the banks of the Lower Avon, with manufactures of woolen cloth.

Bradlaugh, Charles, an English reformer, born in London, Sept. 26, 1833. He became a street orator, when 14 or 15 years old, and his atheistic opinions date from the same period. Expelled from home on this account, he supported himself in various ways. He edited a journal called the "Investigator" in 1858, and a year later became editor of the "National Reformer." In 1873 he visited the United States and delivered lectures in the prominent cities. He was elected to Parliament for Northampton, in 1880, but for refusing to take the oath he was expelled from the House of Commons. He again appealed to his constituents in 1882, and was re-elected by a small majority, but was not allowed to take his seat. In 1885, no opposition being

raised to his taking the oath, he took his seat in Parliament. He died Jan. 30, 1891.

Bradlee, Nathaniel, an American architect, born in Boston in 1829; began the study of architecture in 1846. He achieved wonderful success, having been the architect of over 500 prominent buildings in the city of Boston. In 1869 he made a national reputation by moving bodily the large brick structure known as the Hotel Pelham to the corner of Tremont and Boylston streets. The work attracted wide attention, both in this country and in Europe. He subsequently superintended the removal of the Boylston Market. He died in 1888.

Bradley, Edward. See BEDE, CUTHBERT.

Bradley, James, an English astronomer, born in 1693. In 1742, he was appointed astronomer royal, and made a very important discovery relative to the mutation of the earth's axis. He was a member of the Royal Academy of Sciences of Paris, and also of the Academy of Sciences. He died in 1762.

Bradley, John Edwin, an American educator, born in Lee, Mass. He was graduated at Williams College, in 1865. He served as principal of the high school at Pittsfield, Mass., and at Albany, N. Y. In 1892-1900 he was President of Illinois College. Works include "Science and Industry," "School Incentives," and other works.

Bradley, Joseph Philo, an American jurist, born in Berne, N. Y., March 14, 1813; was graduated at Rutgers College, in 1836; admitted to the bar in 1839; and became a Justice of the United States Supreme Court in 1870. As a member of the Electoral Commission he cast the vote which gave the Presidency to General Hayes, in 1877. He devoted much time to mathematical study and died in Washington, D. C., Jan. 22, 1892.

Bradshaw, John, an English Puritan, who was President of the High Court of Justice which tried and condemned King Charles I., born in Cheshire, in 1586. In 1649, he was Chief Justice of Chester, and when the trial of the King was determined upon, Bradshaw's resolute character pointed him out for president, which office, after a slight hesitation, he accepted. His deportment on the trial was lofty and unbending, in conformity to the theory which rendered the unhappy monarch a criminal and amenable; and everything was done, both for and by him, to give weight and dignity to this unexampled tribunal. On Cromwell's accession to the protectorate, he was deprived of his judgeship, but on the restoration of the Long Parliament, was elected President of the Council of State. Bradshaw died in 1659, and on his death bed asserted that, if the King were to be tried

and condemned again, he would be the first to agree to it. Bradshaw was magnificently buried in Westminster Abbey, whence, after the Restoration, his body was ejected as being that of a regicide, and hanged on a gibbet at Tyburn, with those of Cromwell and Ireton.

Bradshaw's Railway Guide, a well known English manual for travelers, first issued by George Bradshaw, a printer and engraver of Manchester, in 1839. It is now published on the first of each month, and contains the latest arrangements of railway and steamboat companies, besides other useful information. There are now many such handbooks in the field, and the idea has since been further developed in the descriptive hand books of Murray, Bædeker, and others.

Bradstreet, Anne, the earliest American poet, born in Northampton, England, in 1612. She was a daughter of Gov. Thomas Dudley. In 1630 she emigrated to America with her husband, Simon Bradstreet, Governor of Massachusetts. Her poems were published as "The Tenth Muse, Lately Sprung Up in America." They are quaint and literal in style. She died Sept. 16, 1672.

Bradwardine, Thomas, "DOCTOR PROFUNDUS," Archbishop of Canterbury, born in Chichester, in 1290. He was distinguished for his varied learning, and more particularly for his treatise, "De Causa Dei contra Pelagium," an extensive work against the Pelagian heresy, for centuries a standard authority. He was chaplain and confessor to Edward III., whom he accompanied to France, being present at Cressy and the capture of Calais. Being appointed archbishop he hastened to England, but died of the black death on reaching London, Aug. 26, 1349.

Brady, Nicholas, with NAHUM TATE, versifier of the Psalms, born in Bandon, Ireland, in 1659. He was educated at Westminster, Christ Church (Oxford), and Dublin, and kept a school at Richmond, honored by the approval of Richard Steele. Tate and Brady's metrical version of the Psalms was authorized in 1696, but with the strong opposition of many among the Tory clergy. His tragedy, "The Rape, or the Innocent Impostors," his blank verse "Æneid," and his sermons have long since sunk into oblivion. He died in Richmond, England, May 20, 1726.

Bradypus, a mammalian genus, the typical one of the family *bradypodidæ*. It contains the *ai*, or common sloth (*B. tridactylus*), and other species. Various extinct genera and species of the family are found in South America. They are gigantic as compared with the modern sloths. The most notable are *megatherium*, *mylodon*,

scelidotherium, and in the Post-Pliocene of North America, *megalonys*.

Braemar, a Highland district, in the S. W. corner of Aberdeenshire. It contains part of the Grampian range with the heights of Ben Macdhui, Cairntoul, Loch-nagar, etc. The district has some fine scenery, valleys and hillsides covered with birch and fir, but consists mostly of uncultivated heaths. The Queen's residence, Balmoral, is here, on the banks of the Dee.

Brag, a game at cards, so called because each player endeavors to impose upon the others, and to make them believe that his hand is better than it really is. A sum of money is usually staked, and, the cards being compared, the best hand wins.

Braga, a city of Portugal, capital of the Province of Minho, situated on an eminence between the rivers Cavado and D'Este, 34 miles N. E. of Oporto by rail. It is the residence of the Primate of Portugal, who has a palace here. It has also a fine Gothic cathedral (12th century), partly modernized, the Church of Santa Cruz (1642), and manufactures of linen, hats, cutlery, firearms, jewelry, etc. The Bracara Augusta of the Romans, it retains ruins of a temple, an amphitheater, and an aqueduct. Near it is the celebrated *Sanctuario do bom Jesus do Monte*, which is still a place of pilgrimage. In the 6th century, Braga was the chief city of the Suevi, and it fell successively into the hands of the Goths and Moors, from the latter of whom it was taken by Alphonso of Castile. Pop. (1900) 24,309.

Bragança, the name of two considerable towns in Brazil. (1) Bragança, a seaport, 100 miles N. E. of Para, at the mouth of the Caite, which is here navigable to the town. Pop. of town and district, 6,000. (2) Bragança, an inland city of about 10,000 inhabitants, 50 miles to the N. E. of Sao Paulo.

Braganza, or **Bragança**, a town of Portugal, capital of the former Province of Tras-os-montes, with a castle, the ancient seat of the Dukes of Braganza, from whom the present reigning family of Portugal are descended.

Braganza, or **Bragança**, the name of the reigning dynasty of Portugal. In 1801 Napoleon I. declared that the line of the Braganza sovereigns had ceased. John, Regent of the kingdom, withdrew to Brazil in 1807, but he returned in 1821. At his death, in 1826, his son, Don Pedro, resigned the throne in favor of his daughter, Maria da Gloria, preferring to remain Emperor of Brazil, which he had been elected by the Brazilians, Nov. 18, 1825.

Bragg, **Braxton**, an American military officer; born in Warren Co., N. C., March 22, 1817; graduated at West Point, in

1837; was appointed Second Lieutenant in the 3d Artillery; served with distinction under General Taylor in the Mexican War; and retired to private life in 1856. At the outbreak of the Civil War, he became a Brigadier-General in the Confederate army, and was stationed at Pensacola to act against Fort Pickens. In 1862, having been appointed a general of division, with orders to act under Gen. A. S. Johnston, commanding the Army of the Mississippi, he took an important part in the two days' battle of Shiloh. On Johnston's death he was appointed to his command, with the full rank of General, and succeeded General Beauregard as commander of the Department, in July of the same year. The last command he resigned in December, 1863. His chief success was at Chickamauga, in September, 1863, when he inflicted a defeat on the army of General Rosecrans, but was himself, in turn, defeated by General Grant, which led to his temporary removal from command in January, 1864, and he was appointed military adviser to Jefferson Davis. In 1864, he assumed command of the Department of North Carolina. After the war he was chief engineer of the State of Alabama, and superintended the improvements in Mobile Bay. He died in Galveston, Tex., Sept. 27, 1876.

Bragg, **Edward Stuyvesant**, an American legislator, born in Unadilla, N. Y., Feb. 20, 1827; educated at Geneva, now Hobart, College, and admitted to the bar in New York, in 1848. He removed to Fond du Lac, Wis., and was admitted to the Wisconsin bar in 1850, to that of Illinois in 1869, and to the United States Supreme Court in 1877. He served in the Union army during the Civil War, and won his way to the rank of Brigadier-General. He was a member of the Union Convention, at Philadelphia, in 1866; Representative in Congress in 1877-1885; and a delegate to the Democratic National Conventions of 1872, 1884, 1892, and 1896. In the Convention of 1884, he seconded the renomination of Grover Cleveland, when he uttered the memorable phrase, "We love him for the enemies he has made." In 1888 he was appointed minister to Mexico; and in June, 1902, became the first United States consul-general in Havana under the new republic of Cuba.

Bragi (brā'jē), the Scandinavian god of poetry. He is represented as an old man with a long flowing beard, like Odin; yet with a serene and unwrinkled brow. His wife was Idunna.

Braham, **John** (brā'am), an English tenor singer, of Jewish extraction, born in London, in 1774. He appeared with the greatest success on the leading stages of France, Italy and the United States, as well as in his own country. He excelled

Brahe

mainly in national songs, such as "The Bay of Biscay, O," and "The Death of Nelson," and continued to attract large audiences even when 80 years old. He died in 1856.

Brahe, Tycho (brä, or brä'e), a Danish astronomer; born in Knudstrup, near Lund, Dec. 14, 1546. He was descended from a noble family, and was sent, at the age of 13, to the University of Copenhagen, where he had not been more than a year, when an eclipse of the sun turned his attention to astronomy. His uncle destined him for the law, but Brahe, while his tutor slept, busied himself nightly with the stars. He succeeded, as early as 1563, in detecting grave errors in the Alphonsine tables and the so-called Prutenic (*i. e.*, Prussian) tables, and set about their correction. The death of an uncle, who left him an estate, recalled him to his native place in 1565; but he very soon became disgusted with the ignorance and arrogance of those moving in the same sphere with himself, and went back to Germany. At Wittenberg, where he re-



TYCHO BRAHE.

sided for a short time, he lost part of his nose in a duel with a Danish gentleman; but for the lost organ he ingeniously contrived one of gold, silver and wax, which fitted admirably. After two years spent in Augsburg, he returned home, where, in 1572, he discovered a new and brilliant star in the constellation Cassiopeia. In 1573 he married a peasant girl. After some time spent in travel, Brahe received from his sovereign, Frederick II., the offer of the island of Hven or Hoëne, in the Sound, as the site for an observatory, the King also offering to defray the cost of erection, and of the necessary astronomical instruments, as well as to provide him with a suitable salary. Brahe accepted the generous proposal, and, in 1576, the foundation stone of the castle of Uranienburg ("fortress of the heavens") was laid. Here, for a period of 20 years, Brahe prosecuted his observations with the most unwearied industry. So long as his munificent patron, Frederick II., lived, Brahe's position was all that he could have desired, but on his death in 1588 it was greatly changed. For some years, under Christian IV., Brahe was barely

Brahman

tolerated; but in 1597 his position had grown so unbearable that he left the country altogether, having been the year before deprived of his observatory and emoluments. After residing a short time at Rostock and at Wandsbeck, near Hamburg, he accepted an invitation of the Emperor Rudolf II.—who conferred on him a pension of 3,000 ducats—to Benatek, a few miles from Prague, where a new Uranienburg was to have been erected for him; but he died at Prague on Oct. 24, 1601.

Brahilov. See BRAILA.

Brahma, the name of the first of the three gods who constitute the Trimurti, or triad of principal Hindu deities. The epithets applied to this divinity are very numerous, some of the most usual being *Swayambhu*, the self-existing; *Parameshti*, who abides in the most exalted place; *Pitamaha*, the great father; *Prajapati*, the lord of creatures; *Lokesa*, the ruler of the world, etc.; Brahm, the essence of the Supreme Being in the abstract, devoid of personal individuality, to whose name so much reverence is attached that it is considered criminal to pronounce it, is said to have given birth to Brahma, Vishnu and Siva simultaneously; and to have allotted to the first the province of creating, to the second that of preserving, and to the third that of destroying. Accordingly, ever since the creation of the world, Brahma has had little or nothing to do, and it will not be till the 10th *avatar*, or incarnation, that his services will be put in requisition, when this world is to undergo total annihilation. Meanwhile, however, the other deities, Vishnu and Siva, are constantly engaged in their respective duties of preservation and destruction; and the Hindus lavish chiefly their adoration upon those divinities from whom they expect to derive immediate advantage. In the mythological poems, and in sculpture, Brahma is represented with four heads, or rather faces, and holding in his four hands a manuscript book containing a portion of the Vedas, a pot for holding water, a rosary, and a sacrificial spoon. In the sculptures of the cave temple of Elephanta, he is represented sitting on a lotus, supported by five swans or geese.

Brahman, Brahmin, Bramin, or Brachman, one of the Aryan conquerors of India, who discharged priestly functions, whose ascendancy, however, over his fellows was intellectual and spiritual, but not yet political or supported by the caste system; also one of the four leading castes of India, the others, theoretically at least, being *Kshatriyas* (warriors), *Vaisyas* (merchants), and *Sudras* (laborers), not reckoning outcasts beyond the pale. The Brahmans in many places at present are about a tenth part of the community. They are the most intellectual of all castes, having great mental

subtlety. They are admirably adapted for metaphysical speculation, and for mathematical reasoning; but throughout their vast literature they have almost uniformly told monstrous myths in lieu of history. Nor do they care much for natural science.

Brahmana Beads, a name given in India to the corrugated seeds of *elæocarpus*, used by the Brahmans and others as necklaces. They are sometimes worn as beads by children in England, having been brought from India by seafaring relatives or friends.

Brahman Bull, the zebu, a variety of the *bos taurus*, or common ox. It is distinguished by having a large, fatty hump on its shoulders. Divine honors are paid to it in India, and it is deemed an act of piety to turn one loose in the streets, without any provision for its maintenance. It, therefore, helps itself from green grocers' stalls or from gardens. It is not, as a rule, dangerous to pedestrians, but at times has warlike encounters with its humped compeers, besides systematically persecuting all cattle destitute of a hump. It is unpopular with those who are not of the Hindu faith, but they dare not for their lives openly injure it.

Brahmani, a female Brahman; the wife of a Brahman. Also written Brahminee.

Brahmanism, or **Brahminism**, the system of religious belief and practice introduced and propagated by the Brahmans. This greatly varied with the lapse of ages, but to every successive form of it the name Brahmanism may be applied. The earliest inhabitants of India seem to have been mainly Turanians. When, at a very remote period of antiquity, these entered the peninsula, an Aryan nation or tribe existed in Central Asia, N. W. of India, speaking a language as yet unrecognized, which was the parent of nearly all the present European tongues, our own not excepted. At an unknown date a great part of this Aryan nation migrated to the N. W., and settled in Europe, the remainder taking the contrary direction, and entering India by the way of the Punjab. Admiring the glorious Eastern sky, they applied to it, and to the elements of nature, glowing adjectival epithets; these gradually became abstract substantives, then the qualities expressed were personified, and gods ruling over the several elements were recognized. Thus the sky was first called *Deva*, adjective = (1) bright, then (2) brightness, next (3) the Bright God; or, if the adjectival meaning be retained, Divine. This is the familiar Latin *Deus* = God. Similarly, *Dyaus* = the sky, is Greek *Zeus*, genitive, *Dios*, from *Dis*, Latin *Dies piter* = Jupiter. Other divinities worshipped were, *Agni* = fire (Latin *ignis*), *Surya* = the sun, *Ushas* = the dawn (Greek, *ēōs*), *Marut* = storm (Latin *Mars*),

Prithivi = the earth, *Ap* = the waters, *Nadi* = the rivers, *Varuna* = the sky (Greek *ouranos*), *Mitra* = the sun, and *Indra* = the day. These gods are invoked in the 1,017 hymns of the "Rig-Veda," the oldest Aryan book in the world. Dr. Haug, of the Sanskrit College at Poonah, thinks the oldest of these may have been composed and uttered from 2400 to 2000 B. C., or at least from 2000 to 1400 B. C. Max Müller, the translator of the "Rig-Veda," more moderately dates most of them between 1500 and 1200 B. C., believing the collection to have been finished about 1100 B. C.

While the Aryans were in the Punjab a religious schism took place among them, and a large number of them left India for Persia with feelings so bitter that what their former friends left behind called gods they transformed into demons. The venerable *Deva* = God, was changed into *daêva* = an evil spirit. Iran (Persia) was the place to which the seceders went, and there their faith developed into *Zoroastrianism*.

The "Rig-Veda" was followed by three more, the "Yajur-veda," the "Sâma-veda," and the "Atharva-veda," each with a *Sanhit*, or collection written in poetry, and *Brâhmanas* and *Sûtras*, prose compositions; but these are not so valuable as the "Rig-Veda" for tracing the old beliefs. From about 1000 to 800 B. C. collections were being made of the old sacred literature. From about 800 to 600 B. C. the *Brâhmanas* were composed (Dr. Haug thinks between 1400 to 1200 B. C.). Then the *Sûtras* (exegetical compositions), which follow, make *Brâhmanas* as well as *Mantras* divine.

The exact date of the two great epic poems — the "Ramayana," and the "Mahabharat" — is unknown; but the former is believed to be the older. By the time that it appeared the constellation of Vedic gods had set, and one of deified heroes was arising or had arisen. Rama, the deified King of Ayodhya (Oude), the hero of the former poem, is still extensively worshipped, along with Hunooman, the monkey god and Krishna, the hero of the Mahabharat.

During the period of the *Brâhmanas*, the Brahmanic priesthood had arisen to great power; during that of the *Sûtras* they were in quiet enjoyment of their caste dignity. By the 6th century Buddha had arisen to preach the equality of all castes, and his system was dominant in India from about 250 B. C. till 750 A. D., that is, for 1,000 years.

When Brahmanism reasserted its sway the Hindu triad of gods — Brahma, Vishnu and Siva — had arisen (see these words). Nay, Brahma had become almost obsolete, and the respective advocates of Vishnu and Siva were at variance. Between the 12th and the 16th centuries monastic reformers formed sects, some Vishnuvite, others Sivaite. New sacred books

called, however, Puranas (meaning old), are penned to advocate the tenets of conflicting sects, and, though contradicting each other, were accepted as divine. The Mohammedan invasion somewhat repressed their quarrels. At present, the worship of Vishnu under the forms of Krishna and of Rama, and of Siva under that of the Lingam with the veneration of Sukti, the power and energy of the divine nature in action; to which must be added the adoration of Hunooman, Rama's friend; and, in many places of aboriginal Turanian gods, are the most prevalent forms of popular Hinduism. Reformers are falling back on the Vedas, and Christianity obtains converts from it in every part of the land.

Brahmaputra (brä'ma-pö'tra), a large river of Asia, whose sources, not yet explored, are situated near Lake Manasarovara, in Tibet, near those of the Indus. In Tibet, where it is called the Sanpo, it flows eastward N. of the Himalayas, and, after taking a sharp bend and passing through these mountains, it emerges in the N. E. of Assam as the Dihong; a little further on it is joined by the Dibong and the Lohit, when the united stream takes the name of Brahmaputra, literally "the son of Brahma." After entering Bengal it joins the Ganges at Goalanda, and further on the Meghna, and their united waters flow into the Bay of Bengal. The Brahmaputra is navigable by steamers for about 800 miles from the sea, its total length being, perhaps, 1,800.

Brahmo-Somaj (-madj), or the Theistic Church of India, was founded in 1830 by an enlightened Brahman, who sought to purify his religion from impurities and idolatries. This church, while accepting what religious truth the Vedas may contain, rejects the idea of their special infallibility, and founds its faith on principles of reason. The members do not in principle recognize the distinction of caste, and have made great efforts to weaken this as well as other prejudices among their countrymen.

Brahms, Johannes (brämz), a German composer, born in Hamburg, May 7, 1833. In 1861 he went to Vienna, where he afterward resided, and devoted himself to composition. His great "German Requiem" (1868) established his reputation. He was the composer of many symphonies, "Rinaldo," "The Song of Destiny," songs, cantatas, etc. His unrivaled settings of "Hungarian Dances" and his own "Liebeslieder" dances with choral accompaniment, are the most graceful classical compositions of the kind since Chopin. He died in Vienna, April 3, 1897.

Braid, James, a Scotch physician, born in Fife, in 1795, studied medicine at Edinburgh, and settled as a surgeon in Manchester. He is noted for his researches on

animal magnetism, which he called hypnotism. He died March 25, 1850.

Braidwood, Thomas, a Scotch educator, born in 1715, studied at Edinburgh University. He settled as a schoolmaster there, and after 1760 became famous as a teacher of the deaf and dumb. His school was afterward transferred to Hackney, London. He died Sept. 24, 1798.

Braila, a town in Rumania, formerly a fortress, on the left bank of the Danube, which divides itself here into a number of arms, one of them forming the harbor of the town. The export of grain and the sturgeon fisheries are among the principal industries in Braila. Pop. (1899) 58,392.

Braille, Louis (brī'ē), a French teacher of the blind, born in 1809. He invented the Braille alphabet. It consists of a system of points printed on cardboard by indenting the reverse side. The writing is traced with the finger.

Brain, the encephalon, or center of the nervous system and the seat of consciousness and volition in man and the higher animals. It is a soft white and gray matter contained in the skull of vertebrated animals. The invertebrata have, instead of a true brain, nervous ganglia, situated near the end of the body. The external gray matter is softer than the white matter and consists of variously shaped nerve cells communicating with nerve fibers, and thereby receiving and discharging impressions. The internal white matter is composed almost entirely of medullated nerve fibers which transmit nerve impulses from one point to another. The brain is enveloped by three membranes called the *Dura mater*, which is dense and elastic; the *Arachnoid*, thin and double; and the *Pia mater*, which covers the whole surface of the brain and supplies the nervous tissues. These support the blood vessels which nourish the cranium and the brain, and also contain a clear fluid, the cerebro-spinal fluid, which removes the product of the brain waste and serves like a water cushion to diminish the effect of external shocks. The brain consists of two principal parts, the *cerebrum* and *cerebellum*, connected by bands of fibers. The cerebrum—great brain or cerebral hemisphere—occupies in man the upper part of the head and is seven or eight times larger than the cerebellum, which lies behind it and below it in a peculiar cavity of the skull. The cerebrum is divided into two portions, the right and left hemispheres, by the longitudinal fissure, the hemispheres being at the same time transversely connected by a band or bridge of nervous matter called the *corpus callosum*. The cerebellum, like the cerebrum, is also divided into right and left hemispheres, connected by a bridge of nervous matter called

the *pons Varolii*, under which is the *medulla oblongata*, or continuation of the spinal marrow. At the base of the brain are several masses of nervous matter or ganglia known as the *corpora striata* (two), and *optic thalami* (two), and *corpora quadrigemina* (four); and there are in it certain cavities or *ventricles*.

Cerebrum.—When seen from above, as in Fig. 1, the cerebrum underlies the whole



Fig. 1.
The Cerebrum.

vault of the cranium and covers all the rest of the brain. The hemispheres, which are divided by a deep median fissure, are covered by a thin layer of matter, or nerve cells, and thrown into ridges or furrows called convolutions or *gyri* and fissures. These ridges are the result of the folding of the cerebral surface during the growth of the brain. They seem to be arranged without any definite order, but Gratiolet, by comparing the simpler brains of monkeys and human embryos, discovered that certain primary fissures were always present. On the outer surface of these hemispheres is the *fissure of Sylvius*, which is a deep incision at the base of

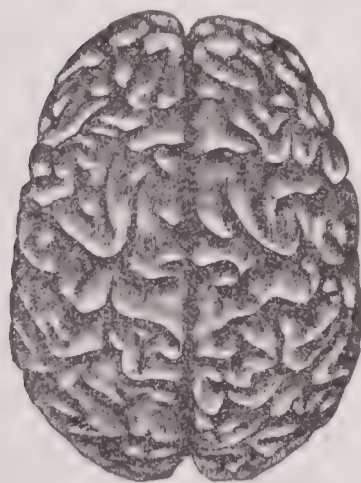


Fig. 2.
Brain of a Negro.

the brain and runs in several directions. The *fissure of Rolando* runs almost vertically from the fissure of Sylvius nearly to the border of the hemispheres. On the inner surface, half way between the central fissure and the rear end of the brain, is the *parieto-occipital incision*. These fissures form the boundaries of the various lobes of the cerebrum. (1) The *frontal lobe* is that part of the outer and corresponding median surfaces which lies anterior to the fissure of Rolando, and is probably associated with the exercise of the higher mental faculties. (2) The *temporo-sphenoidal lobe* lies below the fissure of Sylvius. (3) The *occipital lobe* lies behind the parieto-occipital fissure and includes the corresponding parts on the outer surface. (4) The *parietal lobe* is

bounded by the fissures of Rolando and Sylvius, and by the occipital lobe. (5) The *central lobe* or *island of Reil* lies at the bottom of the fissure of Sylvius and is hidden in the adult by overreaching adjacent lobes. Secondary fissures on these lobes divide them into *convolutions*. On the under surface of the cerebrum are two olfactory nerves and two optic nerves. The olfactory nerves cross like the letter X, wind around the two cerebral peduncles and terminate in the olfactory thalami and the olfactory lobe. These peduncles pass from under the surface of the hemispheres and approach each other as they enter the Varolii. If we press apart the two cerebral hemispheres, we come upon the corpus callosum, which is a band of white fibers connecting the convolutions of both hemispheres. On dividing these and removing some white fibers and a layer of connected tissue called

the *velum interpositum*, with its vascular margin, we expose the two lateral and the third ventricles of the cerebrum, the former occupying the hemispheres, the latter lying between them and continued backward through a narrow channel (the aqueduct of Sylvius) into the fourth ventricle, which lies behind the pons Varolii and the medulla. Projecting into the third and lateral ventricles are rounded masses of gray matter, the *corpus striatum* and *optic thala-*

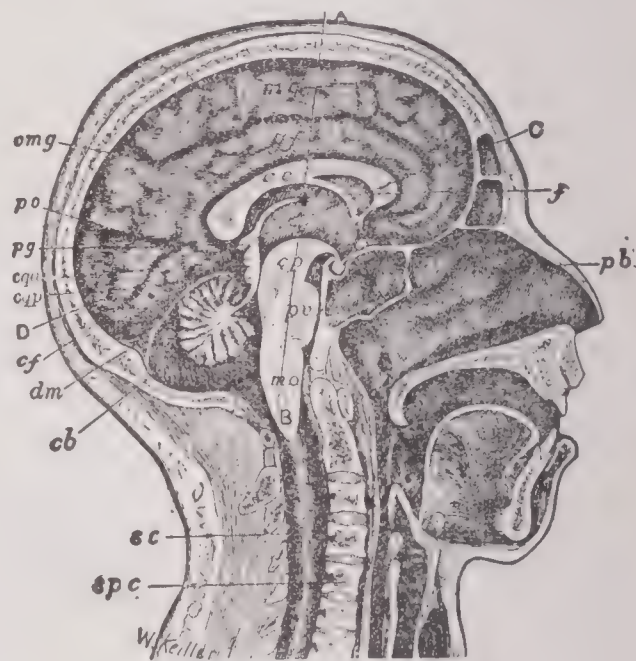


Fig. 3.

Median Longitudinal Section through Head and Upper Part of Neck, to Show Relation of Brain to Cranium and the Spinal Cord.

c, cerebrum; cb, cerebellum; sc, spinal cord; spc, spinal column; mo, medulla oblongata passing through foramen magnum, into the spinal cord; pv, pons Varolii; cp, cerebral peduncles, or *crura cerebri*; cqv, anterior corpora quadrigemina; cqp, posterior corpora quadrigemina; pg, pineal gland; pb, pituitary body; cc, corpus callosum, divided transversely; f, fornix; mg, marginal gyrus; g', gyrus fornicatus; cmg, calloso-marginal sulcus; O, occipital lobe; po, parieto-occipital fissure; cf, calcarine fissure; dm, dura mater, separating cerebrum from cerebellum.

the *velum interpositum*, with its vascular margin, we expose the two lateral and the third ventricles of the cerebrum, the former occupying the hemispheres, the latter lying between them and continued backward through a narrow channel (the aqueduct of Sylvius) into the fourth ventricle, which lies behind the pons Varolii and the medulla. Projecting into the third and lateral ventricles are rounded masses of gray matter, the *corpus striatum* and *optic thala-*

mus, called the basal ganglia. The whole cerebrum is surrounded by a thin, convoluted envelope of gray matter about a quarter of an inch thick. Within this lies the *centrum ovale*, composed of white nerve fibers passing in all directions and difficult to unravel. Connecting the two hemispheres is the corpus callosum. Underneath are the *septa lucida* and the *fornix*. Into the ventricles project the ovoid optic thalamus and the caudate nucleus of the corpus striatum. A wedge shaped mass of gray matter, the *lenticular nucleus* of the *corpus striatum*, is separated from the first two nuclei by a band of white fibers. The *internal capsule* is composed of two parts, an interior and posterior limb, which meet each other at an obtuse angle (the knee). Directly outside the lenticular nucleus is the white *external capsule*, separated by the claustrum, a thin band of gray matter, from the island of Reil. Some of the fibers of the claustrum ovale connect the frontal and occipital lobes, others connect the basal ganglia with the cortical gray matter. An important group, the corona cortex, passes from the internal capsule to the whole of the cortex. That part of the corona radiata entering the occipital lobes is called the optic radiation of Gratiolet, who considered it to be the central expansion of the optic nerve.

The *optic lobes* consist of anterior and posterior pairs of rounded eminences of gray matter situated close to the optic thalami and underlying the pineal gland, a cone-shaped organ thought by Descartes to be the seat of the soul. Research justifies the belief that this is the remains of the pineal eye; the third organ of sight, formerly found in the lower animals. The optic lobes are closely connected with the optic nerves, part of these ending in the anterior pair, and to the third and fourth nerves, whose nuclei of origin lie just underneath them in front of the aqueduct of Sylvius. The crura cerebri are formed of fibers passing up from the medulla cord and from the cerebellum to the cerebrum. In man the anterior pair of the corpora quadrigemina seems to control the reflex contraction of the pupils and some of the movements through a third nerve, while the posterior pair has some more general coördinating power. Unilateral lesions cause in animals a tendency to run in a circle or to rotate around the axis of the body. Removing the cerebral lobe from an animal deprives it of volition and intelligence and a similar experiment on man, or an imperfect development of the cerebrum, results in imbecility and idiocy, and the races that have the heaviest cerebra and the most fully developed convolutions have the most intelligence. Among animals the degree of intelligence increases with the increase in size of the cerebrum relatively to the other parts of the brain. The great physiologist,

Flourens, held that the whole of the cerebrum was used in every mental process. In removing parts of the hemispheres of pigeons he thought that all the mental functions became enfeebled and that, to an equal degree, in proportion to the amount of gray matter removed, from no matter what part of the cerebrum; and that as long as

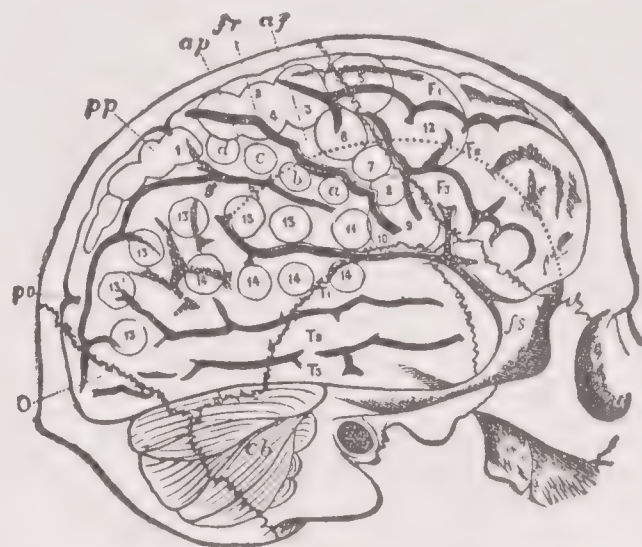


Fig. 4.

Outer Aspect of Brain, Showing Relation to the Bones of the Skull, and the position of Ferriers' Areas.

fr, fissure of Rolando; *fs*, fissure of Sylvius; *po* parieto-occipital fissure; *F1* superior, *F2* middle, *F3* inferior frontal; *af*, ascending frontal convolution; *ap*, ascending parietal; *pp*, postero-parietal convolution; *T1* superior, *T2* middle, *T3* inferior temporo-sphenoidal convolution; *O*, occipital lobe; *cb*, cerebellum; 1 (postero-parietal convolution), advance of the opposite leg, as in walking; 2, 3, 4 (round upper extremity of fissure of Rolando), complex movements of opposite leg, arm, and of the trunk, as in swimming; *a*, *b*, *c*, *d*, (ascending parietal convolution), individual and combined movements of the fingers and wrist of the opposite hand, or prehensile movements; 5 (posterior end of superior frontal convolution), forward extension of opposite arm and hand; 6 (upper part of ascending frontal convolution), supination and flexion of opposite forearm; 7 (median part of ascending frontal convolution), retraction and elevation of opposite angle of the mouth; 8 (lower part of ascending frontal convolution), elevation of ala nasi, and upper lip, with depression of lower lip; 9 and 10, opening of mouth with protrusion and retraction of tongue — on the left side is aphasic region; 11, between 10 and lower end of ascending parietal convolution, retraction of opposite angle of the mouth, the head turns slightly to one side; 12, posterior part of the superior and middle frontal convolutions (eyes open widely, pupils dilate, head and eyes turn toward opposites de); 13, 13' (supra-marginal and angular gyrus), eyes move toward opposite side, or upward and downward (center for vision); 14, superior temporo-sphenoidal convolution (center for hearing).

any part of the gray matter remained, the mental functions could be carried on. This seemed to explain why large masses of brain substances could be removed by accident without apparent effect on the mind, and why there was no constant relations between the symptoms and locality of brain lesions. This did not explain the condition of aphasia, or the loss of articulate speech.

Brain

The *cerebellum* possesses a median and two lateral hemispheres which have been subdivided into lobes. Its parts are arranged in thin laminæ or folia with deep intervening fissures. These laminæ have a central core of white matter with a thin covering of gray matter. The cerebellum has three pairs of peduncles: (a) Superior, which pass upward and across the middle line toward the opposite cerebral hemisphere but ending under the optic lobe; (b) middle, which is that part of the pons Varolii which enters indirectly into connection with fibers from the opposite cerebral hemisphere; (c) inferior (the restiform body), which are connected with the medulla and spinal cord. There is also a close connection with the auditory nerve and semicircular canals of the ear.

Medulla Oblongata.—This is the lowest and most dependent division of the brain. It is conical in form, with the base toward the

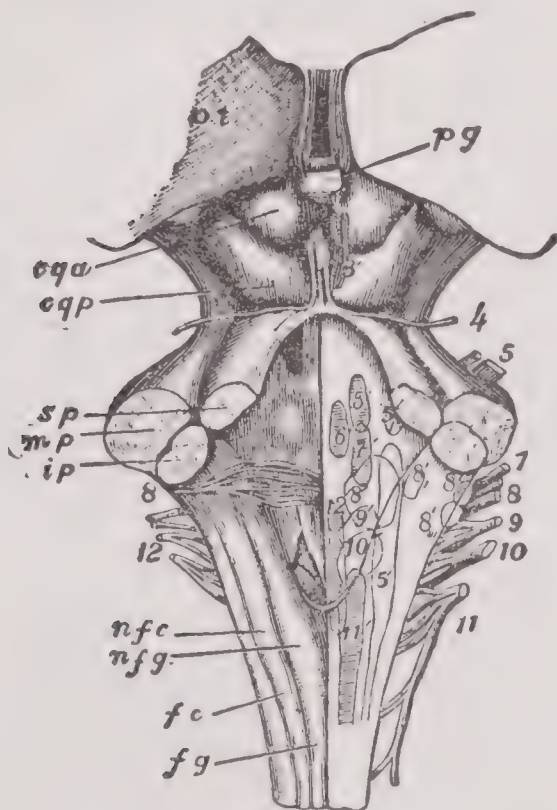


Fig. 5.

Medulla Oblongata with Corpora Quadrigemina
Seen from Behind (Cerebellum cut away).

ot, optic thalamus; pg, pineal gland; cqa, anterior corpora quadrigemina; cqp, posterior corpora quadrigemina; sp, superior cerebellar peduncle; mp, middle cerebellar peduncle, goes to pons Varolii; ip, inferior peduncle, or restiform body, goes to medulla oblongata and spinal cord; fg, funiculus gracilis, or column of Goll; nfg, nucleus of the funiculus gracilis; fc, funiculus cuneatus, or column of Burdach; nfc, nucleus of the funiculus cuneatus. The lozenge-shaped area in the center of the figure is the fourth ventricle. The numbers 4-12 indicate the superficial roots of the corresponding cranial nerves. The numbers 3'-12', their nuclei of origin.

pons Varolii, the narrow end toward the spinal cord, with each side of the middle line of the *anterior pyramids* crossing the other where the medulla passes into the spinal cord. External to them is the ovoid

Brain

projection. The olivary body (Fig. 5) on the dorsal surface is the lozenge shaped fourth ventricle, which is bounded below with the two inferior and above by the two

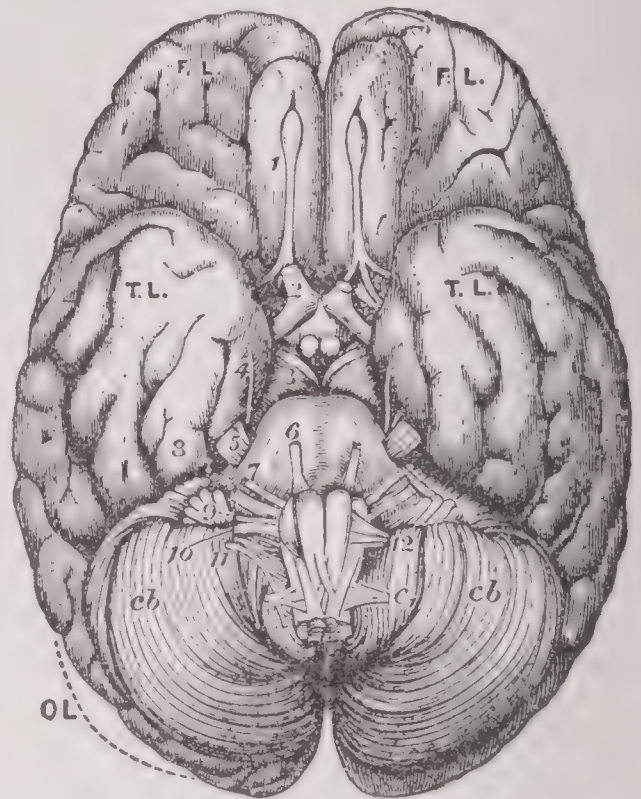


Fig. 6.

Under Surface, or Base of Brain.

F.L., T.L., O.L., frontal, temporal, and occipital lobes of the cerebrum; cb, cb, cerebellum, the medulla oblongata lying between its two lobes. *Cranial Nerves*.—1, olfactory lobe (the nerve of smell); 2, optic nerve (nerve of sight); 3, third or oculo-motor nerve, motor nerve to most of the muscles of the eye; 4, fourth or trochlear nerve, motor nerve to the superior oblique muscle of the eye; 5, fifth, trigeminal, or trifacial, sensory and motor, the large root sensory to the face and eyes, etc.; the small root, motor to muscles of mastication; 6, sixth or abducent nerve, to external rectus muscle of eye, turns eyeball outward; 7, seventh or facial, motor to muscles of expression; 8, eighth or auditory nerve, sensory for hearing (cochlea) and for equilibration (semicircular canals); 9, glossopharyngeal, sensory nerve of taste, and motor to some of the muscles of deglutition; 10, pneumogastric, sensory and motor to larynx, lung, heart and stomach; 11, spinal accessory, motor to muscles of heart (inhibitory) and sterno-mastoid and trapezius; 12, hypoglossal, motor to all the muscles of the tongue; c1, first cervical spinal cord.

superior peduncles of the cerebellum. All the cranial nerves below the fourth originate on the floor of the medulla in the positions marked by the numbers in Fig. 6. Disease of the human cerebellum, when it causes symptoms does not cause general incoordination, but merely a staggering gait like that of intoxication and giddiness. Ferrier holds that it is the center for coordinating movements necessary for the equilibrium of the body and its different parts control different sets of movements. Destruction of the anterior part of the medulla causes a tendency to fall forward. Loss of its posterior part causes a tendency to

fall backward; and of one lateral lobe to rotate toward the side injured. Stimulation of any of the parts causes movements of the head, eyes, and limbs such as would counteract the disturbance of the equilibrium by the destruction of the parts. The medulla is the great seat or center for the functions of organic life, as it gives origin to all the cranial nerves except the first four numbers. These centers are the center for respiratory movements, under the extremity of the fourth ventricle; (2) for the restraint and acceleration of the heart; (3) for the control of the blood pressure including the diabetic center, which is simply a vaso-motor center for the liver; (4) the center for swallowing; (5) center for the movements of the gullet and stomach; (6) movements of articulate speech; (7) for the suppression of the saliva. The term center involves the following mechanism, (a) the sensitive end organ or surface; (b) an efferent nerve going to a nerve cell or the group of nerve cells from which passes an efferent nerve fiber to a muscle. That the action of the center be possible all the links in the chain must be intact.

Every part of the brain is exactly symmetrical with the part opposite. Twelve pairs of nerves proceed from the base of the brain, including the nerves for the organs of sight, hearing, taste and of smell and of touch, also those for the muscles of the face, those for the cavity of the mouth and for the larynx.

Sight.—Munk places the center of sight in the occipital lobe. Destruction of one lobe causes permanent blindness in one side of both eyes. In man, disease of the left angular gyrus produces what is called "word-blindness." In this condition, one loses the power of reading words, although one sees the characters distinctly and may be even able to spell the word, even to retain the power of writing simultaneously from dictation and yet be unable to read what has been written.

Hearing.—The center of hearing seems to lie in the first temporal sphenoidal convolution in both sides. Partial destruction of this convolution on the left side causes the condition of "word deafness," that is, to hear sounds but have no sense of their meaning.

Taste and Smell.—Ferrier locates the sense of taste and of smell in the uncinate gyrus on the inner surface of the temporo-sphenoidal lobe.

Touch.—Some physiologists place these in the motor area. Horsley, Ferrier, and Shafter find that they are in the gyrus fornicatus and the gyrus hippocampi on the median surface of the brain above, behind and below the corpus callosum. Fibers from the various sense organs lead to the cortical areas through the posterior third of the internal capsule. If this is injured, loss of

all forms of sensibility, hearing, sight, taste, etc., of the opposite side follows.

In man the brain weighs from two to four pounds; the average weight in male European adults being 49 to 50 ounces or about 1/35th of the weight of the body; in the dog the average weight is about 1/120th of the animal; in the horse 1/450th. The brain of females weighs five ounces less on the average than that of males. The ratio of the brain—weight to that of the body—is the same in both sexes; consequently the difference of weight in the brain of males and females is due to the lesser body weight in the woman and not to inferior cerebral development. At birth, the proportionate weight of the brain to the body is greatest. It diminishes slowly to the 10th year, when 1:14 is the ratio. About the 40th year the brain is heaviest. After that it diminishes at the rate of an ounce every 10 years. The theory that the size and weight of a man's brain is in direct proportion to his intellect is discredited by Dr. Joseph Simms. Taking 52.2 ounces as the average weight of a man's brain, he found that the brain of the novelist Turgenev weighed 71 ounces, while G. B. F. Butler had 62 ounces of brain. Thackeray, Cuvier, and the infamous Jeffreys had brains weighing between 54 and 58.6 ounces. Gambetta's weighed only 40.9 ounces or less than the average boy of 7 years. Byron's brain weighed 63.8 ounces, Schiller's 55.8 and Dante's 50.2 ounces or 1,420 grams. An idiot boy had a brain weighing 59.5 ounces, while the brain of an ignorant workman, Rustan, weighed 78.3 ounces. Virchow found a brain that weighed 1,911 grams, belonging to a man of no special mental development; this proves that weight is no evidence of intelligence, as people of inferior intellect have often had the heaviest brains.

Except in rare cases of disease, the brain does not fit the skull, being surrounded by three membranes and a watery fluid. Another popular error is the supposition that large convolutions and deep and tortuous passages between the subdivisions of a brain betray superior power. Certain rodents, like the beaver, evince a high order of intelligence and engineering skill, and yet their brains are devoid of convolutions. On the other hand, the whale has a larger brain and it is divided by deep fissures, but the whale is not distinguished for intelligence. The intelligent elephant's brain is larger than the human brain, weighing 9 or 10 pounds, and the fissures in it are much more complicated and tortuous. The coating of gray matter that overlies the brain and dips down into the fissures has been supposed to be the seat of the highest order of mental action, and mental capacity has, therefore, been measured by the thickness of the

cortical layer. That such estimates are unwarranted is the positive conviction of Dr. Simms, who presents a striking evidence on this point. The average thickness of the gray matter is one-fifth of an inch. In Daniel Webster, there was only one-sixteenth of an inch—less than one-third the normal amount. In many of the lower animals, and in persons below the average in intelligence, a thicker cortex has been found than in Webster's brain. The brain attains its highest degree of development earlier than any other part of the body. The parts lying in front have functions connected with the intellectual part of man's nature; while the parts lying nearer the back belong to the merely animal or organic nature. As the central organ of the nervous system the brain is sympathetically affected in nearly all cases of acute diseases.

Diseases of the Brain.—Diseases of the brain fall into two classes, according as they exhibit mental characteristics alone, or also anatomical disturbances. To the former class belong hypochondria, mania, etc. Among the latter may be mentioned meningitis, or inflammation of the membranes of the brain, which seldom occurs without affecting the substance of the brain also, and thus giving rise to phrenitis, hydrocephalus, or water in the head, caused by pressure of water in the cavities of the brain.

Abcess.—A collection of pus is caused usually by fracture of the skull; disease of the middle or temporal bone; *anæmia* is a deficiency in quality or quantity of blood in the brain; *atrophy*, a wasting of brain substance, is either congenital or a condition accompanying old age, or the result of exhausting disease or alcoholic excesses.

Compression, Concussion, and Contusion of the Brain.—Compression means the squeezing of the brain by any fluid, such as blood, serum, or inflammatory exudation or tumor. Concussion is the result of a shock to the brain, but without visible effect on its substance. In contusion, the brain substance is more or less lacerated. *Congestion* of the brain causes headache, mental exhaustion, sleeplessness and giddiness. Acute fever, mental strain, or alcoholic dissipation may cause this disease. Inflammation of the brain is usually the result of injury, or disease of the bone of the skull and is accompanied with more or less meningitis. *Hemorrhage* into the brain leads to apoplexy. Softening is a term popularly, but erroneously, used to indicate failure of mental power, often accompanied by drowsiness, loss of sleep, mental and emotional excitability. There may be no actual softening in such a condition—merely atrophy of the brain. Real softening is the result of clotting of the blood in the vessels, disease of the walls of

the arteries (atheroma) or embolism, or the presence of tumors. The brain substance becomes red, yellow, or white, and the fibers break up as oil drops, and are gradually absorbed, a cyst containing fluid being left. The symptoms depend on the part affected; if it is in the motor area, there will be a paralysis of motion; if in the sensory area, there will be loss of conscious perception. Tumors may grow from membranes, blood-vessels, or connective tissues of the brain. ROBERTS BARTHOLOW, M. D.

Brainard, David Legg, an American explorer, born in Herkimer county, N. Y., Dec. 21, 1856. He received a common school education and enlisted as a private in the United States army in 1876. He rose to distinction in the Greeley Arctic Expedition and was promoted through the various grades to the rank of Colonel. In 1899 he was sent as Chief Commissary to Manila, Philippine Islands.

Brainard, John Gardiner Calkins, an American poet, born in New London, Conn., Oct. 21, 1796. After graduation at Yale in 1815, he went to Hartford in 1822 and took charge of the Connecticut "Mirror," in which many of his early poems appeared. In 1827 he was attacked by consumption and forced to resign his editorship. From this time he resided on Long Island. He issued a volume of poems in 1825 (2d ed. 1832). "Niagara" and "Connecticut River" were his best known poems. He died in New London, Conn., Sept. 26, 1828.

Braine, Daniel Lawrence, an American naval officer, born in New York city, May 18, 1829. He entered the United States navy in 1846 and became a Rear-Admiral. He served with distinction through the Mexican and Civil Wars. In 1873 he obtained the surrender by Spain of 102 survivors of the "Virginius" prisoners. He died in Brooklyn, N. Y., Jan. 30, 1898.

Brainerd, David, an American missionary, born at Haddam, Conn., April 20, 1718. He entered Yale College in 1739, but three years later was expelled for declaring that one of the college tutors had no more of the grace of God than a chair. That same year he was licensed to preach, and sent as a missionary to the Indians in Massachusetts. He labored afterward among the Indians in Pennsylvania, and with much success in New Jersey, baptizing there no fewer than 77 converts, of whom 38 were adults. He wrote "Wonders of God Among the Indians," and "Grace Displayed" (1746). These were republished, in 1822, and had some popularity. He died in Northampton, Mass., Oct. 9, 1747.

Brain Fever, a term in common use for inflammation of the lining membranes of the brain, meningitis; or of the brain itself, cerebritis. These are generally found in

Brainstone Coral

conjunction, seldom separate, and are termed phrenitis or encephalitis. Often associated (a) with tuberculosis, or scrofula; sometimes (b) with gout, rheumatism, or syphilis; in the first instance generally in the case of children and delicate young females, in the others chiefly in adult males; very frequently, also, from injury, or as a consequence of previous diseases. Brain fever is characterized by violent headache, intolerance of light, excitement, extreme sensitiveness, hyperæmia, delirium, convulsions, and coma. These are the symptoms of cerebral irritation, which is often followed by cerebral depression. So real is the delirium that it cannot be distinguished from true perceptions.

Brainstone Coral, a name popularly applied to certain kinds of madrepora of the genus *meandrina*, so named from the general resemblance to the brain of man exhibited in its large rounded mass and numerous winding depressions. When the hemispherical mass is broken, the ridges which bound its furrows may be traced inward through its substance, even to the central nucleus from which they commenced. The brainstone corals are very common in collections, and are much admired for their beauty.

Braintree, a town in Norfolk Co., Mass.; on the New York, New Haven and Hartford railroad; 10 miles S. of Boston. It contains the villages of South and East Braintree; has electric street railroads to the principal nearby towns and villages, and is principally engaged in granite quarrying, and the manufacture of tacks, shoes, wool, rubber goods, and fans. John Adams, John Quincy Adams, and other members of that family were born here. Pop. (1890) 4,448; (1900) 5,981; (1910) 8,066.

Brake, Air-, a mechanical device for regulating the speed of railroad trains and for stopping them. The modern air-brake, in its present perfected and seemingly intricate form, is the result of a system of development co-ordinate with the progress of railroad operation, the evolution of each having been materially influenced by that of the other. Each of the marked advances in the development of the air-brake is due to the quick perception and ingenuity of George Westinghouse, and a brief review of the characteristics of the earlier forms of the Westinghouse air-brake is both of historical interest and of importance to a more ready comprehension of the construction and operation of the modern air-brake. In the course of its development, the air-brake has been known in three different forms—the straight air-brake, the automatic air-brake and the quick action automatic air-brake, each in its turn fulfilling the requirements of its day and laying the foundation for the succeeding form.

Brake

The Straight Air-Brake.—The straight air-brake was the earliest and simplest form and was introduced by Mr. Westinghouse about the year 1869. An air-compressor was attached to and operated by steam from the locomotive and compressed atmospheric air into a storage reservoir, also located upon the locomotive. A line of ordinary gas or water pipe, commonly called the train pipe, extended from the reservoir through the engineer's cab and back underneath the tender and each of the cars of the train. Between the cars, the train pipe was connected, by means of rubber hose and suitable couplings, so as to form a continuous line throughout the length of the train. Near the center of each car was placed an air cylinder, called the brake cylinder, which was connected by means of a short branch pipe with the train pipe. The brake cylinder contained a piston with a stem which was connected, through a system of levers and rods, with the brake shoes which were to be applied to the car wheels to check the motion of the train. In the cab, and within reach of the engineer, an operating valve, consisting of a three-way cock, was placed in the line of the train pipe. By means of this valve, the engineer could permit air to flow from the reservoir into the train-pipe and connected brake cylinders, thereby forcing out the pistons and applying the brake shoes to the wheels. When sufficient air pressure to meet the requirements of the occasion had thus been admitted to the brake cylinders, the engineer could move the handle of his operating valve into such a position as to cut off further flow of air from the reservoir and to retain within the brake cylinders so much air pressure as had already been applied. By moving the handle of the operating valve into still another position, the engineer could cause the air already accumulated in the train pipe and brake cylinders to be discharged through the operating valve into the atmosphere, thereby releasing the pressure of the brake shoes upon the car wheels.

Control of the Air Pressure.—By means of this apparatus, the degree of air pressure in the brake cylinders, and, consequently, the pressure of the brake shoes upon the wheels, could be varied by the engineer from such a moderate application as would be required for checking the speed of the train upon descending grades or in bringing the train gently to a stop at stations, to the most powerful application required when an immediate stop of the train is demanded. This form of air-brake came into quite extensive use upon the comparatively short passenger trains of that period. As the length of the trains became increased, however, it was found that a serious loss of time occurred in the operation of applying the brakes, because of the fact that all the

compressed air for operating the brake cylinders of the different cars must travel back throughout the length of the train-pipe from the storage reservoirs to the brake cylinders, which operation was seriously retarded through the frictional resistance presented by the walls of the train pipe to the rapid passage of such a considerable quantity of compressed air. Also, in the case of the accidental detachment of a portion of the train while in motion, the brakes upon the detached cars were no longer capable of being applied by the engineer. Again, if the rubber coupling hose burst, or if any other portion of the apparatus became ruptured, the escape of the compressed air at such a point prevented the effective application of the brakes, and the control of the train was thereby lost.

The Automatic Air-Brake.—The automatic air-brake, introduced by Mr. Westinghouse in 1873, was designed to remedy the defects of the earlier system and to meet the advancing requirements of the time. The apparatus consisted of that already employed in the straight air-brake system, with the addition upon each vehicle of a storage reservoir, of sufficient capacity to supply the brake cylinder upon that vehicle, and a valve mechanism, called a triple valve, operated by variations in the air pressure in the train-pipe, to control the operation of the brake cylinder. This triple valve was placed in the branch pipe leading from the train pipe to the brake cylinder, and was also supplied with a pipe leading to the new storage reservoir. It was called a triple valve because it performed the three functions of (1) permitting air to flow from the train-pipe into the storage reservoir, for the purpose of charging the latter with air pressure; (2) permitting the compressed air to flow from the reservoir into the brake cylinder, for the purpose of applying the brakes, and (3) permitting the compressed air to flow from the brake cylinder to the atmosphere to remove the pressure from the brake cylinders and thereby release the brakes. The storage reservoir upon the locomotive became thereafter known as the main reservoir, and those upon the individual cars became known as auxiliary reservoirs. The characteristic feature of the automatic air-brake is the triple valve, under the immediate control of which are all the operations of the brakes upon individual cars.

The triple valve, with the parts in their normal positions when the brakes are not applied, is illustrated in section in Fig. 1. The location of the several connections for the branch pipes to the train pipe, the auxiliary reservoir and the brake cylinder are indicated. A piston *a* is adapted to move backward and forward in a piston chamber, from which the piston stem *b* extends

forward into a somewhat smaller valve-chamber, containing a slide valve *c*, which is loosely confined between two shoulders upon the piston stem. Within the slide valve *c* there is a small poppet valve *d*, called the graduating valve, which is secured by a pin to the piston stem *b*. When compressed air is admitted into the train-

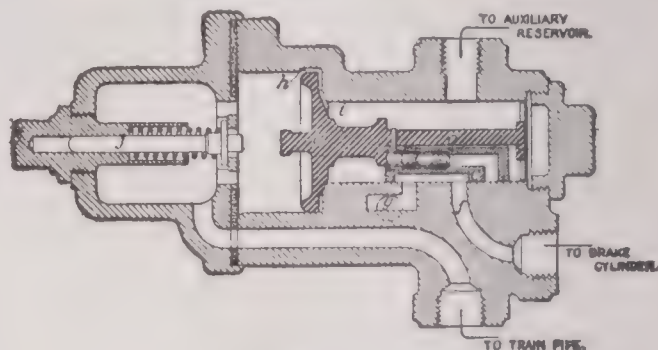


Fig. 1.

TRIPLE VALVE, NORMAL.

pipe from the main reservoir by the engineer, it enters the triple valve structure through the passage ways leading to the left of the piston *a*, where its pressure forces the piston and its accompanying parts into the positions shown in Fig. 1, if they were not already in those positions. In this position of the piston, the small feed grooves *h* and *i* permit the compressed air to gradually pass from the train-pipe, around the piston, into the valve chamber, and thence into the auxiliary reservoir, which thus becomes ultimately charged with the same pressure of air that exists in the train pipe. The brake apparatus is now in operating condition.

To apply the brakes, the engineer discharges a portion of the air contained in the train pipe through his operating valve, whereby the air pressure in the train pipe and the chamber at the left of the piston *a* is more or less reduced. Owing to the inability of the compressed air in the auxiliary reservoir to pass rapidly out through the small feed grooves *i* and *h*, the superior pressure remaining in the auxiliary reservoir and valve chamber forces the piston *a* to the left, thereby first cutting off communication between the auxiliary reservoir and the train-pipe through the feed groove *h*, and simultaneously withdrawing the graduating valve *d* from its seat in the slide-valve. The shoulder at the end of the piston stem *b* then comes into contact with the end of the slide valve *c*, which subsequently accompanies the piston in its progress toward the left, until the latter is finally arrested by coming into contact with the stem *j*, which is supported in the position shown by a spring called the graduating spring. The positions of the parts are then as shown in Fig. 2.

Compressed air from the auxiliary reservoir now passes through a transverse port *e*

in the slide valve, the passage way uncovered by the removal of the graduating valve *d* and the passage way *f* and connecting pipe to the brake cylinder, where it forces out the brake cylinder piston and caused the brake shoes to be applied to the wheels. The discharge of air from the auxiliary reservoir into the brake cylinder necessarily results in reducing the air pressure in the auxiliary reservoir and valve chamber of the triple valve, and such discharge and reduction of air pressure continues until the pressure has become slightly below that of the air remaining in the train pipe and the connecting chamber at the left of the triple valve piston. The slight preponderance of pressure then existing upon the left face of the piston *a* causes it to move to the right until the graduating valve *d* becomes seated

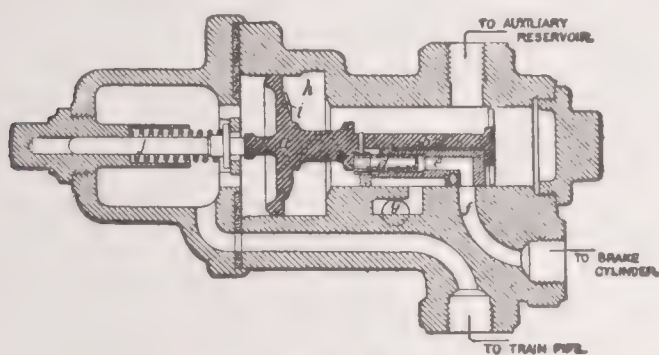


Fig. 2.

TRIPLE VALVE, BRAKE APPLIED.

in the slide valve and thereby prevents further discharge of air into the brake cylinder. The air pressure then existing in the brake cylinder causes the brake shoes to remain applied to the wheels, with a corresponding retarding effect upon the car.

Graduating the Pressure.—Should it appear to the engineer that an increased retarding force of the brakes is desirable, he discharges a further portion of the air remaining in the train pipe through his operating valve. This results in a further reduction of the air pressure in the train pipe and the connecting chamber at the left of the piston *a*, whereupon the preponderating pressure in the auxiliary reservoir and chamber at the right of the piston causes it to again move to the left, until stopped by the stem *j*, thereby moving the graduating valve *d* and reopening the passage through the slide valve for the further discharge of air from the auxiliary reservoir into the brake cylinder. This discharge continues until the air pressure in the reservoir and chamber at the right of the piston *a* has become again reduced to a point slightly below the pressure yet remaining in the train-pipe, when the preponderance of the latter upon the left face of the piston moves it inwardly and once more cuts off further discharge of air to the brake cylinder by receding the graduating valve *d*. This process, customarily called graduating, may be

again repeated by the engineer if the air pressure in the brake cylinder is still found by him to be insufficient to meet the demands of the occasion. In this manner, the engineer is enabled to apply the brakes with any of the various degrees of force required under the variable conditions calling for checking the speed of the train or for bringing it to a smooth and gentle stop at stations.

To discharge the air from the brake cylinder and release the brakes, the engineer moves the handle of his operating valve into the position for restoring communication between the main reservoir and the train-pipe. The air pressure in the train-pipe is thereby elevated and, acting upon the left face of the triple valve piston, moves it, with its connected valves, to the right, until it again reaches the position shown in Fig. 1. In this position of the slide valve, the passage way *f*, connected with the brake cylinder, is brought into communication, through a cavity in the lower face of the slide valve, with a port and passage way *g* leading directly to the atmosphere. The air in the brake cylinder thereby discharges to the atmosphere and the brakes become released. At the same time, the feed groove *h* again establishes communication between the train pipe and the auxiliary reservoir, so that compressed air from the main reservoir upon the locomotive passes into and recharges the auxiliary reservoir, so that it is restored to a condition of readiness for again applying the brakes.

An Emergency Discharge.—Should an emergency arise in which it is important to stop the train quickly, the engineer discharges at once a considerable quantity of air from the train pipe, through his operating valve, thereby rapidly reducing the pressure upon the outer face of the triple valve piston. This results in such a considerable preponderance of pressure upon the right face of the piston that the movement of the latter toward the left cannot be resisted by the spring supporting the stem *j*. The spring becomes compressed and permits the piston to continue its movement to the left until stopped by reaching the end of the chamber in which it operates. Under such conditions, the slide valve *c* moves so far to the left as to completely uncover the passage way *f* leading to the brake cylinder. A less obstructed discharge of air from the auxiliary reservoir to the brake cylinder results, and the maximum air pressure which can be supplied in the cylinder by the air in the auxiliary reservoir is more quickly attained.

As the automatic air-brake is applied by an operation of the triple valve which results from the discharge of air from the train-pipe to the atmosphere, it is evident

that the application of the brakes need not be confined to the manipulation of the operating valve by the engineer, but will result from any cause by which the train-pipe air pressure may become sufficiently reduced. It was this feature of the apparatus which gave it the designation automatic. Should any portion of the train become detached, or should the train pipe or hose become ruptured, a reduction of air pressure in the train pipe immediately follows, and the brakes become automatically applied upon all the cars of the train. The importance of this feature of the automatic brake is very marked. Of all the operations of the air-brake apparatus, the necessity of prompt and reliable action, when the full retarding effect of the brakes is needed, stands pre-eminent. Of all the various manipulations of the air pressure, that of permitting the air pressure in the train-pipe to be discharged to the atmosphere is the simplest and most surely attainable. In this way, the prompt response of the brake apparatus, when emergency calls for its operation, is most fully assured, and the automatic air-brake has, therefore, taken a most conspicuous place in the front rank of railroad safety appliances. No accidental disorder of the apparatus can prevent the application of the brakes in emergencies. By means of the engineer's operating valve, or of a valve called the conductor's valve, connected with the train pipe in each passenger car, or by the occurrence of any disorder which dissipates the air pressure in the train pipe, the apparatus automatically causes the train to come to a stop—in the latter case calling attention to the disorder and giving opportunity for such repair as shall again insure safety before the train proceeds.

Power Brakes for Freight Trains.—The automatic air-brake was very generally adopted for the passenger trains of all important railroads, and fully met all the requirements of its day. When, however, in the development of railroad transportation, the necessity for the use of an automatic power brake upon freight trains became apparent, new conditions were discovered which the automatic air-brake was not qualified to meet. During the year 1886, a series of brake trials was conducted at Burlington, Ia., by a committee of the Master Car Builders' Association, and it was then demonstrated that the operating requirements of power brakes upon long freight trains could not be fulfilled by any power brake in existence. Prompt and efficient as had been the operation of the automatic air-brake upon passenger trains, it was discovered that, upon long freight trains, the reduction of air pressure in the train pipe, sufficiently to actuate the triple valves at the rear end of the train, occu-

pied too long a period of time when that reduction was effected only by the discharge of the train pipe air through the engineer's operating valve. The length of the train pipe upon a freight train of 50 cars is about 2,000 feet, or 2-5 of a mile. When, in an emergency, the engineer turned the handle of his operating valve so as to permit the compressed air to discharge from the train pipe to the atmosphere as freely as possible, the movement of the air in the train pipe toward the engineer's valve was so resisted and retarded by friction upon the walls of the train pipe that fully 17 seconds elapsed from the time that the discharge began at the engineer's brake valve until the pressure in the train pipe upon the rear cars became sufficiently reduced to cause the triple valve to operate. The brakes upon the forward cars were promptly applied with full force, so that the speed of the forward portion of the train became rapidly reduced before the brakes began to apply upon the rear portion of the train. In consequence, the cars of the rear portion of the train plunged forward unresisted into those which were retarded by the brakes at the forward end, with a force that almost equalled that of collision. The shocks produced by such collision were sufficient to seriously damage the cars and their lading.

It was clearly evident that the usefulness of the automatic air-brake upon freight trains became contingent upon the discovery of some means whereby the interval of time elapsing between the application of the brakes upon the cars of the forward end of the train and of those at the rear end of the train could be so diminished that no damaging shocks should result from any operation of the brakes. An examination of the conditions of operation made it equally evident that but two methods could be utilized for securing a more nearly simultaneous application of the brakes to all the cars, one of which is to reduce the air pressure in the train pipe so gradually that such reduction is nearly uniform throughout the train, and the other is to provide a series of openings in the train pipe, in addition to that through the engineer's brake valve, so that the train pipe air may be discharged at different points throughout the train at approximately the same time. While the first of these two methods proves entirely satisfactory for ordinary applications of the brakes in regular service, so much time is occupied by it that it is wholly unsuitable for applying the brakes when emergencies require prompt and efficient action. The second method, therefore, became the only practical solution of the use of the compressed air brake as an effective safety appliance upon freight trains.

The Quick Action Air-Brake.—This invention, introduced by Mr. Westinghouse about

the beginning of the year 1888, was the result of the development of this principle. The train pipe is provided with a vent valve upon each car, which is operated by the mechanism of the triple valve when, and only when, an emergency application of the brakes is desired. By discharging the air, vented from the train pipe in emergency applications, into the brake cylinder, instead of into the atmosphere, Mr. Westinghouse also discovered that a considerably

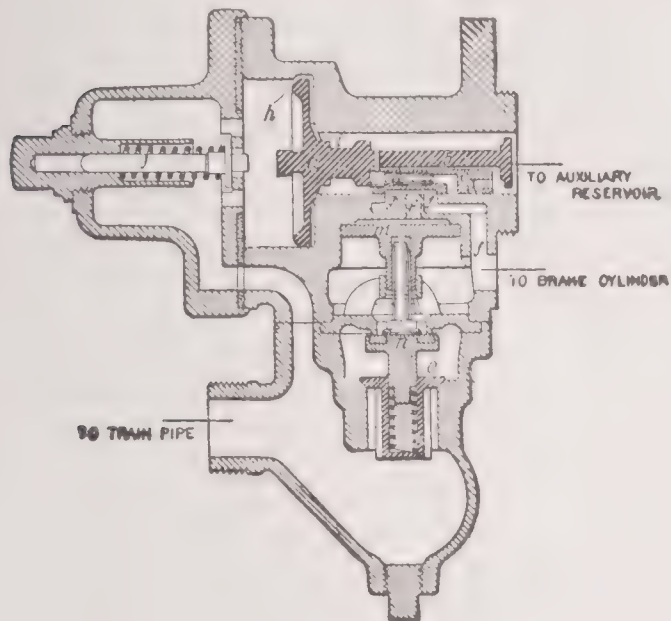


Fig. 3.

QUICK ACTION TRIPLE VALVE.

more powerful and effective application of the brakes could be secured in emergencies than is found to be necessary or desirable for use in the ordinary operations of the brakes in customary service. The mechanism of the quick action automatic air-brake consists of the apparatus hitherto employed in the automatic air-brake system, with the simple addition of the train pipe vent valve and the means for causing it to operate in emergency applications. A sectional view of the quick action triple valve is illustrated in Fig. 3.

All of the upper portion of this triple valve is of the same construction as that already described in connection with the automatic air-brake, with the single exception that the main slide valve *c* is lengthened at the forward end, and this added portion is supplied with a somewhat restricted port *k*. In all applications of the brakes which result from such moderate reductions of train pipe air pressure as occur in all ordinary service applications of the brakes, this portion of the triple valve is alone operative. The additional quick action mechanism consists of the supplemental piston *m*, situated in the cylindrical chamber below the slide valve, an emergency valve *n* with a stem extending upward to the piston and a check valve *o* directly below the emergency valve. A light spring, situated between the check valve and the

emergency valve, serves to support the emergency valve and supplementary piston in the positions shown, under ordinary circumstances. The port or passage way *p*, indicated by dotted lines, connects the main valve chamber with the chamber above the supplementary piston *m*. This port is normally covered and closed by the slide valve *c*, and is only uncovered when the triple-valve piston *a* moves to the left with sufficient force to compress the supporting spring of the stem *j*, and thereby completes its full traverse to the end of its chamber. When the complete movement of the triple-valve piston thus occurs, the port *p* is uncovered through an opening in the lower face of the slide valve *c*, which, however, could not well be illustrated because of the fact that both it and the dotted port *p* are situated behind the plane of the section shown.

Making a Sudden Stop.—When an emergency occurs, in which the engineer finds it necessary to bring the train to a sudden stop, he moves the handle of the brake valve into a position for quickly discharging the air from the train pipe, whereby a sudden

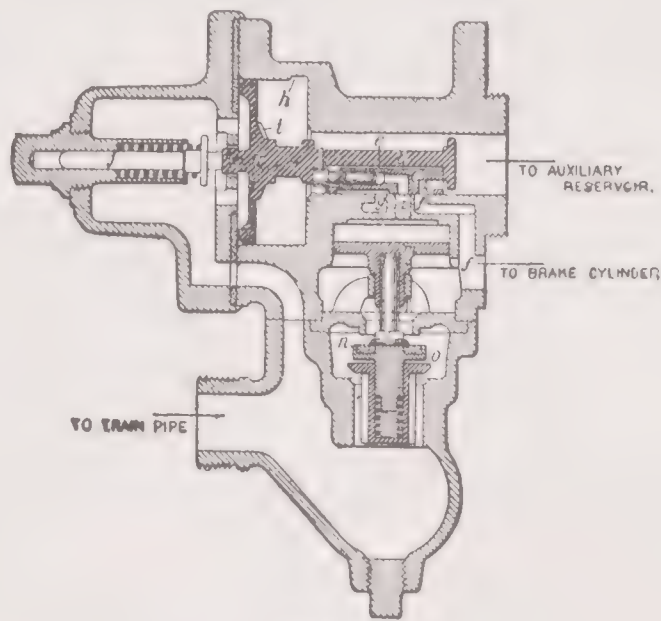


Fig. 4.

QUICK ACTION TRIPLE VALVE, EMERGENCY VALVE OPEN.

and material reduction of the air pressure is effected in the train pipe upon the first car and in the connected chamber at the left of the triple valve piston *a*. This results in such a preponderance of air pressure from the auxiliary reservoir upon the right face of the triple valve piston that the piston is quickly moved to the left, compressing the supporting spring of the stem *j*, until it reaches the end of its chamber. The passage way *p* being thereby uncovered, air pressure from the auxiliary reservoir instantly acts upon the upper face of the supplemental piston *m* to force it downward and open the emergency valve *n*, as illustrated in Fig. 4.

To clearly comprehend what then takes place, it is important to fully realize the conditions which exist at this instant; they are (1) that no compressed air has as yet, during the practically instantaneous operation above described, entered the brake cylinder from any source; (2) that the compressed air can be discharged from the auxiliary reservoir into the brake cylinder only comparatively slowly, because of the restricted character of the port *k* in the slide valve; and (3) that the air pressure in the train pipe, while having been suddenly and materially reduced below the pressure in the auxiliary reservoir, to the extent of five or 10 pounds, or possibly more, is still very considerable (60 or 65 pounds), and it has, by merely lifting the check valve *o*, a capacious and unobstructed passage way, past the open emergency valve *n*, into the as yet empty brake cylinder. In consequence of the existence of these conditions, the check valve *o* is lifted from its seat, against the light resistance of its spring (as indicated in Fig. 4), and the train pipe air rushes into the brake cylinder, thereby greatly reducing the train pipe air pressure in the vicinity. When the brake cylinder has become filled with air at the reduced pressure in the train pipe, the spring above the check valve *o* immediately causes it to be closed, cutting off a return of any air from the brake cylinder to the train pipe, as the pressure in the latter becomes further reduced. The air in the auxiliary reservoir, which has been comparatively slowly discharging into the brake cylinder during the operation just described, now continues to discharge through the port *k* and the passage way *f*, and to add to the contents of the brake cylinder until equilibrium of pressure exists in the reservoir and brake cylinder.

The sudden discharge of a large quantity of air from the train pipe, into the brake cylinder of the first car, not only causes a quick and powerful application of the brakes upon that car, but also produces a sudden and material reduction of the air pressure upon the left face of the triple-valve piston *a* upon the second car, thereby reproducing the conditions necessary for the complete movement to the left of the triple-valve piston and a repetition of the operation which occurred in the triple valve of the first car. This operation of the triple valve of the second car similarly actuates the quick action triple valve upon the third car, and so on, from car to car, throughout the train. The accomplishment of these successive or serial operations of the triple valves throughout the train occurs with such astonishing rapidity that, whereas, 17 seconds elapsed between the application of the old automatic brake upon the first car and the application upon the fiftieth, this inter-

val is but 2.5 seconds in the operation of the quick action air-brake—but little longer than is required for sound to travel through a distance equal to the length of train pipe upon a freight train of 50 cars.

The quick action automatic air-brake system thus virtually consists of two distinct brake systems, one of moderate power and smooth and gentle application for all the customary operations of every day train service, and the other of high power and violent application for use only when emergencies require most energetic means to avert destruction of life and property. It has practically succeeded all other forms of power brake upon railroad trains, and in 1900 was in use upon about 1,000,000 cars.

It has already been noted that the condition which determines whether a service or an emergency application of the brakes will result from a reduction of the air pressure in the train pipe is the rate of rapidity or the suddenness with which the reduction of the air pressure in the train pipe takes place. When the air pressure in the train pipe is reduced comparatively slowly, the leftward movement of the triple valve piston is terminated by the resistance of the spring supporting the stem *j*, in such a position that the compressed air of the auxiliary reservoir becomes discharged into the brake cylinder, thereby reducing the air pressure of the auxiliary reservoir (which acts upon the right face of the triple valve piston) co-ordinately with the continued reduction of the air pressure in the train pipe (acting upon the left face of the piston), so that such a preponderance of air pressure upon the right face of the piston, as is necessary to compress the spring of the stem *j*, does not occur. It is only when the air pressure, acting upon the left face of the triple valve piston is reduced much more rapidly than the discharge of auxiliary reservoir air to the brake cylinder will permit the air pressure upon the right face of the piston to be reduced that the piston makes its complete movement to the left and causes a quick application of the brakes throughout the train. It is necessary, therefore, that the engineer's brake operating valve shall be provided with such means as shall readily enable the engineer to discharge air from the train pipe with only such rapidity as shall result in a service application, or to discharge the air with such greater rapidity as shall cause the emergency application of the brakes.

It is found also that, inasmuch as it is necessary to elevate the air pressure in the train pipe as rapidly as possible, to a point somewhat above the pressure of the air remaining in the auxiliary reservoirs after an application of the brakes, in order to force the triple valve piston to the right and release the brakes, the provision of a stored

pressure in the main reservoir upon the locomotive, higher than that ordinarily charged into the train pipe and brake apparatus, is very desirable for temporary use in effecting a prompt release of the brakes. It has thus occurred that the primitive three-way cock, used for an engineer's brake operating valve, with the earlier forms of the air-brake, has given place to a more complicated device, now employed for effecting the various operations of the quick action air brake.

Engineer's Brake Valve.—The functions of the modern engineer's brake valve may be enumerated as follows: To supply air to the train pipe and the auxiliary reservoirs throughout the train, at a certain definitely determined pressure for the proper

action mechanism of the triple valves to operate with certainty; and to temporarily supply the train pipe with an unusually high air pressure whenever the brakes are to be released. These various operations are in practice controlled by different positions of a rotary disk valve, the various positions of which are defined and secured by the movement of a handle operated by the engineer.

In order to avoid confusion, and to more clearly illustrate the construction and operation of the engineer's brake valve, it is diagrammatically shown with its ports and passage ways so arranged in one plane that a single sectional view of the structure will show them all, except those in the rotary disk valve.

Fig. 5 illustrates a plane view of the valve,

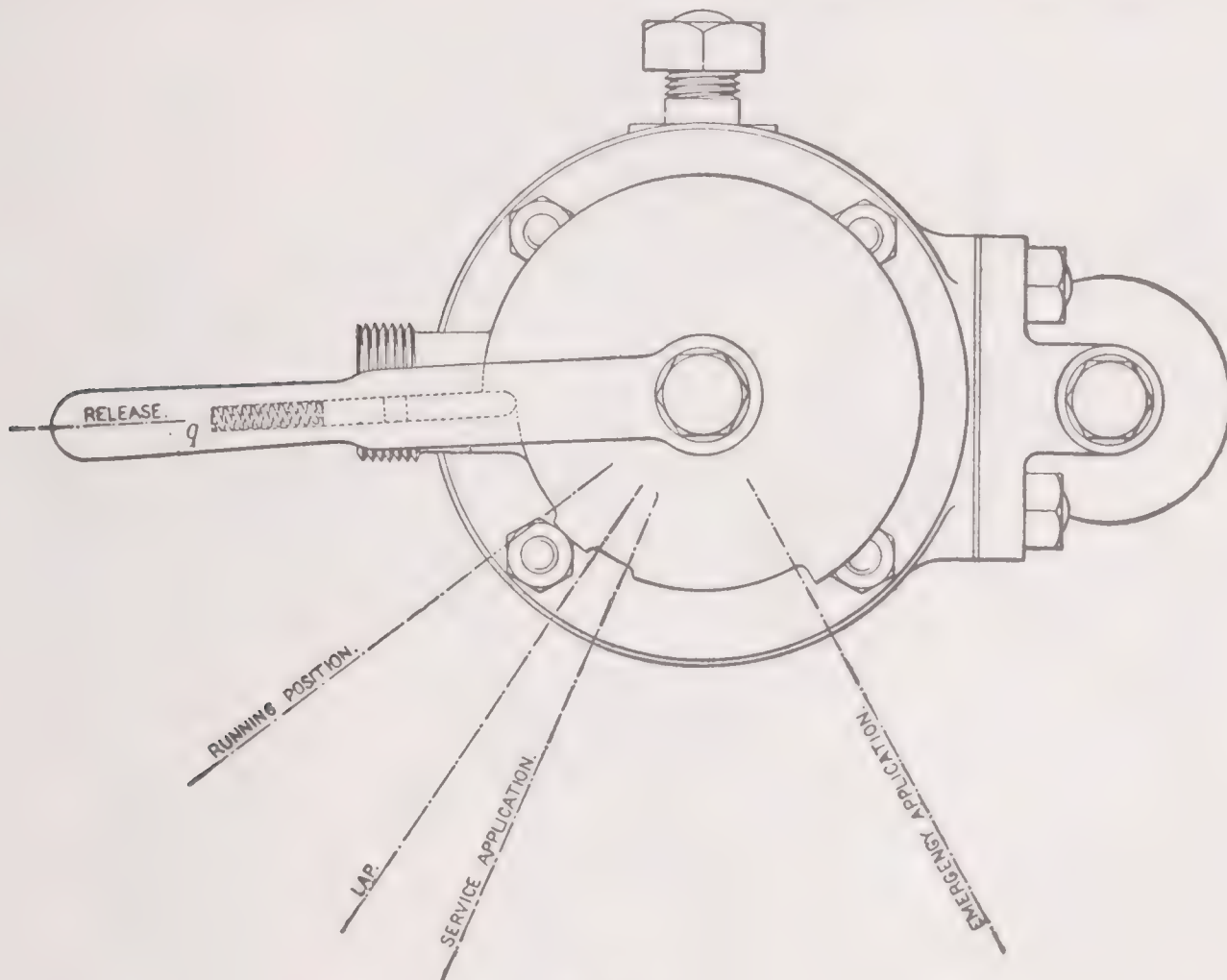


Fig. 5.

ENGINEER'S BRAKE VALVE.

operation of the brakes, the standard pressure adopted for this purpose by the railroads being 70 pounds; to discharge air from the train pipe to the atmosphere at such a rate of rapidity that all the applications of the brakes in customary service may be effected without the operation of the quick action mechanism of the triple valves; to maintain any reduced train pipe air pressure resulting from an application of the brakes, so that the brakes may be kept applied with the force corresponding to such reduced train pipe pressure; to discharge air from the train pipe to the atmosphere with such rapidity, in emergency applications of the brakes, as shall cause the quick

showing the handle in the position for releasing the brakes. The other various positions of the handle are indicated by dotted lines. Within the handle there is a latch or pawl, held in position by a coil spring (indicated by dotted lines, and also shown in Fig. 10), which, by engaging with various projections upon a disk, against which the pawl presses, readily indicates to the engineer's sense of touch the various positions of the handle for causing corresponding operations of the brake apparatus.

Fig. 6 illustrates a sectional view of the engineer's valve, with the handle in the running position, in which air from the main reservoir is admitted into the train-

Brake

pipe for the purpose of charging the brake apparatus upon the cars with the proper degree of air pressure. The handle q is connected by means of a spindle with the rotary disk valve r . In the seat upon which the valve r rotates, there are shown four passage ways. The passage way e leads directly to the train pipe; the passage way z leads directly to the atmosphere; the passage way x leads to the chamber y above the piston u ; and the passage way g leads to

Brake

piston t and valve v are shown in their uppermost positions, being sustained in those positions by the upward pressure of the spring s , which upward pressure is properly adjusted by means of the screw plug which supports the lower end of the spring. It is a standard practice upon railroads to charge the train pipe and auxiliary reservoirs upon the cars with air at 70 pounds' pressure, and the adjustment of the spring s is, therefore, so regulated by the screw plug

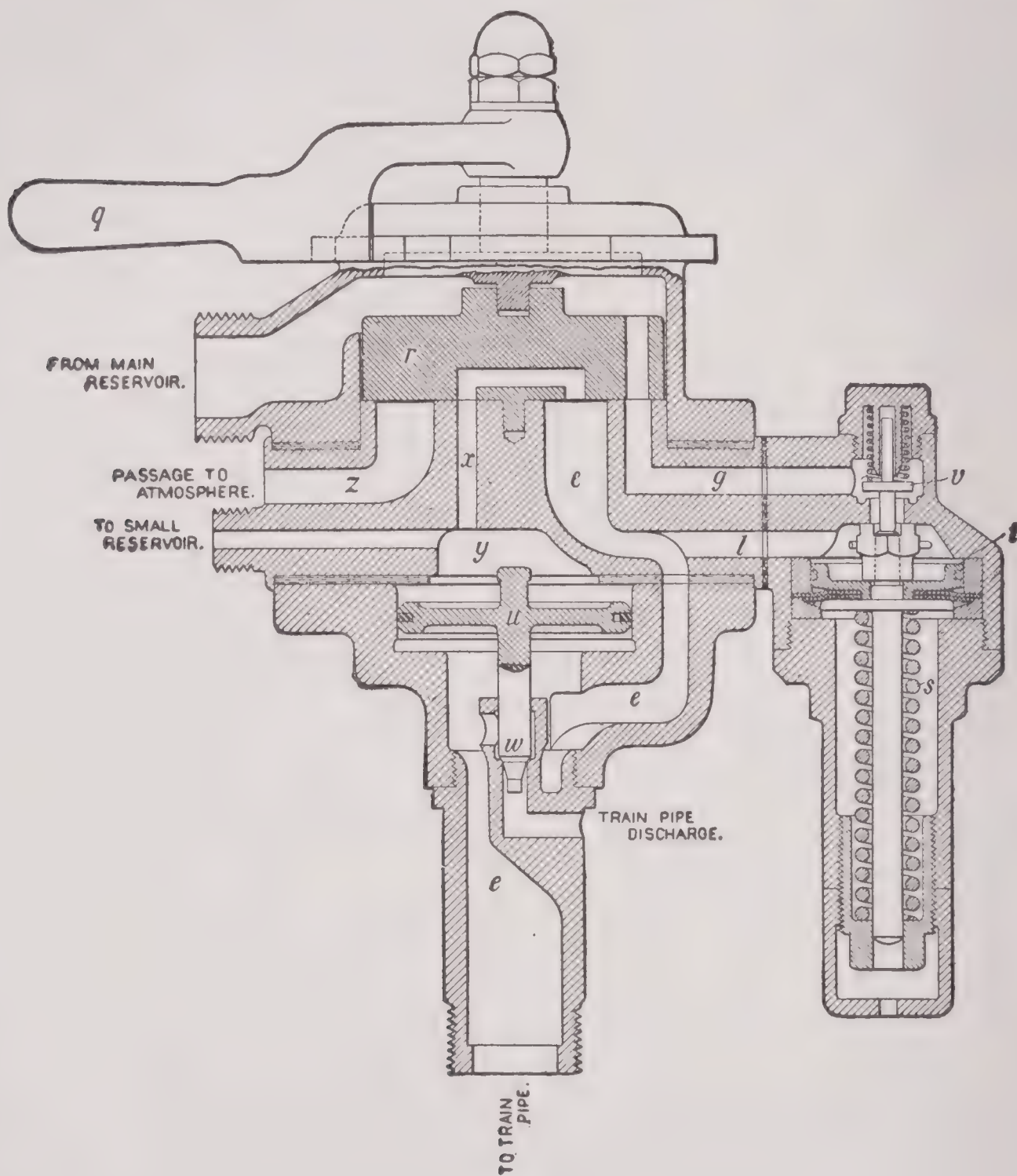


Fig. 6.

ENGINEER'S BRAKE VALVE, HANDLE IN RUNNING POSITION.

the chamber containing the valve v at the upper end of the structure, called the feed valve. In this feed valve the small supply valve p controls communication between the passage-way g and a chamber above the piston t , which chamber is connected by a passage way l with the passage way e leading directly to the train pipe. In Fig. 6, the

that an air pressure of 70 pounds per square inch upon the upper face of the piston *t* is necessary to force the piston downward and compress the spring, thereby permitting the valve *v* to be forced to its seat by the light spring pressing upon its upper face.

Extending downward from the piston u is a stem which terminates in the poppet

valve *w*. The valve *w* normally closes a passage way leading from the train pipe passage-way *e* to the atmosphere. The lower face of the piston *u* is always subject to the air pressure existing in the train pipe, while the upper face is subjected to the air pressure in the chamber *y*. Because of the necessarily small volume of the cham-

ber *y* becomes a portion of a reservoir or chamber of sufficient volume to permit an accurate reduction of air pressure therein through the discharge of a portion of the compressed air therefrom to the atmosphere. This small reservoir, which is located in any convenient place out of the way of the engineer, has, therefore, no other

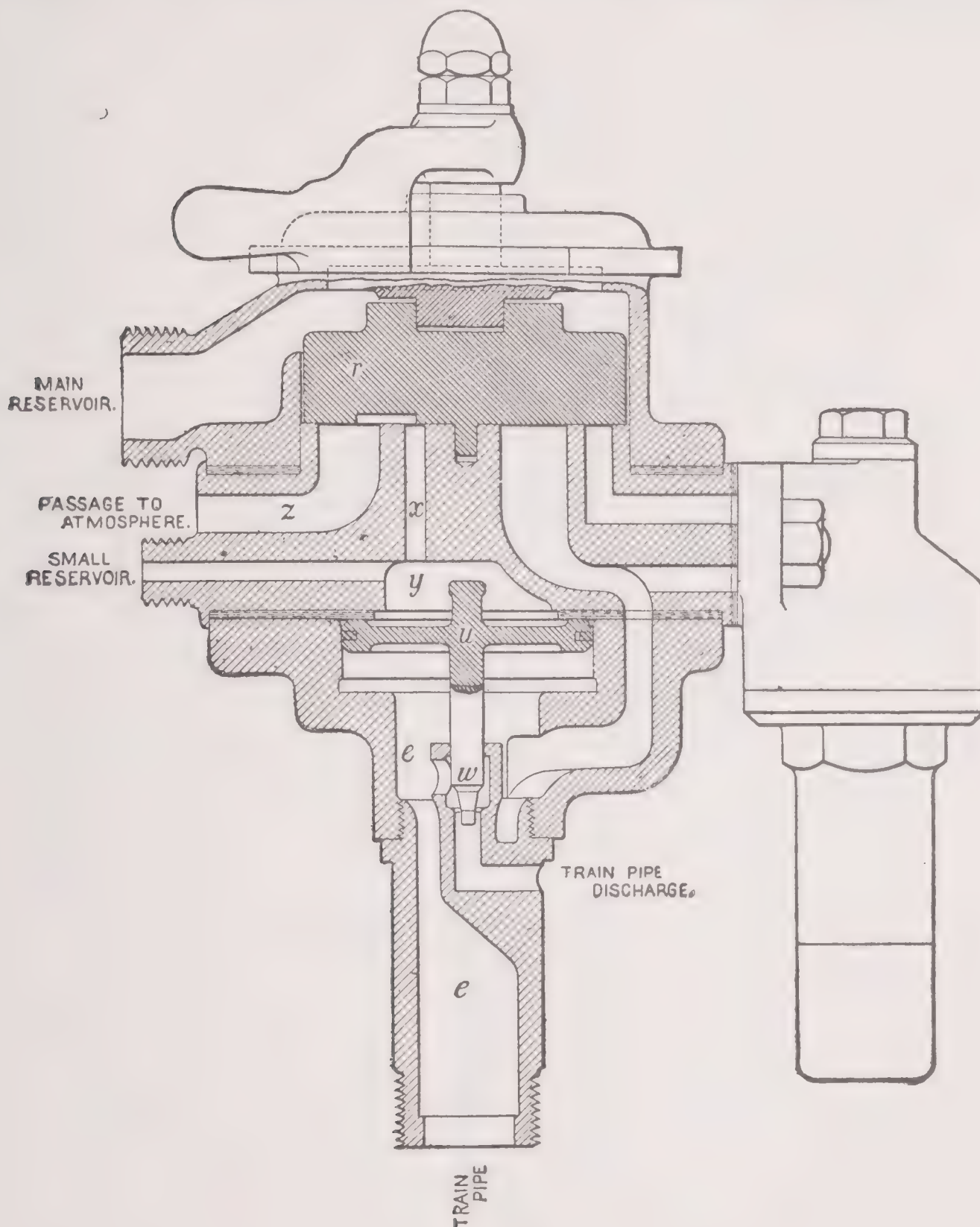


Fig. 7.

ENGINEER'S BRAKE VALVE, UNDER SERVICE APPLICATION.

ber *y*, owing to its position in the midst of a structure which must occupy as small a space as practicable, a passage way leads from it to a small reservoir which is connected with the structure of the engineer's valve by means of a pipe. In this manner,

function than to virtually provide such a volume for the chamber *y* as could not otherwise be acquired without greatly increasing the bulk of the engineer's valve structure, and so rendering it cumbersome and an obstruction in the engineer's cab.

With the handle in the running position, as shown in Fig. 6, the rotary valve *r* is shown in the position in which a passage-way through the valve conducts air from the main reservoir to the passage way *g* leading to the feed valve. The air passes below the supply valve *v* into the chamber above the piston *t* and thence by the passage ways *l* and *e* into the train pipe and auxiliary

ton *t* is forced downward, compressing the spring *s* and permitting the supply valve *v* to become seated and cut off further communication between the main reservoir and the train pipe.

The apparatus upon the cars is now charged and ready to apply the brakes whenever desirable, but the air pump upon the locomotive continues to compress air into

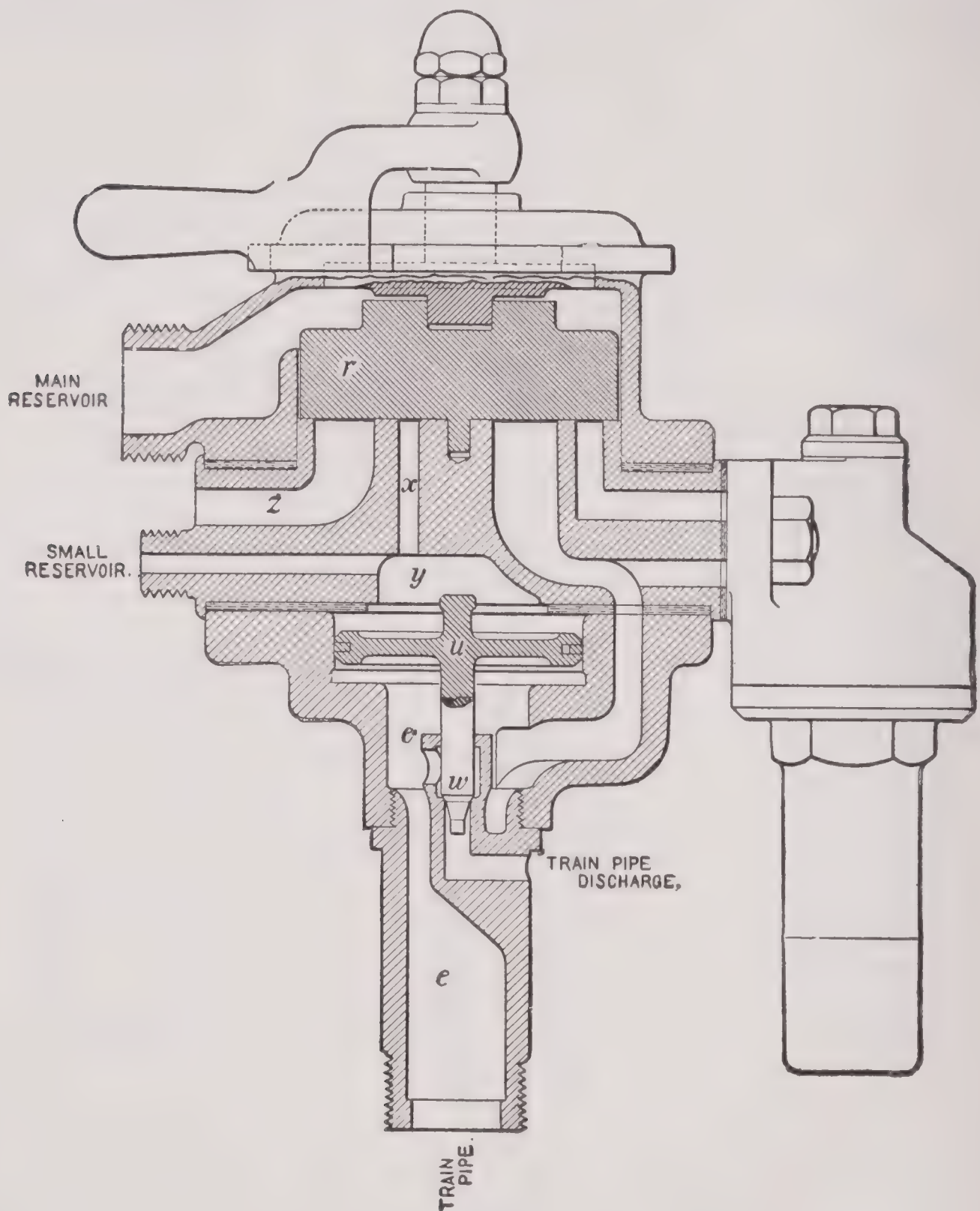


Fig. 8.

ENGINEER'S BRAKE VALVE, COMMUNICATION
CUT OFF.

reservoirs upon the cars. This flow of air from the main reservoir into the train pipe and auxiliary reservoirs continues until they are charged with a pressure of 70 pounds per square inch, whereupon the pis-

ton *t* is forced downward, compressing the spring *s* and permitting the supply valve *v* to become seated and cut off further communication between the main reservoir and the train pipe.

reservoir, is so caused to operate as to cut off the steam supply for the pump and stop its operation.

It is also to be noted that, in this position of the rotary valve *r*, a passage way is provided which connects the passage ways *e* and *x* so that the chamber *y* and the small reservoir connected therewith are in direct communication with the train pipe and

part of the apparatus, the effect is to diminish the pressure upon the upper face of piston *t* of the feed valve, thereby permitting the spring *s* to force the piston upward, unseating the supply valve *v*, and so to permit air from the main reservoir to flow into the train pipe and restore the pressure therein, and in the connected auxiliary reservoirs, to 70 pounds. In like manner, a

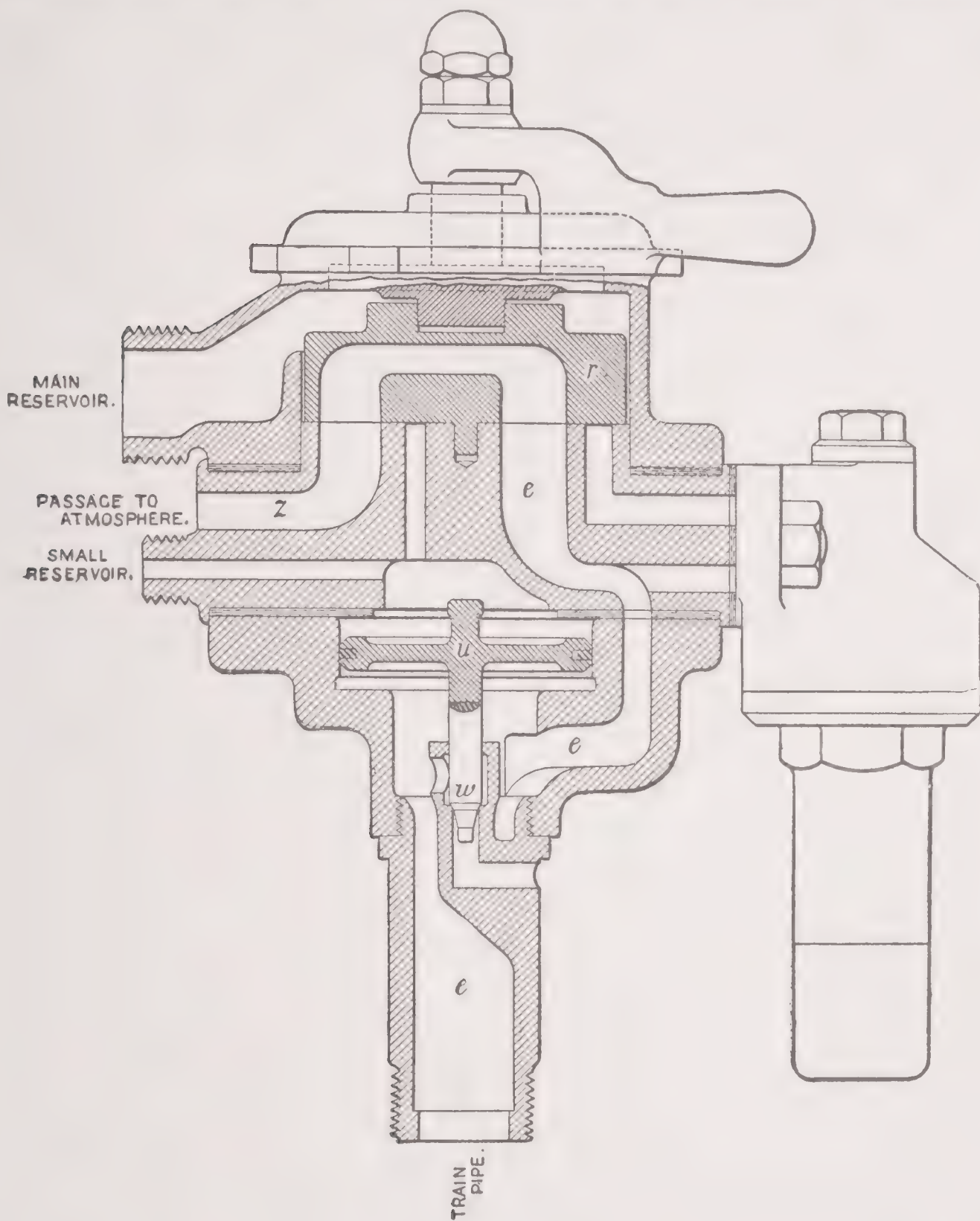


Fig. 9.

ENGINEER'S BRAKE VALVE, EMERGENCY APPLICATION.

charged with the same air pressure as exists in the train pipe.

If, while the air brake apparatus throughout the train is thus charged with the proper air pressure, any reduction of the air pressure should occur through leakage at any

reduction of pressure in the main reservoir, from any cause, acts upon the pump governor to restore the steam supply to the air pump to replenish the pressure in the main reservoir and restore it to 90 pounds.

In making a service application of the brakes, the engineer brings his handle into the proper position, thereby moving the rotary valve *r* into a position where the conditions are as illustrated in Fig. 7. In this position of the rotary valve, all communication between the main reservoir and other parts of the apparatus is cut off, and communication between the chamber *y*, above piston *u*, and the train pipe is similarly broken. At the same time, by means of a small cavity in the rotary valve *r*, the passage way *x* is placed in communication with the passage way *z* so that air from the chamber *y* and the small reservoir connected to

connected by a branch pipe with an air pressure gauge, by means of which the engineer is enabled to see how much the air pressure in chamber *y* is reduced by so discharging the air therefrom. When the air pressure in chamber *y* has been reduced to the extent that it is desired to reduce the train pipe air pressure, the engineer moves his handle into the lap position, thereby bringing the rotary valve into a position illustrated in Fig. 8.

In this position of the rotary valve, all communication between the respective passage ways is cut off. The air continues to discharge from the train pipe through the

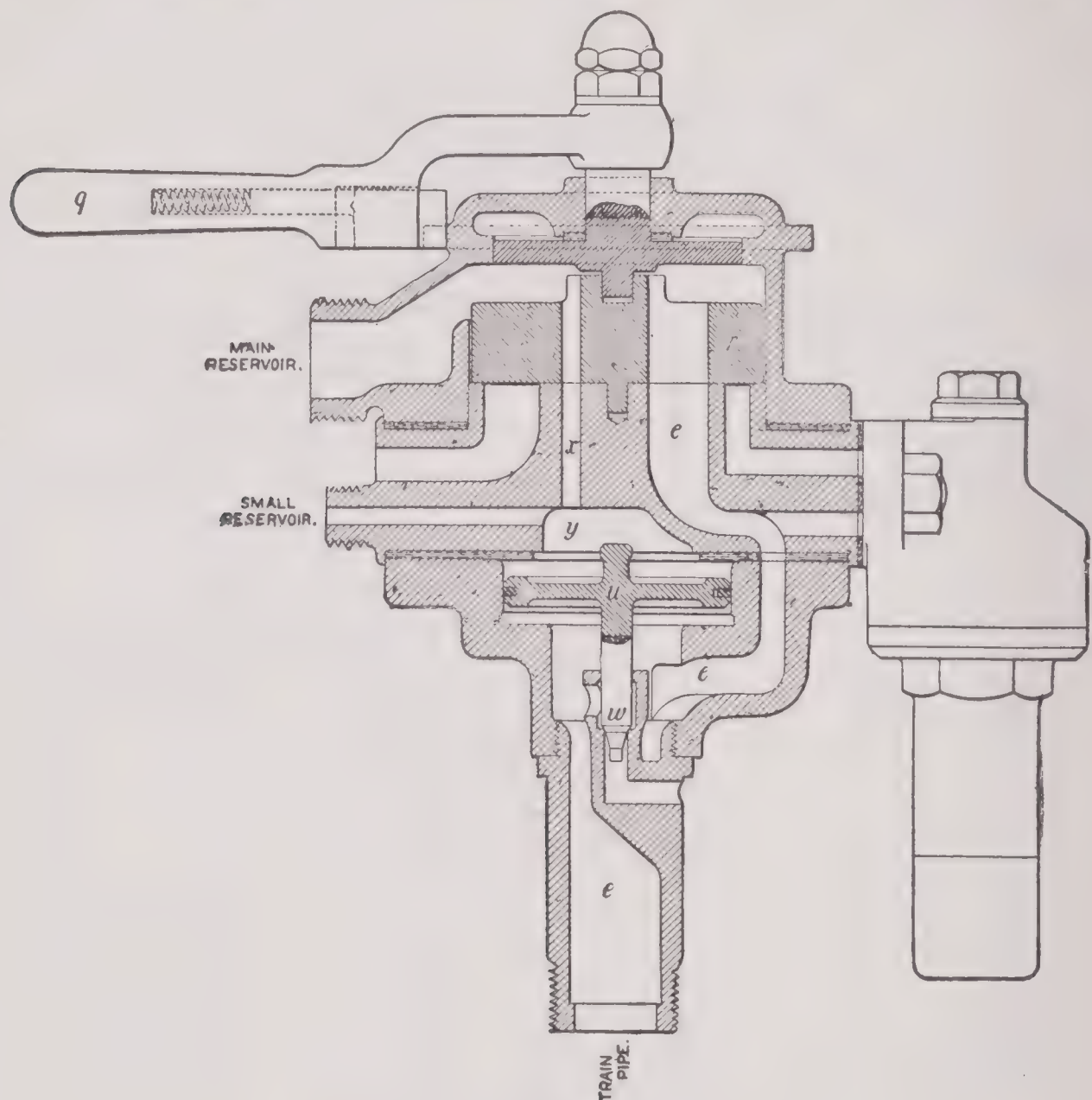


Fig. 10.

ENGINEER'S BRAKE VALVE, RELEASE POSITION.

it may be discharged into the atmosphere. The immediate effect of reducing the air pressure upon the upper face of piston *u*, while the train pipe air pressure below the piston remains unchanged, is to cause the piston *u* to be forced upward, thereby unseating the valve *w* and permitting air to be discharged from the train pipe directly to the atmosphere through the train pipe discharge passage. The pipe connecting the chamber *y* with the small reservoir is also

train pipe discharge passage until the air pressure in the train pipe has been reduced to a point slightly below that to which the pressure in the chamber *y* was reduced by discharge of air from the latter chamber to the atmosphere. Thereupon, the preponderance of pressure upon the upper face of piston *u* causes the piston to move downward and reseat the valve *w*, thereby cutting off further discharge of air from the train pipe to the atmosphere. Should the

engineer subsequently wish to apply the brakes with a greater force, he again moves the handle of his valve to the position for making service applications and discharges an additional quantity of air from the chamber y to further reduce the air pressure therein. This results in the piston u being again forced upward, again unseating the valve w and further discharging air from the train pipe.

There are two reasons for the interposition of the piston u and valve w in this process of discharging air from the train pipe, instead of discharging it directly to the atmosphere through a port in the rotary valve r , which would appear to be the most natural and simple course. One reason is that, as the number of cars composing a train varies greatly, the length of train pipe of a train of cars likewise varies between wide limits. Upon a short train, the volume of air which must be discharged from the train pipe to effect a given reduction of air pressure therein, is very much less than the volume which must be discharged from the train pipe of a long train to produce the same reduction of air pressure. If the air were directly discharged from the train pipe to the atmosphere, therefore, it would be necessary for the engineer to hold the handle of the brake valve in the position for making a service application a different length of time for each different length of train, to cause the same reduction of air pressure, while, with the use of the chamber y and connected reservoir, the engineer discharges the same quantity of air therefrom to the atmosphere, upon any length of train, to cause a given reduction of train pipe air pressure, and the piston u remains in its upward position a longer or shorter time, depending upon the length of the train. By this means, the engineer becomes readily accustomed to hold the handle of his brake valve in the service application position the proper length of time to produce any given reduction of train pipe air pressure, and thus, with experience, he is enabled with reasonable accuracy to apply the brakes with the desired force without the necessity of consulting the pressure gauge.

The other reason for the use of piston u and valve w is that it is desirable that the discharge of air from the train pipe to the atmosphere shall be gradually and not suddenly terminated. The body of air in the train pipe acquires some velocity of movement toward the engineer's brake valve during the period that the discharge continues, and the sudden termination of such discharge may easily result in a temporary increase of pressure at the forward end of the train pipe, sufficient to cause a release of the brakes at the forward end of the train. By means of the conical teat below the valve w the downward motion of the

piston u , which is gradual, is accompanied by a gradual closure of the train pipe discharge passage, thereby preventing such an increase of air pressure in the forward end of the train pipe, after closure, as would result in causing a release of any of the brakes.

In an emergency application of the brakes, the rotary valve r is turned to a position for establishing conditions illustrated in Fig. 9. By means of a cavity in the rotary valve, the train pipe passage way e is brought into direct communication with the passage way z leading to the atmosphere. The air in the train pipe is thus presented with an unobstructed avenue for discharge to the atmosphere, whereby the train pipe air pressure is so rapidly reduced as to cause an emergency application of the brakes throughout the train.

To release the brakes, after any kind of an application, the handle of the engineer's brake valve is placed in the release position, in which the rotary valve r is brought to a position for effecting the conditions illustrated in Fig. 10. In this position of the rotary valve communication is established from the main reservoir to the train pipe through a port leading to the passage way e , and to the chamber y by a port leading to the passage way x . By this means, the main reservoir air is furnished with an unobstructed passage way to the train pipe, for quickly replenishing the air pressure therein, and the air pressure in the chamber y and connected reservoir is simultaneously replenished so as to prevent the increasing train pipe pressure from lifting the piston u . The handle of the engineer's brake valve is customarily left in the release position only long enough to assure the release of all the brakes upon the train, when it is turned into the running position and restores the conditions illustrated in Fig. 6, whereby the train pipe and auxiliary reservoirs are again charged with an air pressure of 70 pounds and are brought to a condition of readiness for the next application of the brakes.

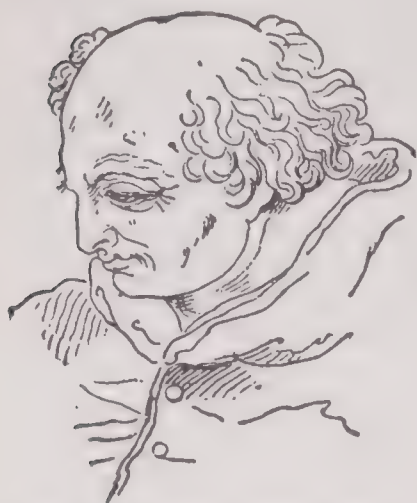
R. A. PARKE.

Bramah, Joseph, an English inventor; born in Yorkshire in 1749; especially known for an ingenious lock, and for the hydraulic press. He died in Pimlico, Dec. 9, 1814.

Bramante d'Urbino (brä-man'té), (real name DONATO LAZZARI), an Italian architect, born in 1444. Showing an early taste for drawing, he was brought up to the profession of a painter, but he quitted it to dedicate his talents to architecture, which he cultivated with uncommon success. He first designed and commenced in 1513, the erection of St. Peter's at Rome, carried on and finished by other architects after his death. He was a great favorite with Pope Julius II., who made him superintendent of his buildings, and, under that pontiff, he

Brambanan

formed the magnificent project of connecting the Belvidere Palace with the Vatican by means of two grand galleries carried across a valley. He built many churches, monas-



BRAMANTE D'URBINO.

teries, and palaces at Rome, and in other Italian cities, and was employed by Pope Julius as an engineer to fortify Bologna, 1504. He manifested a decided predilection for the classic architecture of the Greeks, and was the instructor of Raphael in that art. Bramante

Painted portraits with ability, and he was skilled in music and poetry. He died in 1514.

Brambanan, a district of the Province of Surakarta, Java, rich in remains of Hindu temples, of which there are six groups, with two apparently monastic buildings. The edifices are composed entirely of hewn stone, and no mortar has been used in their construction. The largest is a cruciform temple, surrounded by five concentric squares, formed by rows of detached cells or shrines, embracing an area of 500 feet square. In several of these *dagobas* the cross-legged figures of Buddha remain; but the larger figures which must have occupied the central temples have disappeared from all but one.

Bramatherium, a genus of *antilopidæ*, consisting of a gigantic species with four horns. It is allied to *sivatherium*, which also is four-horned. Both occur in the Upper Miocene, or Lower Pliocene beds of the Sewalik Hills in India.

Bramble, or **Blackberry** (*rubus fruticosus*), a plant common in Great Britain and most parts of Europe, having prickly stems, which somewhat resemble those of the raspberry. The flowers do not appear till the summer is considerably advanced, and the fruit ripens toward the end of it, continuing to be produced till the frosts of winter set in. The fruit is too well known to need description. Preserves are prepared from it of very delicate flavor, besides a pleasant and fairly potent wine. The bramble is little cultivated in Great Britain; but it seems to deserve attention, at least as much as the raspberry, and shows great capacity for improvement by cultivation. A slight rail on each side of a row of brambles, to restrain the straggling stems, affords the necessary security for neatness and order, and the care bestowed is repaid by abundance of fruit, very acceptable where wild

Bran

brambles are not plentiful, and at a season when there is no other small fruit in the garden. This being one of the most variable of British plants, its systematic arrangement has been a matter of great controversy, especially among pre-evolutionary botanists. Baker enumerates 21 sub-species, of which most again pass into varieties. Some are very pretty, and reward cultivation on the rock garden. In the United States, where they are called blackberries they are extensively cultivated for their fruit; and, of late, American kinds have been with advantage introduced into Great Britain. Species of *rubus* very similar to the common bramble, or varieties of it, abound in the northern parts of Asia, the Himalaya Mountains, and North America.

Brambling, **Bramble Finch**, or **Mountain Finch**, a bird of the family *fringillidæ*. It breeds in the more northern parts of Scandinavia; visiting Italy, Malta, Smyrna, etc., in its winter migrations. It has no song, its call note being a single monotonous chirp. It is rather larger than the chaffinch. The tail is forked, and its prevailing colors are black, white, and yellow.

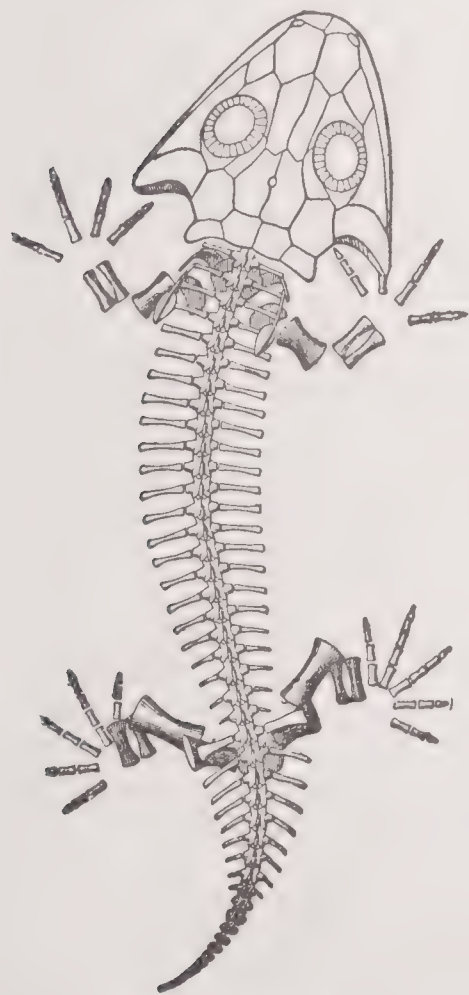
Bramhall, **John**, an anti-Puritan Irish prelate, born in 1594; educated at Sidney-Sussex College, Cambridge. He was already Sub-Dean of Ripon, and on the road to high preferment when he went to Ireland as Wentworth's chaplain in 1633. He soon became Archdeacon of Meath, and was consecrated Bishop of Derry in 1634. Bramhall's intolerance roused the wrath of the stubborn Scotch settlers in his diocese, and ruined the King's cause in Ulster. When the Civil War broke out, for safety's sake he crossed to England, but the royalist disasters soon drove him to the Continent. At Paris, he argued with Hobbes on necessity and the freedom of the will, but the dogmatic bishop was no match save in his own opinion for that subtlest of sceptics. The Restoration gave him the metropolitan see of Armagh. Bramhall closely imitated Laud in policy, and even resembled him in person, but was far his inferior in intellect. Not strong but merely obstinate in purpose, the so-called Athanasius of Ireland by his impolitic intolerance sealed the doom of Episcopalian supremacy in Ulster. He died in 1663.

Bran, the skins or husks of ground maize, wheat, rye, or other grain, separated from the flour. The nutritive value of these husks increases as we proceed from the outside of the grain toward the interior. The outer skin, or coarse bran, is very indigestible, owing to the presence of a layer of silica. The inner skins, called pollards, are more nutritious, containing from 12 to 15 per cent. of nitrogenous matter, and from 20 to 30 per cent. of starch. Unless, however, they are ground very finely, they

Branch

are apt to set up irritation of the bowels and diarrhoea. Though rich in nitrogen, bran appears to possess but little nutritive power. It may be of use to those who are well fed, and need a laxative, but to the poor who need nourishment it is of very little use. It is, however, of some commercial value, being largely employed in the feeding of horses and cattle, and in brightening goods during the processes of dyeing and calico printing.

Branch, that part of a plant which is produced from a lateral leaf bud on the primary axis or stem. It is looked upon as part of the stem, and not as a distinct organ. A branch generally produces secondary branches, and these give rise to minor ramifications, called branchlets or twigs. The different modes in which branches spring from the stem give rise to the various forms of trees; such as pyramidal, spreading, and weeping. Thus, in the cypress, the branches are erect, forming acute angles with the upper part of the stem; in the oak and cedar, they are spreading, each forming nearly a right angle; in the weeping ash and elm, the angles are oblique; while in the weeping willow and birch, the branches are pendulous, from their flexibility. The comparative length of the upper and under branches also gives rise to great differences in the contour of trees, as seen in the conical form of the spruce, and in the umbrella-like shape of the Italian pine.



STRUCTURE OF A
BRANCHIOPOD.

Branchia, the gills of fishes and various other inhabitants of water. They are the apparatus for enabling the animal to extract oxygen from the water, instead of being dependent on the atmosphere for that life sustaining element.

Branchiopoda, Cuvier's first order of the sub-class entomostraca. The genera included under it, such as cyclops, cypris, apus, limnadia, branchipus,

Brandenburg

etc., are now generally ranked under several orders, viz., *copepoda*, *ostracoda*, and *phyllo-poda*. Milne Edwards places them under two, the *phyllo-poda* and the *cladocera*. It is also a division or "legion" of the sub-class *entomostraca*. It includes the order *cladocera*, *phyllo-poda* and *trilobita*, perhaps with *mesostoma*.

Branchiostoma, Costa's name for the very anomalous genus of fishes now called amphioxus.

Branco, Rio, a river of Northern Brazil, which rises in the Parima Mountains, on the very borders of Venezuela; and, after a S. course of about 400 miles, joins the Rio Negro, of which it is the principal tributary, on its way to the Amazon.

Brand, an English provincial name for certain diseases of cereals, applied generically. Thus bunt is called pepper brand, and smut is called dust brand. The name is also given to a disease in vegetables, by which their leaves and tender bark are partially destroyed as if they had been burned.

Brand, Sir John Henry, a Boer statesman, born in Cape Town, Dec. 6, 1823. He studied law in Leyden and in 1849 began to practice in the Supreme Court at Cape Town. In 1853 he became Professor of Law in the South African College. He early became prominent in public affairs, his sympathies being strongly pro-British. His influence prevented any participation of the Orange Free State in the movement to check British policy in South Africa. In 1863 he was elected President of the Orange Free State and was re-elected every five years until his death. Queen Victoria knighted him in recognition of his aid. Brandford was named in his honor, and Ladybrand was named in honor of his wife. He died July 15, 1888.

Brande, William Thomas, an English chemist; born in London, Feb. 11, 1788. He was educated at Westminster school, studied medicine and became an assistant to Sir Humphry Davy, succeeding him in 1813 in the chair of chemistry at the Royal Institution. In 1828 he became a superintendent in the Mint. He died Feb. 11, 1866. He wrote several standard books on chemistry.

Brandenburg, a province of Prussia, surrounded mainly by Mecklenburg and the provinces of Pomerania, Posen, Silesia, and Prussian Saxony. The soil consists in many parts of barren sands, heaths, and moors; yet the province produces much grain, as well as fruits, hemp, flax, tobacco, etc., and supports many sheep. The forests are very extensive. The principal streams are the Elbe, the Oder, the Havel, and the Spree; but the first two merely skirt the territory. Brandenburg carries on an active trade in

Brandes

manufactured articles, and is well situated for commerce, since it has many canals, rivers, good roads, and is intersected by the railways from Berlin to Leipsic, etc. The province of Brandenburg includes, besides some other districts, the greater part of the former mark of Brandenburg, which formed the cradle of the Prussian monarchy, and the center round which the present extensive kingdom has grown up. It is divided into the three administrative divisions of Berlin, Potsdam, and Frankfort, and it has a total area of 15,381 square miles, with a pop. (Dec. 1, 1905) of 3,531,906. Most of the inhabitants are Lutherans; the rest are chiefly Roman Catholics and Jews. From 1685 to 1688 many French refugees, Walloons, and inhabitants of Lorraine and of the Palatinate, settled in the mark. At present Brandenburg is the most important of the Prussian provinces, including as it does the capital (Berlin), and the governments of Potsdam and Frankfort. The first people who are known to have inhabited Brandenburg were the Suevi. They were succeeded by the Slavonians, a barbarous people, whom Henry I. conquered and converted to Christianity in the early part of the 10th century. The government was first conferred on a Saxon count, and did not become hereditary till the time of Albert, whose son succeeded to the dignity of elector in 1180. This race becoming extinct, Charles IV. assigned the electorate to his son Sigismund, who became emperor in 1415, and sold the region to Frederick, burgrave of Nuremberg, the ancestor of the present reigning family. Frederick William the Great made various accessions to the territories of his ancestors, and obliged the King of Poland, in 1656, to declare Prussia an independent State. The old mark was ceded to Napoleon in 1807, and formed part of the kingdom of Westphalia; but it was restored to Prussia in 1814. The Elector of Brandenburg held the seventh rank among the electors of the empire, and had five votes in the council of princes.

Brandes, Georg (bran'des), a Danish literary critic of Jewish family; born in Copenhagen, Feb. 4, 1842, where he graduated at the university in 1864. Several books on æsthetic and philosophic subjects brought on him a charge of skepticism which was not removed by an epoch-making series of lectures, delivered before large audiences, and published under the title, "The Great Tendencies of Nineteenth-Century Literature" (1872-1875); for his description of the later intellectual position of Europe, as broken away from the orthodoxy and romanticism of the beginning of the century, brought on him the bitter attacks of all the reactionary forces in Denmark. His

Brandt

"Danske Digtere," a masterpiece of psychological analysis, appeared in 1877; but the hostility of his enemies induced him in the same year to leave Denmark, and settle in Berlin, where he published, among other works, critical biographies of Lassalle (1877); Esaias Tegnér (1878). and Lord Beaconsfield (1879). Then a lecture tour through Norway and Denmark brought a powerful party to his side, and in 1882 he returned to Copenhagen, his countrymen having guaranteed him an income of 4,000 crowns, with the one stipulation that he should deliver public lectures on literature. His later works include "Den Romantiske Skole i Frankrig" (1882); a biography of Ludvig Holberg (1885), and a valuable study of Shakespeare, published in an English translation in 1899.



GEORG BRANDES.

Branding, an ancient mode of punishment by inflicting a mark on an offender with a hot iron. It is generally disused under the English civil law, but is a recognized punishment for some military offenses, as desertion. It is not, however, now done by a hot iron, but with ink, gunpowder, or some other preparation, so as to be visible, and not liable to be obliterated. The mark is the letter "D," not less than an inch in length, and is marked on the left side two inches below the armpit.

Brandis, Christian Augustus, a German author; born in Hildesheim, Feb. 13, 1790; studied philology and philosophy at Kiel and Göttingen; lectured at the University of Copenhagen; removed in 1816 to Berlin, where he edited, with Emmanuel Bekker, the critical edition of "Aristotle"; became professor at the University of Bonn in 1821; and secretary to the King of Greece in 1837. His works are chiefly philosophical or historical. He died in Bonn, July 24, 1867.

Brandt, Sebastian, a German author, born in Strasburg, in 1458; studied law and the classics with zeal at Basel, where he received permission to teach; and soon became one of the most influential lecturers in that city. The Emperor Maximilian showed his regard for Brandt by appointing him an imperial councilor. His fame rests wholly upon "The Ship of Fools," a satire on the follies and vices of the time (1494). Its distinguishing note is its abounding

Brandy

humor; but it owed its great popular success very largely to the clever woodcuts with which it was illustrated. It was trans-



SEBASTIAN BRANDT.

(1508) is in part a translation, in part an adaptation. A more recent imitation is W. H. Ireland's "Modern Ship of Fools" (1807). He died in Strassburg in 1521.

Brandy, a spirit produced by the distillation of both white and red wines, prepared chiefly in the South of France. A brandy highly esteemed is that of Cognac, which is obtained by distilling white wines of the finest quality. An inferior kind of spirit is frequently prepared from the "marc" of grapes and the refuse of wine vats. When first distilled it is as colorless as alcohol, and continues so if kept in bottles or jars. When stored in casks, however, it acquires from the wood a pale amber tint, and in this state is sold as pale brandy. The dark color of brown brandy is produced artificially, to please the public taste, by means of a solution of caramel, and this is frequently added in excess to give a rich appearance to a brandy of low quality. A large proportion of the brandy sold in this country is simply raw grain spirits flavored and colored. The spirit is imported into France, where it is redistilled and converted into French brandy. Brandy improves in flavor by being kept, but loses in strength. Genuine Cognac brandy has always been both costly and difficult to obtain in this country (the more so on account of the high import tariff collected thereon), the price for the liquor reaching \$20 or more per gallon. Of late years the development of viticulture in the Western States, particularly in California, has enabled American enterprise to produce a brandy that is everywhere a formidable rival to the French article, and for purity and excellence infinitely preferable to the compounded and doctored spirit for which we have been accustomed to pay so high a price. Genuine brandy consists of alcohol and water, with small quantities of ænanthic ether, acetic ether, and other volatile bodies produced in the process

lated into Latin and several European vernacular languages; into English by Henry Watson, "The Grete Shyppe of Fooles of the Worlde" (1517). Barclay's "Shyp of the Folyes of the Worlde"

of fermentation. The value of brandy as a medicine depends on the presence of these ethers and other volatile products; when, therefore, it is adulterated with raw grain spirit and water, the amount of these ethers is so reduced that the brandy becomes almost valueless for medical purposes. Imitation brandy is prepared either by flavoring highly rectified spirit with essence of Cognac or by distilling the spirit with bruised prunes, acetic ether, argol, and a little genuine brandy, and adding to the distilled spirit tincture of catechu and spirit coloring. This is said to be greatly improved by keeping.

Brandywine Creek, in Pennsylvania and Delaware, is formed of two forks, the E. and W., which effect a junction in Chester county of the first named State, and, taking a S. E. course, empties into Christiana creek at Wilmington. Here, Sept. 11, 1777, was fought a severe battle between the British and German troops, 18,000 strong, under Howe, and the Americans numbering 13,000 men, under Washington, in which the latter were defeated. The consequence of this battle was the occupation of Philadelphia by the British troops.

Brank, in some parts of England and Scotland, a kind of bridle, a scolding bridle, an instrument used for the punishment of scolds. It consisted of a headpiece, which inclosed the head of the offender, and a sharp iron, which entered the mouth and restrained the tongue.

Brant, Joseph, a Mohawk chief, born in Ohio in 1742. He participated in the campaign of 1755, and held the post of secretary to Col. Johnson, superintendent general of Indian affairs. On the outbreak of the American Revolution, Brant took an active part in raising an Indian force to oppose the colonists, and was present at the action of Cherry Valley, and in other engagements. He did all in his power to prevent the confederation of the Indian tribes, previous to Gen. Wayne's expedition, and opposed peace between them and the United States. Brant was, however, a brave and intelligent chief, and a zealous administrator of all that tended to elevate and civilize his own people. In 1786 he visited England, there published the "Book of Common Prayer," and the "Gospel of St. Mark," in Mohawk and English, and collected funds for an Anglican Church, the first erected in Canada West. He passed the closing years of his life at Burlington Bay, on Lake Ontario, on an estate granted him by the British Government. One of Brant's sons commanded a mixed Canadian and Indian force during the War of 1812. He died in Canada, Nov. 29, 1807.

Brantford, a city of the province of Ontario, Canada, county-seat of Brant co., on the Grand river, and on the Grand Trunk,

Brantford

Brantôme

the Toronto, Hamilton, and Buffalo, and other railways, 65 miles S. W. of Toronto and 25 miles W. S. W. of Hamilton. It is situated in a fertile and highly cultivated agricultural district, which also contains natural gas. It is regularly laid out in wide, well-shaded streets. The chief business thoroughfares are Colborne, Market, George, Dalhousie, Queen, and King streets; the residential streets include Chatham and Sheridan streets, and Brant, Park, and Dufferin avenues. There are four parks: Victoria, Alexandra, Jubilee, and St. Andrews. There is a monument to Joseph Brant, the famous Mohawk chief after whom the city is named, and a monument in honor of volunteers who died in the Boer War. The city contains a church—the oldest in Ontario—built for the Mohawk Indians. Another object of interest is the house in which lived Alexander Graham Bell when he invented the telephone.

Buildings, Institutions, etc.—The most noteworthy buildings are the public library, court house, collegiate institute, the "Expositor" building, the Y. M. C. A., the city hospital, and the Ontario Institution for the Blind. Brantford possesses many fine churches representing the leading religious denominations; and among the educational and charitable institutions, besides those already mentioned, are Wicliffe Hall, Orphans' Home, Widows' Home, House of Refuge, Technical School, and Children's Home. There are an opera house, and two daily newspapers, "Expositor" and "Courier." A United States consul resides here.

Business Interests, etc.—Brantford is well known for its manufactures, chiefly agricultural implements and engines; also foundry and machine-shop products, carriages, cars, malleable iron, pottery, etc. According to the Dominion census of 1906 the manufactured output was valued at \$8,545,679, as compared with \$5,564,695 according to the census of 1901, an increase of 53 per cent. About 4,000 hands are employed. The assessed value of taxable property in 1907 was \$8,500,000; the municipal receipts were \$350,000, and the expenditures \$340,000. Near by is the Indian Reserve, the headquarters of the Iroquois, or Six Nation Indians, in Canada. Pop. (1901) 16,619; est. (1907) 21,000.

Brantôme, Pierre de Bourdeille (brontôm'), **Seigneur de**, a French chronicler, born at Périgord about 1540. He was for many years traveler or soldier; retired to his estate twenty years before his death, and used his leisure in writing his "Memoirs," in sections devoted to "Lives of Illustrious Men and Great Captains of Foreign Countries," of "Illustrious Men, etc., of France," of "Illustrious Women," of "Courteous Dames," "Anecdotes of Duels," "Spanish Rhodomontades and Oaths," etc. The author is vain and egotistical, but thoroughly naïve

Brassey

and honest. The style is charmingly piquant, with frequent sallies of wit and flashes of eloquence. His "Complete Works" (10 vols.) were published at The Hague (1740). He died July 15, 1614.

Brasenose, one of the colleges of Oxford University, founded by William Smith, Bishop of Lincoln, and Sir Richard Sutton, in 1509. The origin of the name is doubtful, but there is a large nose of brass over the entrance. Brasenose is richly endowed.

Brasidas, a Spartan general, who distinguished himself in the Peloponnesian War. He defended Methone, in Messenia, with success, and became a chief magistrate of Sparta. Later, he took several Macedonian cities. In 426 B. C. he made himself master of Amphipolis. He was wounded here in a combat with Cleon, the Athenian general. He died in 422 B. C.

Brass, an alloy of copper and zinc, of a bright yellow color, hard, ductile, and malleable. The best brass consists of two parts by weight of copper to one of zinc. Before zinc was obtained in its metallic form brass was manufactured from calamine (native carbonate of zinc) mixed with copper and charcoal. Even now this process is easier than the direct fusion together of the two metals. The proportion of copper and zinc varies. Ordinary brass is a yellow alloy of copper and 28 to 34 per cent. of zinc. The density of cast brass is 7.8 to 8.4; that of brass wire, 8.54. It is harder and yet more fusible than copper, more sonorous and not so good a conductor of heat. It is extensively used for candlesticks, handles of doors, the framework of locks, mathematical instruments, etc., while in the state of wire it is much used in pin making.

Brasses, Monumental, large plates of brass, or of the mixed metal called latten, or laton, inlaid on slabs of stone, and usually forming part of the pavement of a church. The figure of the person intended to be commemorated was generally represented either by the form of the brass itself, or by lines engraven on it. Such, however, was not always the case, an ornamented or foliated cross, with other sacred emblems, being frequently substituted for the figure. Nor was the practice of imbedding them in the pavement uniform, as they were sometimes found elevated on what were called altar tombs.

Brassey, Thomas, an English engineer and railroad contractor, born in Baerton, Cheshire, Nov. 7, 1805. After receiving an ordinary education, he was, at the age of 16 years, apprenticed to a surveyor, whom he succeeded in business. After building parts of the Grand Junction and the London and Southampton railways, he contracted, in 1840, in partnership with another, to build the railway from Paris to Rouen. In a few years he held under contract, in England and France, some 10 rail-

Brassica

ways, involving a capital of \$180,000,000, and employing 75,000 men. In partnership with Betts and Peto he undertook the Grand Trunk of Canada, 1,100 miles in length, including the great bridge at Montreal. His army of men were employed in nearly every part of Europe, South America, Australia, India, etc. He amassed great wealth, but continued to be generous to the needy, and modest and simple in his tastes and manners. Sir Arthur Helps wrote his "Life" (1872). He died in Hastings, Dec. 8, 1870.

Brassica, a genus of cruciferous plants containing several well known culinary herbs. There are numerous well known species, among which as the most familiar may be mentioned *brassica oleracea* (sea cabbage), the original of the cabbage of our gardens, *B. monensis*, the wall flower cabbage; and the *B. campestris*, or common wild navew. The *B. napus*, the rape or cole seed, and the *B. rapa*, or common turnip, have here and there rooted themselves spontaneously, thus producing in many a belief that they are indigenous in localities in which they did not originally exist. The colza of the Dutch is *B. campestris*; *B. præcox* is the summer rape of the Germans; and *B. elongata* is cultivated in Hungary for its oil. The various cultivated species, as a rule, require a loamy soil, well manured, and with plenty of water.

Brassicaceæ, an order of plants more generally called *cruciferae* (crucifers). It is placed by Lindley under his cistal alliance. The sepals are four, the petals four, cruciate; the stamens six, two shorter than the other four. Ovary superior, with parietal placentæ. Fruit, a silique or silicle one-celled or spuriously two-celled, seeds many or one. It constitutes Linnaeus' order *tretradynamia*. Lindley divides the order into five sections—*pleurorhizæ*, *notorhizæ*, *orthoploceæ*, and *diplecolobeæ*. The *brassicaceæ* or crucifers are one of the most important orders in the whole vegetable kingdom. About 1,730 species are known. Their chief seat is in the temperate zones. Among the well known plants ranked under the order may be mentioned the wall flower, the stock, the watercress and other cresses, the cabbage, the turnip, etc.

Brattleboro, a town in Windham county, Vt.; on the Connecticut river, and the Boston and Maine and the Central Vermont railroads; 11 miles S. E. of Newfane, the county-seat. It is in a picturesque farming region; is the trade center of Southeast Vermont; and contains the State Asylum for the Insane, Brooks Public Library, Glenwood Academy, and manufactories of organs, carriages, furniture and machinery. Brattleboro is the center of the maple sugar industry of Vermont, and has 2 National banks and several weekly and monthly periodicals. Pop. (1900) 5,297; (1910) 6,517.

Bray

Bravi (brä'vë), the name formerly given in Italy, and particularly in Venice, to those who were ready to hire themselves out to perform any desperate undertaking. The word had the same signification in Spain, and both the word and the persons designated by it were found in France in the reign of Louis XIII. and during the minority of Louis XIV.

Bravo, Nicholas (brä'vō), a Mexican statesman, born in 1790. He participated in the revolution against Spain (1810-1817), and later aided Iturbide in establishing a republic. Under Santa Ana he twice acted as President. He died in 1854.

Bravo-Murillo, Don Juan, a Spanish statesman, born in Badajoz, in June, 1803. In 1825, he entered the College of Advocates at Seville, and showed great devotion to the monarchy. When the Progressistas came into power he went to Madrid, and founded a law magazine, the "Boletín de Jurisprudencia." In 1836, he became Secretary of the Department of Justice under Señor Isturiz. In 1847 he became Minister of Trade and Public Instruction, and, in 1849-1850, of Finance. In 1851, he formed a cabinet, with himself as premier, but, in 1853, it was superseded by that of General Lersundi. The oppressive measures adopted by Bravo-Murillo and his successors led to the Revolution of 1854, and the attainment to power of Marshals Espartero and O'Donnell. He died in Madrid, Jan. 11, 1873.

Bravura, an air requiring great skill and spirit in its execution, each syllable being divided into several notes. It is distinguished from a simple melody by the introduction of florid passages, a style of both music and execution designed to task the abilities of the artist.

Braxy, a disease in sheep. This term is frequently applied to totally different disorders, but the true braxy is undoubtedly an intestinal affection, attended with diarrhœa and retention of the urine. After some young sheep have been weaned, they are apt to gorge themselves with grass, turnips, etc.; this produces a kind of colic, which usually ends in death. Again, when a lean flock of sheep is placed suddenly on rich food, or on coarse pasture of an indigestible nature, irritation and inflammation of the bowels set in, and this frequently proves fatal. In both cases the sheep are said to die of braxy. The duration of the disease is very short, in some cases terminating fatally in 24 hours.

Bray, a small English parish, near Maidenhead, Berkshire, of which Simon Aleyn was vicar from 1540 to 1588, during the reigns of Henry VIII., Edward VI., Mary, and Elizabeth. He kept his vicarage by changing his faith according to that of the State for the time being, becoming a Pro-

Bray

testant with Henry, Catholic again in the reign of Mary, and Protestant again on the accession of Elizabeth. His principle was to live and die Vicar of Bray, and to it he adhered. The modern ballad, "In Good King Charles' Golden Days," makes the versatile vicar live in the reigns of Charles II., James II., William III., Anne, and George I.

Bray, an Irish seaside town, partly in Dublin county, but chiefly in Wicklow, 13 miles S. E. of Dublin by rail. The beauty of its situation has raised it from a small fishing village to a watering-place, popularly known as the Irish Brighton, with well built houses, and an esplanade a mile long, hotels, and Turkish baths.

Bray, Anna Eliza, an English woman of letters, born in London, Dec. 25, 1790. Her maiden name was Kempe; she studied for the stage, but in 1818 was married to Charles A. Stothard, son of the famous artist, and, after his death, became the wife of the Rev. Edward A. Bray, Vicar of Tavistock. From 1826 to 1874 she wrote at least a dozen novels, one of which, "The Talba, or the Moor of Portugal," brought her the acquaintance of Southey. She wrote the "Life of Thomas Stothard" (1856), and many books of travels. Her letters, addressed to Southey, on the superstitions and scenery of Tavistock, entitled "The Borders of the Tamar and the Tavy" (3 vols., 1836; new ed., 1879), and "A Peep at the Pixies; or, Legends of the West" (1854), are esteemed. Mrs. Bray's "Autobiography" appeared in 1884. She died in London, Jan. 21, 1883.

Brazil, now called officially the UNITED STATES OF BRAZIL, a vast republic in South America, occupying a space nearly equal to one-half of that entire continent. It is of extremely irregular outline and varying dimensions; its greatest diameter being, E. to W., or from Cape Augustin (lat. $8^{\circ} 21' S.$; lon. $34^{\circ} 56' W.$) to the Yavari or Jabary river, which separates it from Peru, 2,630 miles; and, N. to S., from Cape Orange (lat. $4^{\circ} 23' N.$; lon. $51^{\circ} 25' W.$), E. of Oyapok bay, to the S. extremity of Lake Mirim, 2,580 miles; area 3,209,878 square miles. It is bounded S. E., E., and N. E. by the Atlantic Ocean; N. by French, Dutch, and English Guiana, and Venezuela; W. and S. W. by Colombia, Peru, Bolivia, Paraguay, and the Argentine provinces of Misiones, and by the republic of Uruguay. Its entire coast-line, from the extreme S. point already mentioned, to the head of the Bay of Oyapok (lat. $4^{\circ} 0' N.$; lon. $51^{\circ} 32' W.$), is upward of 3,700 miles. Throughout this vast extent of coast there are few great indentations, though in some parts smaller harbors and inlets are pretty numerous, many of the former excellent and generally surrounded by flats. The principal bays, reckoning

Brazil

from the S. extremity of the country, are, Santos, Rio Janeiro, Bahia or All Saints, on the S. E. coast; and St. Marcos, St. Jose, Pinzon, and Oyapok on the N. and N. E. coasts. The principal capes or headlands are, Capes Frio, St. Thome, Point St. Antonio, St. Augustin, St. Roque, on the S. E. and E. coasts; and Magoary, Norte, and Orange, on the N. coast.

General Description.—The appearance of the coast of Brazil is very different at different places. From the S. extremity of the island of Santa Catharina, a distance of about 450 miles, it is low, sandy, and intersected by the outlets of numerous lakes or lagoons, which skirt the shores throughout this whole extent. From this point, or from about lat. $27^{\circ} 30' S.$ to lat. $21^{\circ} 45' S.$, 700 miles, the land is very elevated, appearing rugged and mountainous from a distance, but when more nearly approached becoming highly picturesque; its hills being clothed with thick woods, and its valleys with a never-fading verdure. This part of the coast, the most rocky portion of which is between Santos and Cape Frio, may be seen from the sea at a distance of 55 miles. From lat. $21^{\circ} 45' S.$, or from about St. Joao to Bahia, lat. $13^{\circ} S.$, 650 miles, the coast is in general low and level, with hardly any indentations. From Bahia to about lat. $4^{\circ} N.$, which embraces the whole E. projection of Brazil, the coast (about 800 miles in extent) is of moderate height, nowhere rising above 30 feet, and is also destitute of harbors, excepting those formed by the mouths of rivers. From this point to the Amazon it is extremely low and marshy; W. and N. of that river it is sandy, and somewhat higher, though still of considerable elevation. From these details it will be seen that the only portion of the coast of Brazil that can be called mountainous, or which has any pretension to picturesque appearance, is that between the island of Santa Catharina, lat. $27^{\circ} 35' S.$, and St. Joao da Praia, lat. $21^{\circ} 40' S.$, or about a fifth part of the whole.

With the exception of the Rio Francisco and the Paraná, all the large rivers of Brazil empty themselves on its N. shores, and nearly all run parallel courses from S. to N., traversing the vast plains which occupy the center and N. W. portions of the country, and presenting means of internal communication unequalled in any other part of the globe. The surface of Brazil generally is divided into upland and lowland in pretty equal portions; the former, which comprises the hilly districts and table-lands, extending over the E., S. and central parts, and has an average elevation of about 2,000 to 2,500 feet, although at some points it reaches from 4,000 to 10,000 feet, such elevations generally forming the culminating points of continuous mountain chains, which stretch for the most part from

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N. to S., as in the Serra do Mar and in the Serra dos Orgaos, though occasionally we find very lofty summits situated in comparatively isolated positions. The lowlands comprise the silvas or woody regions, and the llanos or plains and flats; the former lying principally along both sides of the Amazon, and the latter stretching chiefly along the N. and N. E. shores.

Brazil is divided, politically, into 21 States (formerly provinces), of which there are at least nine each exceeding Great Britain in superficial extent. It is, however, very difficult to ascertain accurately the area of the States, and of the whole country, the existing data being very unsatisfactory and conflicting. The following table gives the areas of the States and the population in 1900, as revised by the Brazilian minister to the United States:

States.	Area in sq. Miles.	Pop. 1900.
Alagoas	22,583	600,440
Amazonas	732,460	300,915
Bahia	164,649	2,901,365
Ceara	40,253	805,687
Espirito Santo	17,312	250,997
Goyaz	288,546	227,572
Maranhao	177,566	530,854
Matto Grosso	532,708	250,827
Minas Geraes	222,160	4,000,099
Para	443,553	850,455
Parahyba	28,854	457,232
Parana	85,453	349,491
Pernambuco	49,625	230,224
Piauihy	116,218	267,609
Rio de Janeiro (city).....	538	752,651
Rio de Janeiro	26,634	1,250,884
Rio Grande do Norte.....	22,195	268,273
Rio Grande do Sul.....	91,335	1,197,455
Sao Paulo	112,330	2,000,753
Santa Catharina.....	27,436	383,769
Sergipe	7,370	310,926
Total	3,209,878	18,386,815

In addition to the population given above, it is estimated that there are perhaps 600,000 uncivilized Indians. The most important towns in Brazil are the capital, Rio de Janeiro, Bahia, Pernambuco, Pará or Belém, San Paulo, Parahyba, Ceará, and Porto Algre.

Mountains, Table-lands, and Plains.—In remarkable contrast to the countries on the W. side of the South American continent, Brazil has no mountains of very great elevation. The higher mountains of Brazil, most of them occurring at greater and lesser distances from the E. coast, extend generally in a direction more or less from S. to N., though numerous inferior ranges traverse the country in various other directions. The most connected chains, and those in which the highest summits occur, are the Serra do Espinhaço, the Serra dos Orgaos, and the Serra do Mar. The first originates in Bahia, about lat. 15° S., and, intersecting the State of Minas Geraes, terminates at lat. 23° S. It lies parallel to the coast, and at a distance from it of about 250 miles; its culminating point, believed to be the highest in Brazil, is Itatiaia-Assu, 10,040 feet. The Serra dos Orgaos (Organ

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mountains), so called from the fancied resemblance of its peaks to the tubes of an organ, and the Serra do Mar, which form, in fact, but one chain, the first name being applied to the N. E. half of the range, and the second to the S. W., lie also parallel to the coast, N. N. E. and S. S. W., but at a distance from it of a very few miles only, extending from about lat. 22° to 27° S. The culminating points of this range appear to occur in the Serra dos Orgaos division, which has summits rising to the height of 7,000 or 8,000 feet. Elevated regions also extend N. and W. from these mountain systems through the States of Minas Geraes, Pernambuco, Goyaz, and Matto Grosso, but few of the peaks here appear to attain any very great elevation. Between the sources of the Tocantins and Paraná, however, are the Montes Pyreneos or Pyrenees, in which are summits estimated at 8,000 and 10,000 feet. Toward the Paraguay the hills become lower, and on the Bolivian frontier there are marshes. The watershed between the affluents of the Amazon and La Plata is so little elevated that some of the sources of the Madeira, which falls into the former, and of the Paraguay, which enters the latter, are not more than three miles apart, and might easily be joined by a canal. The hilly region or table-land extends along the E. side of the country as far N. as lat. 3° S., but inland, in Matto Grosso, not farther than 12° S., and N. of lat. 10° S., the Serra Ibiapaba may be taken as the W. limit. This table-land occupies half the country, together with part of the Argentine Republic and Uruguay, and its average elevation is from 2,000 to 2,500 feet. Along the Amazon and its affluents the vast plains or silvas are said to occupy a space equal to six times the size of France. Another great plain stretches between the Serra Ibiapaba and the Tocantins river, measuring from N. to S. upward of 600 miles, and from E. to W. more than 400.

Rivers and Lakes.—The river system of Brazil is unequaled, perhaps, in any other part of the world for the number and magnitude of the streams of which it is composed, the surface of the whole N. W. portion being interlaced with rivers of every length and volume; presenting the complex appearance of vessels in the human body, to which the Amazon and its larger tributaries may be said to stand in the relation of main arteries. By far the greater portion of these numberless streams have more or less of a N. direction, and finally find their way, either directly or through their principals, to the Amazon. The largest river of Brazil, and the largest, it is believed, in the world, though not the longest, is the Amazon, which enters the country from the W., about lat. 4° 30' S.; lon. 70° W., and after a N. E. course from the point named of about 800 miles, flows into the

Atlantic near the equator. In order of magnitude follow the Rio Negro and Madeira, both tributaries of the Amazon; the former flowing from the N. W., the latter from the S. W. The other large rivers in this portion of the country are the Branco, a tributary of the Rio Negro; the Tapajos and Xingu, other two large tributaries of the Amazon; the Araguay, Tocantins, Maranhao, and Paranahyba. The next in size is the Rio Francisco, which, after flowing N. for about 800 miles, suddenly turns due E., and subsequently S. E., falling into the sea about lat. 11° S. Passing along the coast, S. from the embouchure of the Francisco, the following considerable rivers occur—the Vazabarris, Itapicuru, Paraguassu, Belmonte or Jequitinhonha, in the State of Bahia; Doce, State of Espirito-Santo; and the Paraiba-do-Sul, the S. boundary of the same State. In this enumeration of the rivers having their embouchures on the E. coast of Brazil, we have omitted an immense number of smaller streams, perhaps not many below a hundred. In the interior of the S. portion of the country occur the large rivers Uruguay, Yguazu, Parapanema, Tieta, Para, Paraguay, and Paraná, with numerous smaller streams—smaller in comparison to these, but still large rivers—winding in all directions through every province. Most of the rivers in this part of Brazil have a W. and S. direction; those having the former proceeding from the W. side of the serras by which this part of the coast is lined, and those having the latter issuing from the hilly tract which crosses the center of the State of Matto Grosso from E. to W., and which forms the watershed of the W. and central part of the country, the rivers of the province of Para flowing from it N., and those of Matto Grosso S. and W. Of the rivers last named the Paraguay and Paraná are the largest, and have the longest courses. The former has its source in the central high lands of Matto Grosso, whence it flows nearly due S., quitting the Brazilian territory at lat. 21° S., and from this point forming the W. boundary of Paraguay. The Paraná rises in the hilly district of the State of Goyaz, not far from the sources of the Tocantins, though their subsequent courses are nearly in direct opposition; the latter proceeding due N., while the former flows S. S. W. The Paraná forms, throughout a portion of its course, the boundary between the Brazilian territory and Paraguay, quitting the former about lat. $25^{\circ} 40'$ S. Although unrivalled in the number and magnitude of its rivers, Brazil has comparatively few lakes of any great extent. The largest is the Lagoa dos Patos, a lagoon in the State of Rio Grande do Sul, the extreme S. of the Brazilian States; it is about 150 miles in length, and 35 miles in breadth at the widest part, and is separated from the

sea by a narrow strip of land only; it discharges its water into the ocean by a channel called the Rio Grande. Farther N. several smaller lakes occur, the largest of which may be from 20 to 30 miles in length. There are hardly any others worth mentioning throughout the whole of Brazil.

Geology and Mineralogy.—Granite prevails to the extent of 2,000 miles along the coast of Brazil, and, with syenite, forms the base of the table-land. The superstructure of the latter consists of metamorphic and old igneous rocks, sandstone, clay-slate, limestone, in which are large caverns with bones of extinct animals, and alluvial soil, of which the N. part of the country is almost wholly composed, being intersected by numerous large streams. The mineral wealth of Brazil is considerable, and includes gold, silver, and iron, diamonds, topazes, and other precious stones. Among the earliest discovered and first wrought gold mines were those of Jaraguá, but they have long ceased to be regularly worked, the precious metal being found more easily and in greater abundance mingled with the sands and alluvial deposits of rivers. The process of separation, the gold being in small particles, is effected by repeated washings, which are continued till nothing but the pure metal remains at the bottom of the vessel. The entire quantity of gold produced has now greatly fallen off, being hardly a fourth of what it formerly was, owing chiefly to the auriferous sand having been exhausted. Large quantities of diamonds have been obtained in Brazil. The district from which most stones have been derived is Diamantina in Minas Geraes, adjoining the Serra do Espinhaço. The diamonds have been hitherto found in the beds of rivers only, and are washed from the sand and stones with which they are mingled much in the same way as the gold. The largest known Brazilian diamond was found in the Rio Bogagens, and weighed $254\frac{1}{2}$ carats. The negro who found a diamond weighing 17 carats, used to obtain his liberty, a variety of proportionate rewards being appointed for those of lesser value. About 20,000 negroes were at one time employed in the diamond mines. The government received one-fifth of the total value of all the gold and diamonds found in the country. Notwithstanding the sounding names of these two items of the mineral wealth of Brazil, neither of them has been nearly so profitable, nor so beneficial to the general interests of the country as the homeliest of its agricultural productions. In the short space of a year and a half the exports of sugar and coffee amounted to more than the value of diamonds found throughout a period of 80 years within the limits of Brazil.

Climate.—As almost the whole of Brazil lies S. of the equator, and in a hemisphere where there is a greater proportion of sea than land, its climate is generally more cool and moist than that of countries in corresponding latitudes in the Northern Hemisphere. This is particularly applicable to the flat portions of the country, where impenetrable forests occupy the alluvial plains, and, by preventing the sun's rays reaching the earth, cut off one of the principal sources of heat—radiation. In the S. parts of Brazil, in consequence of the gradual narrowing of the continent, the climate is of an insular character—cool summers and mild winters. The quantity of rain that falls in Brazil differs widely in the amount in different localities. The N. States generally are subject to heavy rains and violent storms; but the S. regions rejoice in a settled, mild, and salubrious climate. The rainy season commences in October, and usually lasts till March, setting in with heavy thunder-storms. At Rio, where the climate has been much modified by the clearing away of the forests in the neighborhood, the mean temperature of the year is 72°; and the rains have been so diminished as to have seriously reduced the supply of water to the city. Generally the climate of Brazil is delightful, diffusing and maintaining a perpetual summer throughout this favored land. In the N. parts the air in the lower tracts is somewhat sultry and oppressive; but vegetation is vigorous and profuse, the ground being covered with flowers, and the trees with a foliage that is ever green; while the nights are deliciously cool. Near the coast the temperature is modified by the trade wind, which, after traversing the Atlantic, fans the shores of Brazil, imparting a refreshing coolness to the atmosphere.

Soil, Vegetable Productions, etc.—The soil of Brazil, so far as its capabilities have been tested, is highly fertile. Altogether but a comparatively small portion has yet been subjected to this test, probably not more than a hundredth part of the surface being under cultivation, and this portion is almost entirely limited to the coast, and to the N. E. part of the country, which seems peculiarly well adapted for the cultivation of maize, sugar, and coffee. The pastures, moreover, are of vast extent, and, as they afford food for immense numbers of horned cattle, they form one of the principal sources of the wealth of the country. Being almost wholly within the limit of the palm region, the vegetation of Brazil is characterized generally by the peculiar physiognomy which that beautiful family of vegetables impresses on tropical countries. Of these nearly 200 species are known as native to the country. The chief food-supplying plants are sugar, coffee, cacao, rice, maize, wheat, manioc (cassava), beans, ba-

nanas, yams, lemons, oranges, figs, etc.—the two first, sugar and coffee, being the staple products of the republic. The manioc is a native of Brazil, and its farina is almost the only kind of meal used in that country. An acre of manioc is said to yield as much nutriment as six acres of wheat. The Indians find in this beautiful and useful plant a compensation for the rice and other cereals of the Old World. But it is in the boundless forests of Brazil that the vigor of the vegetative power is exhibited in its most imposing form. No language, it has been said, can describe the glory of the Brazilian forests—the endless variety of form, the contrast of color and size, the largest trees bearing brilliant blossoms of every hue, and clothed with a drapery of curious epiphytes and festoons of climbing plants, while thousands of a diameter of not less than 8 and 12 feet stand so close together that it is impossible (the intervals being filled up with an undergrowth of plants) to clear a passage between them. In contrast to these giants of the forest stand the graceful palm, the delicate acacia and bamboos, and grasses of 40 feet high. "If the name of primeval forest," says Humboldt, "can be given to any forest on the face of the earth, none can claim it perhaps so strictly as those that fill the connected basins of the Orinoco and the Amazon." But it is not in the plains alone that this gigantic vegetation is met with; the sides of the mountains are also clothed with trees of enormous size, including the most beautiful specimens of the palm and tree fern. The cocoanut palm attains a great size on the seashores; and the curious *Bertholletia*, or monkey-pot tree, the kernels of which are exported from Para under the name of Brazil nuts, is met with in many localities, but more especially in the N. W. parts of the country. A peculiar characteristic in Brazilian vegetation is the many species of the myrtle family, which, though not of much use economically, perfume the air with their exhalations. Rubber, drugs, dyes, fibers, vegetable ivory, and cabinet woods are all products of the Brazilian forests. Among the trees are the *andaçu*, or *Purga da Paulistas* (*Anda Gomezii*), the seeds of which yield a purgative oil; the cacao or chocolate tree; the *Cæsalpinia echinata* or Brazil-wood tree, used, under the name of Pernambuco wood, for dyeing silk of a crimson color; the rosewood tree, the fustic, mahogany, and a variety of others well adapted for various purposes. The different kinds of forests and woods in Brazil are distinguished by the inhabitants by particular names. There are the *Mattos Virgens*, or virgin forests, such as those which exist on the Organ mountains and along the whole maritime cordillera; the *Catingas*, consisting generally of small and de-

ciduous trees; the Carrascos, of close-growing shrubs, about 3 or 4 feet high; and the Capveira, such wooded tracts as are formed by the small trees and shrubs which spring up where virgin forests have been cleared away. The beauty, variety, and abundance of the flowers of this extraordinary country are no less remarkable than any other of its vegetable productions.

Animals.—The principal domestic animals of Brazil are horned cattle and horses; the numbers of the former are prodigious, covering the boundless plains of the interior. The greatest part of them live in a wild or semi-wild state. Horses are numerous in the S. provinces; they are of a middling size, from 12 to 14½ hands high, but strong, lively, and swift. Mules are reared in the S. States. Sheep are in little repute, the meat being ill flavored and the wool of indifferent quality. Goats and hogs are abundant. The woods of Brazil swarm with wild animals, including the puma, jaguar, sloth, armadillo, etc. Wild hogs are also common, as well as an amphibious animal called the water hog or capybara, resembling a hog in form, but of the size of a heifer. Monkeys are likewise numerous; and vampire bats are in some localities so destructive as to prevent the rearing of cattle. Among the feathered tribes are, the smallest, the humming-bird, and one of the largest, the rhea or ostrich. There are also parrots in great variety, and a powerful eagle, the harpy. Waterfowl, especially geese and ducks, abound in certain seasons on the lakes and lagoons at the S. extremity of Brazil. The reptiles consist of the boa constrictor and other species of serpents, some of them venomous, especially the jarraraca, which is much dreaded by the natives. When full grown it is usually about six feet long, and is nearly allied to the rattlesnake genus. It prevails over all the S. States. Its bite is attended with great suffering, and with the most serious consequences, even where death is averted. In the marshy countries of the S. the boa or python is said to attain a length of over 20 feet. Other important reptiles are several species of alligator and different kinds of turtle, which, on the Amazon in particular, supply abundance of food. The insects of Brazil are, many of them, remarkable for the beauty of their colors and their size, especially the butterflies and moths, of which as many as 14,000 species are known. In some localities insects are so numerous in the woods that their noise is heard in a ship at anchor some distance from the shore. The white ants are especially numerous and destructive. The scorpions of Brazil attain a length of six inches. Most of the bees of the country are stingless, there being no fewer than 30 species of that description. The shores and rivers abound with

fish. Among the most valuable of those caught on the former is the garopa, which attains a length of from 12 to 20 feet, and is well flavored; they are most numerous on the coast of Bahia, where great quantities are annually taken and exported. The numbers of fish caught in the Amazon and other rivers of the country are very great, constituting a principal part of the subsistence of the inhabitants.

Education.—In every town schools for teaching the first rudiments are now to be found, to which the children of all citizens are admitted free. There are no universities, but there are government colleges of law, medicine, etc. In all large towns there are professorships of Latin, Greek, English, French, philosophy, rhetoric, geometry, chemistry, botany, etc.; and printing presses are now common throughout Brazil.

People.—The varied population of Brazil consists of people of pure Portuguese blood, who form a comparatively small minority of the whole; of full-blooded negroes, who form the largest unmixed element in the population; of aborigines or native Indians; and of people of mixed race, the most numerous of all; besides a certain number of German and other European immigrants. The Portuguese portion of the population have made Portuguese the national language of the country. The native Brazilians of Portuguese blood are said to be an idle and inactive race, with few wants, and fewer enjoyments. The mulattoes, the offspring of Europeans and negroes, are ingenious, and evince an aptitude for the mechanical arts. The native Indians are generally of a copper color, robust, and well made, but of short stature. They generally go naked, paint their skins, and are fond of ornamenting their heads with feathers. They belong to various tribes or races, among which the chief are the Tupi, the Guarani, and the Omagua. A certain number of them are nominally Christians.

Commerce.—The principal articles of import are cottons, linens, woollens, wrought and unwrought iron, coals, machinery, hardware, and cutlery from Great Britain; cottons, trinkets, furniture, candles, hats, fruits, and wine from France; glass, beer, linen paper, etc. from Germany; iron, sailcloth, cord, rope, etc., from Russia and Sweden; wine, brandy, fruits, etc., from Portugal; and wheat, flour, biscuits, soap, leather, etc., from North America. The exports consist of coffee, sugar, rubber, cotton, hides, cabinet and dyewoods, drugs, gums, and diamonds. By far the most valuable export is coffee, which makes up two-thirds or more of the whole exports. These in 1897 were valued at £26,752,000, the imports being about £21,568,000. The imports from Great Britain (chiefly cottons, machinery and metals, woollens, coals)

amounted in 1894 to £7,826,566, but in 1898 these had decreased to £6,196,286. In 1898 the exports to Great Britain were £4,601,773. The chief exports are caoutchouc (£3,603,198 in 1898), coffee (£516,240 in 1893, £190,273 in 1897), cotton (£1,179,643 in 1893, only £97,892 in 1898), raw sugar, cocoa, and fruits. In 1899 the railways of Brazil had a total length of nearly 9,000 miles. At the same date the length of telegraph lines was over 12,000 miles. The number of letters and postal cards sent through the postoffice was over 38,000,000.

Religion, Government.—There is now no established religion in Brazil, but the Roman Catholic is the one almost exclusively prevalent. Until recently the government was monarchical, hereditary, constitutional, and representative. Since the overthrow of the empire in 1889 republican institutions have been established, each of the old provinces being now a State, whose internal affairs are administered without interference from the central federal government. At the head of affairs is a president, by whom, and the national congress, legislation is carried on. The congress consists of a chamber of deputies and a senate, the former elected by direct vote as representative of the different States; while the senators are chosen by the State legislatures, three for each State for nine years. The executive authority is vested in the president. The public debt is now about £124,000,000.

The annual revenue of the republic has latterly amounted to about £10,000,000, and has been generally exceeded by the expenditure. The army numbers over 28,000 men, including officers; there are also about 20,000 gendarmes. Service is obligatory, the period being three years in the active army and three in the reserve. The effective navy is of moderate strength, but constitutes a considerable burden on the finances of the country.

History.—Brazil was discovered Jan. 26, 1500, by Vincente Yanez Pinçon, one of the companions of Columbus, and was subsequently taken possession of by Pedro Alvares de Cabral. Emanuel, King of Portugal, had equipped a squadron for a voyage to the East Indies, under the command of Cabral. The admiral, quitting Lisbon, March 9, 1500, fell in accidentally, April 24, with the continent of South America, which he at first supposed to be a large island on the coast of Africa. In this conjecture he was soon undeceived, when the natives came in sight. Having discovered a good harbor, he anchored his vessels, and called the bay Puerto Seguro. On the next day he landed with a body of troops, and having erected the cross, took possession of the country in the name of his sovereign, and called it Terra da Vera Cruz; but the name was afterward altered

by King Emanuel to that of Brazil, from the red wood which the country produces.

The Portuguese entertained for some time no very favorable opinion of the country, not having been able to find there either gold or silver; and, accordingly, they sent thither none but convicts and women of abandoned character. Two ships were annually sent from Portugal, to carry to the new world the refuse of the human race, and to receive from thence cargoes of parrots and dyewoods. Ginger was afterward added, but in a short time prohibited, lest the cultivation of it might interfere with the sale of the same article from India. In 1548 the Jews of Portugal, being banished to Brazil, procured sugar canes from Madeira, and began the cultivation of that article. The court of Lisbon began to perceive that a colony might be beneficial without producing gold or silver, and sent over a governor to regulate and superintend it. This was Thomas de Souza, a wise and able man. De Souza found it very difficult to succeed in inducing the natives to fix on settled habitations, and to submit to the Portuguese government. Dissatisfaction ensued, which at length terminated in war. De Souza did not bring with him a sufficient number of men to conclude hostilities speedily. By building St. Salvador, in 1549, at the bay of All Saints, he established a central and rallying point for the colony; but the great object of reducing the Indians to submission was effected by the Jesuits, who gained their affections by presents and acts of kindness.

The increasing prosperity of Brazil, which became visible to Europe at the beginning of the 17th century, excited the envy of the French, Spaniards, and Dutch successively. The latter, however, were the principal enemies with whom the Portuguese had to contend for the dominion of Brazil. Their admiral, Willekens, in 1624, took possession of St. Salvador (Bahia) in the name of the United Provinces. Having plundered the people of St. Salvador, he returned to Europe, leaving a strong garrison. The Spaniards next sent out a formidable fleet, laid siege to St. Salvador, and compelled the Dutch to surrender. When the affairs of the Dutch assumed a more favorable aspect at home, they dispatched Admiral Henry Lonk, in the beginning of 1630, to attempt the entire conquest of Brazil. He succeeded in reducing Pernambuco, and on his return to Europe left behind him troops which reduced, in 1633, 1634, and 1635, various other portions of the country. These, under Dutch management, furnished yearly a large quantity of sugar, a great deal of wood for dyeing, and other commodities. The Dutch now determined to conquer all Brazil, and intrusted Maurice of Nassau with the

direction of the enterprise. This distinguished officer reached the place of his destination in the beginning of 1637, and subjected Ceará, Sergipe, and the greater part of Bahia. Seven of the 15 provinces which composed the colony had already submitted to them, when they were suddenly checked by the revolution which removed Philip IV. from the throne of Portugal, and gave to the Portuguese independence and a native sovereign. The Dutch, as enemies of the Spaniards, became friends to the Portuguese, and the latter confirmed the title of the Dutch to the seven provinces of which they were in possession. This division gave rise to the name of the Brazils, in place of the former appellation. The Dutch government soon began to oppress the Portuguese colonists, who, after an obstinate contest, drove them out of several of the provinces. Finding they were not able to retain possession of the country, the Dutch ceded all their interest to the Portuguese for a pecuniary compensation. The dominion of Portugal was now extended over all Brazil, which, during the 18th century, remained in the peaceful possession of the Portuguese.

The value of Brazil to Portugal continued steadily to increase after the discovery of the gold mines in 1698, and the discovery of the diamond mines in 1728. Up to the year 1810 Brazil had sent to Portugal 14,280 hundredweights of gold and 2,100 pounds of diamonds, which foreign countries, and especially Great Britain, at last succeeded in purchasing at the Lisbon market. Rio Janeiro now became the mart for the proceeds of the Brazilian mines and native productions. But the administration was anything but adapted to promote the prosperity of the country. The attention of the government was turned almost exclusively to the gold washings and to the working of the diamond mines; and the policy of the administration consisted in the exaction of taxes and duties, which were collected from the fortified ports, to which trade was solely confined. Foreigners were excluded or jealously watched, and trade was paralyzed by numerous restrictions. In the interior, the lands situated on the great rivers, after being surveyed, were frequently presented, after the year 1640, by the kings of the house of Braganza, to the younger sons of the Portuguese nobility, whom the system of entails excluded from the prospect of inheritance. These grantees enlisted adventurers, purchased negro slaves by thousands, and subjected the original inhabitants or drove them from their districts, and ruled their dominions with almost unlimited sway. The missions of the Jesuits also received similar donations from the kings. They organized a brave militia from the converted savages and their descendants, and bore the sword and the cross

farther and farther into the interior. Equally independent with the secular lords of the soil, they united the converted savages in villages and parishes along the rivers. The celebrated Jesuit Vieyra introduced the cultivation of spices, in which Holland alone had hitherto traded. As these Brazilian proprietors defrayed from their own means the above-mentioned indemnifications made to the Dutch, the Portuguese government, in return, confirmed and enlarged all the privileges of the ancient planters, extending them to the present and future possessions of these noble families. But in the end the government multiplied its own monopolies, and assumed prerogatives interfering with the interests of the ancient and rich landlords. Even from 1808 to 1821, as long as the court resided in Rio Janeiro, the Portuguese by birth continued to have the preference in the high offices of State before the chief native families; and the system of taxing the productions of Brazil, and the importation of articles needed by the Brazilian nobility for themselves and slaves, was even extended. The government finally placed obstacles in the way of increasing the number of the latter, which the rich landlords deemed indispensable for the establishment of new plantations. The vassals, moreover, always had a stumbling block in their way in the fiscal prerogative of the court, that the land which the vassal called his own, but which he had hitherto neglected to search for gold or for diamonds, in case of any future discovery of such treasures, should be the property of the crown, or at least the object of high taxation. Even the humanity of the government, in attempting to ameliorate by laws the condition of the slaves, was a subject of offense, because it appeared to the lords to be an injury to their legal property to proceed in such a matter without their consent. Without ascribing to the Brazilians any democratic propensities, all these circumstances must have awakened the desire of independence in their breasts, as much as it augmented their hatred of the Portuguese. From these two causes a conflict of parties of several years' duration at length took place, the result of which was the late empire.

On the invasion of Portugal in 1808 by the French, the sovereign of that kingdom, John VI., sailed for Brazil, accompanied by his court and a large body of emigrants. Soon after arriving there he began to improve the condition of the country by placing the administration on a better footing, and throwing open its ports to all nations. On the fall of Bonaparte the king raised Brazil to the rank of a kingdom, and assumed the title of King of Portugal, Algarve, and Brazil. The revolution which took place in Portugal in 1820, com-

Brazil

elling the king to return to that country, he next year sailed for Lisbon, leaving Pedro, his eldest son and successor, as lieutenant and regent. But as the Portuguese Cortes were not willing to grant the entire equality of civil and political relations demanded by the Brazilians, and had expressly declared that Brazil was to be divided into governments, and ruled by the ministry of State at Lisbon, and the prince-regent was to be recalled to Portugal—such violent convulsions were excited in Rio Janeiro and various parts of Brazil, December, 1821, that it was explicitly declared to the prince-regent that his departure would be the signal for establishing an independent republic. The prince, therefore, resolved to remain in Brazil, and gave a public explanation of his reasons, Jan. 9, 1822, to his father, to the Cortes in Portugal, and to the people of Brazil. The Portuguese troops were removed from Brazil. The prince-regent assumed, May 13, 1822, the title of “perpetual defender of Brazil,” and in June convened a National Assembly, composed of 100 deputies, to frame a separate constitution for the country. The National Assembly of Brazil declared the separation of that country from Portugal, Aug. 1, 1822, and Oct. 12, appointed Dom Pedro the constitutional Emperor of Brazil. The new emperor retained, at the same time, the title of “perpetual defender of Brazil.”

The king, after some slight and ineffectual attempts to reestablish the former relations between Portugal and Brazil, acknowledged the independence of the latter country in 1825. Some years afterward a series of tumultuary proceedings ended in the abdication of Dom Pedro, who left Brazil on April 7, 1831, leaving his son, who was under age, as his successor. The rights of the latter were recognized and protected, and a regency of three persons appointed by the Chamber of Deputies to conduct the government during his minority. In 1840 the young emperor was declared of age, being then in his 15th year, and was crowned on July 18, 1841. The new government had considerable difficulty in crushing the republican and revolutionary party, which kept up a series of struggles in several provinces for some years. In 1845 the insurgents had all laid down their arms, but in 1848 a new rising took place, which was put down not without difficulty in the following year. In 1851 a war broke out with Rosas, dictator of Buenos Ayres, in which Brazil was joined by Paraguay, Uruguay, Corrientes, and Entre Rios, and which ended in favor of the allies. From this war Brazil received a certain impulse. The trade now increased, the finances of the country improved, and the government began to further the development of the country by constructing roads,

Braziletto

encouraging immigration, and fostering the education of the people. In 1853 the Bank of Brazil was founded, and the construction of railways began. In 1859 a minister for agriculture, commerce, and public work was appointed, and a large government loan for the construction of railways was authorized. In 1863, in consequence of the arrest of three English naval officers, a misunderstanding arose with England, which led to the termination of diplomatic relations for a time between the two countries. Meanwhile (November, 1864) hostilities had been commenced by the Paraguayans under President Lopez against Brazil, in consequence of the interference of the latter in the affairs of Uruguay; and in May, 1865, an alliance for the purpose of carrying on war against Paraguay was concluded between Brazil, the Argentine Confederation, and Uruguay. This war, the brunt of which had to be borne by Brazil, lasted till 1870, the Paraguayans having maintained a heroic resistance, and having only given up the contest on the death of their leader, Lopez, in battle against the Brazilians (March 1, 1870). This struggle was attended with an immense expenditure of men and money to Brazil, but it established her reputation as a great power and secured the freedom of the navigation of the La Plata river system. For some years after this a movement toward greater freedom went on in Brazil. In 1888 it took the form of a total abolition of slavery without compensation, and in 1889 it received further development in a revolution which overthrew the monarchy. On Nov. 16 a provisional government was formed, and the emperor with his family sailed for Europe. The new constitution which was immediately issued, declared that Brazil was now a republic composed of the federated United States of Brazil; each of the provinces took the position of a State, each State having its own local government, with representation in a congress appointed by popular vote. A more carefully prepared constitution was published in 1891. An insurrection, confined chiefly to the fleet, broke out in 1893. After a great deal of desultory fighting and the bombardment of Rio, it was suppressed in 1894 by President Peixoto.

Brazil Cabbage, or **Chou Caraibe**, names somewhat vaguely applied to various species of *caladium* and *colocasia* (natural order, *araceæ*), which yield edible tubers, and are largely cultivated in the tropics.

Braziletto, an English name of *cæsalpinia*, a genus of leguminous plants constituting the typical one of the sub-order *cæsalpiniceæ*. The narrow leaved braziletto, *C. sappan*, furnishes the sappan-wood used in dyeing red. *C. sepiaria*, the Mysore thorn, is so spinous that it constitutes an impene-

Brazilian Grass

trable fence. Hyder Ali planted it around fortified places. It is a scandent shrub. There are other species from the East or West Indies or South America.

Brazilian Grass, an incorrect popular name applied to a substance used in the manufacture of a very cheap kind of hats, known as Brazilian grass hats, and also as chip hats. It consists of strips of the leaves of a palm, *chamærops argentea*, which are imported into Great Britain for this manufacture, and chiefly from Cuba.

Brazil Nuts, the seeds of a Brazilian tree—the *bertholletia excelsa*. It belongs to the order *lecythidaceæ*. The nuts or seeds are largely exported from Para, whence they are sometimes called Para nuts. They are edible, besides which they yield on pressure an oil used by watch-makers and artists.

Brazil Tea, a tree—the mate (*ilex paraguayensis*), the leaves of which are used in South America as a substitute for Chinese or India tea.

Brazil Wood, a kind of wood used for dyeing, and extensively imported from the West Indies, Brazil, and other tropical countries. The best qualities of it are said to be produced by *cæsalpinia echinata*. Other kinds are derived from the *C. brasiliensis* and *C. crista*. The former has timber which is elastic, tough and durable, and which takes a fine polish. It is of a fine orange color, full of resin, and yields by infusion a fine, full tincture.

Brazing, the act of soldering together the surfaces of iron, copper, brass, etc., with an alloy composed of brass and zinc, sometimes with the addition of a little tin or silver. The surface to be united must be rendered perfectly clean and bright. The alloy, in granular form, is usually wetted with ground borax and water, dried, the pieces placed in contact and exposed to the heat of a clear forge fire, causing the solder to flow between them. This may be assisted by the use of a soldering iron.

Brazos, a large river of the United States, in Texas, rising in the N. W. part of the State, and flowing into the Gulf of Mexico, after a course of 900 miles, 40 miles W. S. W. of Galveston. During the rainy season, from February to May inclusive, it is navigable by steamboats for about 300 miles.

Brazza (brat'sa), an island in the Adriatic, part of Dalmatia, 24 miles long and from 5 to 7 broad, mountainous and well wooded. It produces good wines and oil, almond, silk, etc. Pop. about 20,000.

Brazza, Pierre Savorgnan de, a French explorer, born on board ship, off Rio de Janeiro, Brazil, Jan. 26, 1852; entered the French navy in 1870. During 1876–1878

Bread

he explored the Ogowe and Kongo regions of Africa, and made treaties between France and the natives, founding Franceville and several other villages. In 1886 he was made Governor of the French Kongo and Gaboon colonies, which he had thus secured. Brazzaville on the Kongo river is named after him. He died Sept. 15, 1905.

Breach, the aperture or passage made in the wall of any fortified place by the ordinance of the besiegers for the purpose of entering the fortress. Breaching batteries, are batteries of heavy guns intended to make a breach.

Breach, in law, any violation of a law, or the non-performance of a duty imposed by law. Breaches are of various kinds:

1. Breach of close, *i. e.*, of what is inclosed in fact or in the eye of the law. The entry into another man's land. (Blackstone's "Commentaries," bk. iii., ch. xii.)

2. Breach of covenant.—The violation of a written agreement. (Blackstone's "Commentaries," bk. iii., ch. ix.)

3. Breach of duty.—Violation of the duty incumbent upon one rightly to discharge the functions imposed upon him by the office or trust which he holds. (Blackstone's "Commentaries," bk. iii., ch. ix.)

4. Breach of the peace.—Offenses against the public, involving personal violation of the peace, or incitement or provocation to others to do so. (Blackstone's "Commentaries," bk. iv., ch. xi.)

5. Breach of pound.—The act of breaking into a pound, or any similar place, to rescue one's cattle or other property there inclosed. (Blackstone's "Commentaries," bk. iii., ch. ix.)

6. Breach of prison.—Escape of a prisoner from prison by breaking the building, or in any other way. (Blackstone's "Commentaries," bk. iv., ch. x.)

7. Breach of promise.—(a) General.—Violation of one's pledged word, especially if the promise be written down. (b) Special.—Breach of promise of marriage. An action lies for it on the part of either man or woman, though, as a rule, only the latter is believed to be substantially injured or deserve damages.

8. Breach of trust.—The violation of one's duty as trustee, or anything similar.

Bread. In the earliest antiquity we find the flour or meal of grain used as food. The inconvenience attending the use of the grain in its natural state, and perhaps the accidental observation that when bruised and softened in water it formed a paste, and when dried again a more compact, mealy substance, led by degrees to the artificial preparation of bread. Easy as it seems, it must have been a long time before it was completely successful. The grain was no doubt first bruised between stones,

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and from the meal mixed with milk and water a dry, tough, and indigestible paste was made. The subjecting of this paste to the action of fire would be an improvement subsequently introduced. Latterly, and probably accidentally, it was observed that by bringing the paste into a state of fermentation its tenacity is almost entirely destroyed, and the mass when baked becomes bread—porous, agreeable to the taste, digestible, and consequently healthy. The use of machinery in the operations of bread-making is now common in the larger establishments.

Bread, as is well known, is made from the flour or meal of the cereals, maize, millet, and rice being principally used for the purpose in the more S. countries, rye, barley, and oats in the more N., and wheat in the intermediate and temperate regions; but other vegetable products, such as beans, peas, lentils, turnips, carrots, potatoes, and even the bark of trees, are also sometimes employed either alone or mixed with the flour of the cereals. Beet and flour, in the proportion of equal weights, have been found to constitute a nutritious and palatable bread, and a very nutritious bread may also be made from the flour of beans and peas. By far the greater proportion of the bread consumed in the British Islands is made from wheat flour, though in the country districts of Scotland oatmeal cakes or bannocks are still used to some extent. Their use is decreasing every year, however. Rye bread is not much used in Great Britain, but in the N. parts of Europe it is more common than wheat bread. It is darker in color than the latter, and a little less nutritious. In Westphalia a kind of very coarse black bread, called *Pumpernickel*, is made from rye, of which the peasants bake one large loaf for the whole week. In many parts of Germany bread is made of grain nearly entire, or but just bruised. Bread is either fermented or unfermented. In making the former, leaven or yeast is used, which causes it to rise, and gives it the well-known spongy texture of the common loaf; the latter is made without yeast, and is more dense and solid than the former, except where the effect of fermentation is produced by chemical means, as in aerated bread. A great proportion of the biscuits manufactured, those known as ship-biscuits in particular, are unfermented. In a good many parts of England, especially in the country districts, people are in the habit of making their own bread, and those accustomed to the home-made bread generally prefer it to that of the bakers. It is sweeter, more compact, and full-flavored and keeps much longer.

The process of bread-making, that is, of making the common fermented loaf, as it is practised in bakeries in Great Britain,

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is generally as follows: The first thing to be done toward the manufacture of a batch of bread is, in the language of the baker, to stir a ferment. For this purpose water, yeast, flour, and some potatoes mashed and strained through a colander, are mixed together and worked up into a thin paste, in which, on being left at rest for a time, an active fermentation sets in, the carbonic acid generated causing the mixture to rise and fall. In about three hours the fermenting action is at rest, and the mixture may now be used, but it is not generally used till at the end of four or five hours. The next operation is called setting the sponge. This consists in stirring up the above ferment well, adding some lukewarm water, and mixing in as much flour as will make the whole into a pretty stiff dough, which receives the name of the sponge. The sponge being kept in a warm place begins to ferment in the course of an hour or so, heaving and swelling up till at last the imprisoned carbonic acid bursts from the mass, which then sinks or collapses. This is called the first sponge. But as the fermentation is still going on, the carbonic acid soon causes the sponge to rise again as before to nearly twice its volume, when the carbonic acid bursting through the mass causes it to fall a second time; and this constitutes what the bakers call the second sponge. The rising and falling might then go on for 24 hours, but as the alcoholic would pass into the acetous fermentation soon after the second rising, the baker always interferes after the second and very frequently after the first sponge. The bread made from the first sponge is generally sweeter; but unless the best flour is used, and even then, the loaf that is made from it is smaller in size and more compact than that which is made with the second sponge. In hot weather, however, as there would be much danger of the bread turning sour if the sponge were allowed to take a second fall, the first sponge is frequently used. The next process is called breaking the sponge, and consists in adding to it the requisite quantity of water and salt, the sponge being torn to pieces by the hand and thoroughly mixed with water. The remainder of the total quantity of flour intended to be employed is now gradually added, and the whole is kneaded to a dough of the due consistency. The kneading is a most important process, as the rising or complete fermentation of the bread, and consequently its wholesomeness, largely depends upon it. It is known to have been carried far enough when the hand, on being pushed into the mass of dough, is withdrawn without any adhering to it. The dough is now allowed to remain in the trough till it rise or give proof—an interval of from one and a half to three or

four hours, according to the kind of yeast employed—and it is then weighed off into lumps, which are shaped into loaves and placed in the oven. There they are exposed for about an hour to a temperature of 570° F., which is gradually allowed to fall to 430° or 420°, and in the process of baking they swell to about double their original size. The yield of a sack of flour is 90 to 92 four-pound loaves.

Three kinds of yeast are used by bakers: brewer's yeast or barm, German yeast, and patent or hop yeast. The first is that derived from ale only, as porter yeast is too bitter; German yeast is obtained from the Unterhefe in the brewing of beer and is largely imported into Great Britain; patent yeast consists of a decoction of hops, to which malt with some brewer's or German yeast is added. Several qualities of flour are used, and are known by the names of firsts or whites, seconds or households, and thirds. The latter two contain a certain proportion of the bran. Brown or whole-flour bread is quite extensively eaten in Great Britain, and is considered to be very wholesome. It is made from undressed wheat, and consequently contains the bran as well as the flour. As the bran consists to a great extent of gluten, starch, fatty, and other nutritious substances, many contend that it is an error to remove it from the flour, since thereby a large amount of nutriment is altogether lost to the public, while the fine flour that remains is both less nutritious and less digestible than if the bran were retained. That there is more nutriment in the whole meal than in the flour is certain, but it has been alleged that the former is apt to pass through the alimentary canal too quickly to allow of its nutriment being properly extracted. Still there is no doubt that for many constitutions it forms a very healthy and suitable food.

Formerly, when chemistry was less advanced than it is now, bread-making or "panification" was considered a great mystery, and a special kind of fermentation was ascribed to it by philosophers. Now, however, it is resolved into the simplest operations resulting from common and acknowledged causes. The cereals contain in their grains, deposited in cells, a substance called gluten, exactly the same in composition as flesh. It is present in larger quantity in the center than at the surface of the grain. An average quality of the flour consists of

Gluten	12
Starch	70
Sugar	5
Gum	3
Water	10
	<hr/>
	100

When water is added to the flour in the first operation of baking, it unites with the gluten and starch, and dissolves the gum and sugar. The yeast or barm added acts now upon the dissolved sugar, especially at an elevated temperature, and produces the vinous fermentation, forming alcohol, and setting free carbonic acid as a consequence of the transformation of the elements of the sugar. The gaseous carbonic acid is prevented from escaping by the glutinous property of the nitrogenous ingredient, and if the mixing or kneading has been properly performed, it remains very equally diffused through every part of the dough. The amount of sugar thus decomposed is very small in amount, probably never exceeding 1 per cent. of the weight of the flour, or one-fifth of the sugar present in it. The alcohol and carbonic acid are carried into the oven with the dough, and the former partially escapes, while the latter gas, being expanded by the heat, endeavors to do so, but meets with obstacles, not only from the gluten, but also from the starch, which the heat causes to pass from its insoluble to its soluble state, and in doing so it becomes much inflated by the escaping gas. The regulation of the temperature is important, because if it were urged too quickly, the bubbles of gas bursting through their prison walls would combine into larger bubbles, and form those large cavities which the good baker dislikes so much to see. Many attempts have been made to economize the alcohol expelled by the heat, but none have met with success, the quantity produced being so small as not to repay the expense of its collection.

When starch is roasted it passes into a kind of gum, which is, to a small extent, formed in the crumb of the bread, but much more largely in the crust. The outer part of the loaf receiving the heat, loses much of its water; its starch passes into gum; its sugar into caramel; and this, aided by a like change in the other organic matters, produces the peculiar odor of the crust. The flour, during baking, has united with much water, the loaf generally containing 43 per cent., while flour has only 10 per cent. In workhouses and large establishments, where the bread is baked in connected loaves and not in separate cans, the amount of water is as much as 50 per cent. or one-half of the whole weight. One hundredweight of flour baked into bread will therefore produce on an average about 160 pounds of the latter. It will thus be obvious that a pound of flour contains considerably more nutriment than the same weight of bread. The changes, however, which have taken place during the formation of the latter render it more easily digestible, and hence better adapted for the purposes of nutrition.

We have now to say a few words on aerated bread, or unfermented bread, which receives its sponginess or porosity from carbonic acid supplied artificially, and not produced by fermentation. Bread of this sort has been made in small quantities for a good many years, but it is only in quite recent times that its use has become at all extensive. In a pamphlet entitled "Instructions for making Unfermented Bread; by a Physician," published in 1846, hydrochloric acid and bicarbonate of soda were recommended as agents for producing carbonic acid in the loaf, nothing else being added to the flour except water and salt; but carbonic acid water is now generally employed for the same purpose, according to the process invented by Dr. Dauglish. Since water is capable of absorbing carbonic acid in quantities equal to its own bulk, the water to be used in kneading the dough is placed in a strong iron box, and has a large quantity of carbonic acid forced into it by means of pressure. The flour and salt are contained in another strong airtight vessel inside of which there is a kneading apparatus worked from without through a closely-packed stuffing box. By means of a connecting pipe the water is introduced into the latter vessel, where it undergoes the same pressure, and the kneading apparatus is set to work. When the kneading is thoroughly performed the pressure is removed, and the escape of the gas raises the dough or sponge. The loaves are baked in separate tins, the requisite quantity for a loaf being divided off into the tins by mechanical means. An improved oven was invented by Dr. Dauglish which consists of a long chamber with an endless chain traveling along it, and forming a kind of movable bottom, in which the tins containing the loaves are placed, and are baked in their progress from one end to the other. Bread made in this way is as sweet and agreeable to the taste as any fermented bread; it is light and uniform in texture, and as it retains some of the valuable ingredients of the flour that are lost by fermentation, it is preferable on the score of its nutritive properties. For dyspeptic persons and infants it is highly recommended. Another thing in its favor is its cleanliness and purity. It contains nothing but flour, water, and salt; and as it is scarcely touched by the hand in process of making, those who use it are not disgusted to think that their bread may have been laboriously kneaded by the hands of some perspiring and not over cleanly workman.

Bread-making by Machinery.—Although the art of making bread dates back to the most remote period of civilization, only within the last 50 years have its scientific aspects been systematically studied. With the classic labors of Liebig in the chemistry of fermentation, bread-making was radi-

cally changed. The baking of a loaf was no longer a matter of individual skill, but of scientific knowledge. By reason of this change of method the little cellar bakery, in which bread of poor quality was only too often made, began to give place to the modern factory bakery equipped with elaborate machinery and with ovens of improved construction. The result has been that bread has been vastly improved in quality and is now made in accordance with certain well-established chemical rules. To illustrate the methods which are followed in a well-equipped modern bread factory, the present article is devoted to a description of a model bakery, which supplies New York with a large portion of its bread.

The raw material employed in the making of bread at the bakery in question consists principally of flour, yeast, milk, and water. For the finer varieties of bread, butter is used. The flour is piled in sacks to the number of 6,000 in a large storeroom occupying the top-most floor of the factory building, and is composed of spring wheat, winter wheat, and pure rye. Although modern milling machinery has done much to improve the quality and cleanliness of flour before it reaches the consumer, the baker finds that it must be still further cleaned before it becomes fit for this purpose. Consequently an elaborate cleaning apparatus or "dresser" is employed, invented by the late Jonathan Mills, which so thoroughly refines the flour that even the finest fibers of the sack are removed in passing through the machine. The cleaning apparatus comprises essentially a system of hoppers, screens, conveyors, and bins.

The hoppers are located at one end of the flour-storage room; and into their mouths the flour is poured. At the lower tapered end of each hopper an adjustable rocking closure is suspended by rods, which closure permits the passage of a definite amount of material. As the rods swing from side to side the closure rocks and permits the flour to drop into a spiral conveyor, by which it is transferred into a rotary screen. As the flour is whirled around and mixed in this rapidly-turning screen, it is driven by its centrifugal force toward one end of the screen; but before it reaches that end it has sifted through the meshes. The foreign matter and impurities are left behind, and these alone emerge from the end of the screen, left open for that purpose. The sifted, cleaned flour is transferred by a screw-conveyor, mounted immediately below the rotary screen, to a bucket-elevator, by which it is raised to the flour-storage room and conveyed to four bins by way of separate chutes. As the one bin receives its charge, its chute is closed, so that the next bin may

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be filled. This cleaning apparatus is constantly in operation; for during a working-day some 200 barrels of flour must be refined.

The four bins in the storage-room are situated directly above four dough-mixing machines on the floor below. And to each mixing machine the flour is carried by a small screw-conveyor and a flexible pipe-like chute from the superposed bin. Above each machine is a tank in which cold and hot water are mixed until a temperature varying from 90° in summer to 95° in winter is attained. Into each mixing machine 60 gallons of milk and water, previously mixed by a baker, 840 pounds of flour, 15 pounds of salt, and a suitable amount of yeast, are introduced to form what is technically called a "sponge." In the making of rye bread caraway seed is also mingled with the other material. For the finest varieties of bread, milk and butter are used, as already remarked.

Although the four mixing machines differ somewhat in detail, the main elements of the construction are the same in all. Each machine comprises essentially an iron vessel mounted to swing, in which a double spiral dasher or mixer is mounted, and is turned through the medium of gearing driven by a belt and pulley from a counter-shaft. When the mixing machine has received its charge of material the belt is shifted from a loose to a fast pulley, whereupon the dashers turn and knead the sponge into dough. Human hands could never knead so thoroughly and so quickly. After 20 minutes of mixing and kneading, by which the ingredients are intimately commingled into a perfectly homogeneous mass, the mixing machine is swung downwardly on its axis, and from the turning dasher the dough is cut with a long-bladed knife and collected in a wheeled trough.

Time was when this kneading and mixing was done by hand. The workmen washed their hands and cleaned their nails before kneading and handling the dough. But it is hard to knead dough thoroughly by hand; and perspiration must break out from the pores with the arduous labor. By using mechanical kneaders the dough can be mixed, thoroughly kneaded, without touching it with the hands. How great is the saving in time and labor wrought by these machines may be conceived when it is considered that the work which each performs in 20 minutes required at one time the incessant labor of two men for three-quarters of an hour.

Before machinery was introduced in the making of bread a man worked from 12 to 13 hours a day in a large bakery and from 17 to 18 hours in a small bakery. At present all large bakeries, at least those of New York city, employ their men only during 60 hours per week.

Breadfruit

The dough collected from the mixing machines in the troughs is now allowed to ferment or "raise," as it is popularly called, a process which requires about two and a half hours. After fermentation the dough is ready to be molded by hand into loaves of some 40 different shapes and sizes. Adequate machines for this purpose have never been devised.

From the mixing-room the fermented dough is dropped into a molding and oven room by chutes, the rye bread dough passing down by one way, the wheat bread dough by another. The rye bread dough is carried to a table in the mixing-room, cut into pieces of a certain weight, dropped into a machine called a "break," and then passed down into the molding and baking room by way of a chute to be molded and baked. The "break" consists merely of a pair of rollers placed side by side, and serves the purpose of squeezing the air out of the dough.

The wheat bread dough, on the other hand, is subjected to no squeezing, but is conveyed directly by a chute to a table, to be cut up and distributed among the men who are to work it into its proper shape. After having been molded into loaves the dough is allowed to raise in a steam box for half an hour.

In the walls of the baking-room 15 ovens are built into which the loaves are inserted by long-handled wooden shovels commonly called "peels." The baking extends over a period of one-half to three-quarters of an hour, depending upon the size of the loaf. The interior of the ovens is lit by gas so that the loaves can be readily seen. Of the various ovens employed, a large double Werner-Pfleiderer drawplate oven should be particularly mentioned; for it constitutes a most valuable adjunct to the baking plant.

The oven in question has two heating chambers arranged in as many tiers, and two carriages, each of which receives a baking plate and is run forward and back in its chamber. Hangers of different lengths extend from the forward ends of the carriages and are curved in the lower carriage so as not to impede the upper. These arms or hangers run on rails to guide the carriage into the oven. The construction utilizes the space in front of the oven to the best advantage; for large-sized baking plates may be drawn out full length.

After the baking the loaves are collected, classified, as it were, and taken to the shipping room. Here they are loaded on some 50 delivery wagons and distributed throughout the city of New York. The output of this model bakery aggregates about 43,000 loaves of bread and 15,000 rolls per day.

Breadfruit. The breadfruit is a large, globular fruit of a pale-green color, about the size of a child's head, marked on the

Breadfruit

surface with irregular six-sided depressions, and containing a white and somewhat fibrous pulp, which when ripe becomes juicy and yellow. The tree that produces it (*Artocarpus incisa*) belongs to the natural order *Artocarpaceæ* (nearly allied to the *Urticaceæ*



BREADFRUIT.

or nettle tribe), and grows wild in Otaheite and other islands of the South Seas. It is about 40 feet high, with large and spreading branches, and has large bright green leaves, deeply divided into seven or nine spear-shaped lobes. The eatable part of this fruit lies between the

skin and the core, and it is as white as snow and somewhat of the consistence of new bread. When gathered it is generally used immediately; if it be kept more than 24 hours, it becomes hard and choky. The inhabitants of the South Sea Islands prepare it as food by dividing the fruit into three or four parts and roasting it in hot embers. Its taste is insipid, with a slight tartness, somewhat resembling that of the crumb of wheaten bread mixed with Jerusalem artichoke. Of this fruit the Otaheiteans make various messes by mixing it with water or the milk of the cocoanut, then beating it to a paste with a stone pestle, and afterward mingling with it ripe plantains, bananas, or a sour paste, made from the breadfruit itself called mahie. It continues in season eight months, and so great is its utility in the island of Otaheite, "that," observes Captain Cook, "if in those parts where it is not spontaneously produced, a man plant but 10 trees in his whole lifetime, he will as completely fulfil his duty to his own and to future generations, as the native of our less temperate climate can do by ploughing in the cold of winter and reaping in the summer's heat as often as these seasons return; even if, after he has procured bread for his present household, he should convert the surplus into money and lay it up for his children." Not only does this tree supply food, but clothing, and numerous other conveniences of life. The inner bark, which is white and composed of a net-like series of fibers, is formed into a kind of cloth. The wood is soft, smooth, and of a yellowish color, and is used for the building of boats and houses. In whatever part the tree is wounded a glutinous, milky

Breastwork

juice issues, which when boiled with cocoanut oil, is employed for making birdlime, and as a cement for filling up cracks in such vessels as are intended for holding water. Some parts of the flowers serve as tinder, and the leaves are used for wrapping up food and other purposes.

As the climate of the South Sea Islands is not very different from that of the West Indies, it was thought desirable that some of the trees should be transferred in a growing state to the British islands there; and it was for this purpose that the "Bounty" sailed in 1787 to the South Seas, under the command of the well-known Bligh. This expedition being unsuccessful, a second, also under Bligh, was fitted out in 1791. He arrived in safety at Otaheite, and after an absence from England of about 18 months, landed in Jamaica with 352 breadfruit trees in a living state, having left many others at different places in his passage thither. From Jamaica these trees were transferred to other islands; but the negroes, having a general and long-established predilection for the plantain, the breadfruit is not much relished by them. Where, however, it has not been generally introduced as an article of food, it is used as a delicacy; and whether employed as bread or in the form of pudding, it is considered highly palatable by the white inhabitants.

Break=Circuit Chronometer, the name applied to a box chronometer to which a device has been attached for breaking an electric circuit at every motion of the escape wheel, generally every half second.

Breakespere. See ADRIAN IV.

Breakwater, a pier, wall, mole, sunken hulk, or anything similar, placed at the entrance of a harbor, at the exposed part of an anchorage, or in any such situation, with the view of deadening the force of the waves which roll in from the ocean. There are several notable breakwaters in this country — one of the longest and most notable being that in Lake Michigan, protecting the harbor of the city of Chicago. It is peculiar in its construction, being built perpendicularly and encased with wooden beams. The Delaware breakwater, in Delaware Bay, is built with sloping sides, being much broader at its base than on top.

Bream, the carp bream, *abramis brama*. It is of a yellowish white color, which changes, through age, to a yellowish brown. The sides are golden, the cheeks and gill covers silver white, the fins, light colored, tinged, the ventral one with red and others with brown. It is found in deep waters and lakes. It is sought after by anglers, who, however, consider the flesh insipid.

Breastwork, in fortification, a hastily constructed parapet made of material at

hand, such as earth, logs, rails, timber, and designed to protect troops from the fire of an enemy. In architecture, the parapet of a building. In shipbuilding, a railing or balustrade standing athwartships across a deck, as on the forward end of the quarter deck or roundhouse. The beam supporting it is a breastbeam.

Breast, Female, or mammary gland, consists of a series of tubes radiating from a common center, the nipple of which is situated in an areola or dark colored patch. On the surface of the latter are several (from 4 to 10) sebaceous glands, which secrete an unctuous fluid to protect the skin of the nipple, which is very thin, from the saliva of the sucking infant. The milk tubes (15 or 18 in number) enlarge into sinuses, and pass each to a separate lobe or subdivision of the breast, where they divide into twigs and branches (the lactiferous ducts), which end in minute vesicles. The lobes are held together by fibrous tissue, and are well packed in fat, which increases sometimes to an enormous extent the apparent size of the organ.

Inflammation, Symptoms of.—First hardness, which extends and increases; next, pain during suckling; skin becomes pink, and later red, tense, and shining; pain is now very severe, and great constitutional disturbance is excited. In the center of the redness the skin becomes purplish, around this a puffiness, and in the center a slight depression and softening; an abscess now exists; then the skin becomes thinner, and finally breaks, and the abscess discharges its contents (pus, blood, etc.).

Treatment.—Previous attention to the nipple; if it is small and undeveloped, draw it out; bathe it frequently with alum and whisky to harden it; if the nipple becomes cracked, use a nipple shield while nursing, and apply between nursings soothing applications or dusting powders. When breast becomes inflamed, support with a bandage or with a large handkerchief, to remove the weight of the organ. Water dressings, both before and after the abscess breaks, are easily managed and of good service. Compound resin ointment, spread on a cloth, and applied closely over the affected part, may be used with advantage in all stages. If the abscess is deep seated, surgical aid will be necessary to prevent the matter from burrowing through the connective tissues. Tonic, good diet, and general support of the constitutional powers are demanded.

Breath, the air which issues from the lungs through the mouth and nostrils. For details regarding the organic machine on the action of which breathing depends, see LUNGS. For the process of breathing itself see RESPIRATION. From 350 to 400 cubic feet of air are drawn into the lungs in 24 hours. The air expired is different, both

in volume and composition, from that which was inspired. Each hour an adult man takes in 450 to 550 grains of oxygen, and emits in the same period about 632 grains of carbonic acid, about 45 to 50 grains of nitrogen, and 9,720 grains of watery vapor. Hence a continued supply of fresh air, laden with oxygen, is needful to maintain life. For the want of it, out of 146 prisoners shut up in the "Black Hole" of Calcutta, which was not a hole at all but only a room too small for its occupants, 123 perished in eight hours, as did 260 out of 300 Russian prisoners confined in a cave after the battle of Austerlitz.

Breccia (bretch'ya), a kind of marble composed of a mass of angular fragments, closely cemented together in such a manner that when broken they form *brèches* or notches. In geology, the word has now a more extended signification. It signifies a rock composed of angular as distinguished from rounded fragments united by a cement of lime, oxide of iron, etc. The fragments, of course, are derived from pre-existing rocks. Presumably these are not far off, for if the fragments had been transported from a distance by water, their angles would have been rounded off. There are quartzite breccias, ferruginous breccias, volcanic breccias, bone breccias, etc.

Brèche-de-Roland (brāsh'de-rō-lan), that is, "the breach of Roland," a mountain pass in the Pyrenees, between France and Spain, which, according to a well known legend, was opened up by Roland, one of the paladins of Charlemagne, with one blow of his sword Durandal, in order to afford a passage to his army. It is an immense gap in the rocky mountain barrier 43 miles to the N. of Huesca.

Breckinridge, Clifton Rhodes, American legislator and diplomatist, born in Lexington, Ky., Nov. 25, 1846; received a public school education and served in the Confederate army and navy. After the war he attended Washington College (now Washington and Lee University) for three years, and engaged in mercantile business in Pine Bluff, Ark. He was elected to Congress in 1882 as Representative-at-Large, as a Democrat; was re-elected in 1884, 1886, 1889, 1890, 1892 and 1894, and served on the Committee on Ways and Means during the greater part of his Congressional life. In 1894-1897 he was United States Minister to Russia.

Breckinridge, or Breckenridge, John, an American statesman, born in 1760. In 1795 he was made Attorney-General of the new State of Kentucky, and he served in its Legislature from 1797 to 1800. He entered the United States Senate, in 1801, becoming four years later Attorney-General in Jefferson's cabinet, in which office he died in 1806.

Breckinridge, John Cabell, Vice-President of the United States, born near Lexington, Ky., Jan. 21, 1821; practiced law in Lexington until 1847, when he was chosen major of a volunteer regiment for the Mexican War. He sat in Congress in 1851-1855, and in 1856 was elected Vice-President, with James Buchanan as President. In 1860 he was the pro-slavery candidate for the presidency, but was defeated by Abraham Lincoln. A United States Senator from March to December, 1861, he then entered the Confederate army, was appointed a Major-General, in 1862, and held some important commands during the Civil War. He was Secretary of War in Jefferson Davis' cabinet, at the close of the struggle, and escaped to Europe, whence he returned in 1868. He died in Lexington, May 17, 1875.

Breckinridge, Joseph Cabell, an American military officer, born in Baltimore, Md., Jan. 14, 1842; a nephew of Gen. John C. Breckenridge of the Confederate army. He practiced law in Danville, Ky., till the beginning of the Civil War, when he joined the Union army. He was made a First Lieutenant in the Regular army Aug. 1, 1863, a Captain in 1874, Brigadier and Inspector-General in 1889, and Major-General of Volunteers, May 4, 1898. He served in the Santiago campaign and had a horse shot under him.

Breckinridge, Robert Jefferson, a Presbyterian clergyman and theological writer, born at Cabell's Dale, Ky., March 8, 1800. He was originally a lawyer. He was President of Jefferson College in 1845-1847; from 1847 he was pastor at Lexington, Ky. He was a leader in the division of the Presbyterian Church in 1837 into Old and New Schools. His chief works were "Knowledge of God, Objectively Considered" (1857); "Knowledge of God, Subjectively Considered" (1859). He died in Danville, Ky., Dec. 27, 1871.

Breda (brā'da), a town in Holland, Province of North Brabant, at the confluence of the Merk and the Aa. Breda was once a strong fortress and of great military importance as a strategical position. From the 16th to the end of the 18th century Breda has an interesting military history of sieges, assaults and captures, with which the names of the most famous generals of their time, the Duke of Parma, Maurice of Orange, the Marquis Spinola, Dumouriez, and Pichegru, etc., are connected. It was the residence for a time of the exiled Charles II. of England, and it was in the Declaration of Breda that he promised liberty of conscience, a general amnesty, etc., on his restoration.

Bredérode, Hendrick, Count (bra'da-rōd), a Dutch patriot, born in 1531, joined

with Counts Egmont and Horn in opposing the tyranny of Cardinal Granvella, the Spanish Governor of the Netherlands. In 1566, he presented to Margaret of Parma, who had succeeded Granvella, the famous "Request," which gave rise to the insurrection of the *Gueux*, or "Beggars." Under the grinding oppression of the Duke of Alva's administration in the Low Countries, he retired to Germany. He died in 1568.

Brederoo, Gerbrant Adriaenszoon (brā'-dē-rō), a distinguished Dutch dramatist and poet, born at Amsterdam, March 16, 1585. His best poems are "The Meditative Song Book" and "The Great Fountain of Love," collections of grave and gay pieces, all of which have been very popular, and since his time often reprinted. His lyrics are admired for their musical verse and their tender sensibility; but his masterpiece is unquestionably the "Jerolimo" ("Spaansche Brabander Jerolimo"), a comedy based upon a French version of one of Mendoza's plays. Another comedy, "Moortje," is an adaptation from Terence. He died in Amsterdam, July 8, 1618.

Bree, Matthias Ignatius van (brā), a Flemish painter, born in Antwerp, in 1773; in 1797 gained the *Prix de Rome* by his "Death of Cato." In 1804, he returned to Antwerp, where he became Director of the Academy of Fine Arts. His chief works are the "Entrance of Napoleon into Antwerp," the "Death of Rubens," in the Antwerp Museum, and the "Patriotism of the Burgomaster at the Siege of Leyden, 1576," in the townhouse of Leyden. He died Dec. 15, 1839. His brother, PHILIPP VAN BREE (1786-1871), also acquired some reputation as an historical painter.

Breech, in firearms and ordnance, the rear portion of a gun; the portion behind the chamber; in shipbuilding, the outer angle of a knee timber; the inner angle is the throat.

Breeches, a garment worn by men, covering the hips and thighs, and reaching to the knees. (Pantaloons, or trousers, are sometimes erroneously given this name.)

Breeches Bible, an English translation of the Bible printed at Geneva in 1560; so called from the reading of Gen. iii. 7: "They sewed fig-tree leaves together and made themselves breeches." There is no more reason for giving the name to this Bible than to Wyclif's version, in which the same words are also found.

Breech Loader, a firearm in which the charge is introduced at the rear instead of at the muzzle. The use of breech loaders goes back to the 16th century; indeed, it is probable that that form of arm is about as old as the muzzle loader. In the modern form, however, it is of quite recent introduction.

Breech Loading

Breech Loading, made to be loaded at the breech. Breech loading gun or cannon, a gun or cannon made to be loaded at the breech instead of the muzzle. Breech loading rifle, a rifle made to be loaded at the breech.

Breech Pin, in firearms, a plug screwed into the rear end of a barrel, forming the bottom of the charge chamber. Otherwise called a breech plug or breech screw.

Breech Screw, in firearms, the plug which closes the rear end of the bore of a firearm barrel. The parts are known as the plug, the face, the tenon, the tang, and the tangscrew hole.

Breech Sight, the hinder sight of a gun. In conjunction with the front sight, it serves to aim the gun at an object. It is graduated to degrees and fractions, their length on the scale being equal to the tangents of an arc having a radius equal to the distance between the front and rear sights. The front sight is merely a short piece of metal screwed into the gun, usually at the muzzle, but sometimes between the trunnions, or on one of the rimbases, with its upper edge parallel to the bore of the gun. The rear sight may be detached, having a circular base fitting the base of the gun, or may slide through a slotted lug, and be retained at any given height by a set screw. The breech sight, the target scale and the pendulum are merely different forms of this device.

Breede (bra-dā'), a river in Cape Colony, rises in the Warm-Bokkeveld, and flows chiefly in a S. E. direction through the district of Zwellendam, entering the Indian Ocean at St. Sebastian's Bay, about 60 miles N. E. of Cape Agulhas, the most southerly point of Africa. It is navigable for vessels drawing not more than 10 feet of water to a distance of 40 miles, and drains a very fertile district.

Breeding, the art of improving races or breeds of domestic animals, or modifying them in certain directions, by continuous attention to their pairing, in conjunction with a similar attention to their feeding and general treatment. Animals (and plants no less) show great susceptibility of modification under systematic cultivation; and there can be no doubt that by such cultivation the sum of desirable qualities in particular races has been greatly increased, and that in two ways. Individual specimens are produced possessing more good qualities than can be found in any one specimen of the original stock; and from the same stock many varieties are taken characterized by different perfections, the germs of all of which may have been in the original stock but could not have been simultaneously developed in a single specimen. When, however an effort is made to develop rapidly, or

Breeding

to its extreme limit, any particular quality, it is always made at the expense of some other quality, or of other qualities generally, by which the intrinsic value of the result is necessarily affected. High speed in horses, for example, is only attained at the expense of a sacrifice of strength and power of endurance. So the celebrated merino sheep are the result of a system of breeding which reduces the general size and vigor of the animal, and diminishes the value of the carcass. Much care and judgment, therefore, are needed in breeding, not only in order to produce a particular effect, but also to produce it with the least sacrifice of other qualities. Breeding, as a means of improving domestic animals, has been practiced more or less systematically wherever any attention has been paid to the care of live stock.

George M. Rommel, expert in animal husbandry of the Bureau of Animal Industry, says in a "Bulletin" of the United States Agricultural Department that American breeders of cattle have equaled if not excelled the results reached on the other side of the water. "But," he adds, "no supremacy of excellence, no victory in show ring or market, can efface the memory of the debt America owes to those sturdy yeomen whose names adorn the herd records of England and Scotland." Mr. Rommel's paper is devoted to a study of America's breeds of beef cattle. He begins at the very beginning, going back to that voyage of Columbus, on which the first cattle known to the Western Hemisphere are supposed to have been brought over. Other Spanish explorers and armed invaders followed Columbus' example, bringing not only cattle but horses as well. There was an abundance of grass and water, and as the Spaniards penetrated farther into the interior of the country their herds in growing numbers followed them. From these sprang the native cattle of the West Indies and Mexico, the long-horned steers of Texas and the wild horses of the plains.

The next cattle immigration came with the Portuguese to Newfoundland and Nova Scotia. The French, too, introduced cattle into Arcadia and New France. These were carried into the far interior, and as far back as 1750 the French missionaries in Illinois possessed considerable herds of cattle, horses, and swine. Virginia got her cattle from England soon after the settlement of Jamestown. They multiplied in the Old Dominion very rapidly, one contributing cause being that the killing of cattle was a crime punishable with death.

The Pilgrim Fathers began the cattle business with three heifers and a bull, brought over from England in the ship "Charity" in 1624. New Hampshire got her first cattle from Denmark, New York

Breeding

from Holland, and Delaware from Sweden, at about the time the "Charity" landed the three heifers and the bull. The first shipment to the Carolinas was from England in 1670, while Georgia was the last of all the colonies to figure as a market for the English export trade in breeding cattle.

Thus it was that the United States got its first start in that cattle business which in 1902 made it possible to have all the excitement about the meat trust. The stock gathered from various parts of Europe were all so hopelessly inter-crossed in course of time that their identity was lost, with the result that our forefathers had what were known as the native cattle of the United States. Of this stock Mr. Rommel says: "What the native stock was like we can best imagine from the stories of men now old, and from the scrub stock that is even yet the eyesore of many American pastures. Blood of Spanish, Swedish, French, Dutch, and English, with, maybe, a dash of buffalo as they wandered westward, gave this stock a cosmopolitan character that was representative, perhaps, but hardly profitable. Lack of care by farmers, with no Bakewell to point the way to improvement, brought about a type of animal that a century has not been able to absorb."

In the years from 1760 to 1837 there was an awakening. That was the era of the fermentive stage of Anglo-Saxon cattle breeding. It was in 1760 that Robert Bakewell began the operations which left so lasting an impress upon the cattle-breeding business. He was the first man to practise systematic inbreeding. Around his name those of all great improvers of live stock group themselves, and from the lessons he taught by example every breeder to this day learns the fundamentals of his craft. He was a Leicestershire man, given little to talking, and not at all to writing about his methods. A great deal that he learned by careful experiment he kept to himself.

His aim was to secure cattle that would fatten on the smallest amount of food, and the great success of his art was revealed only by what he did and not by what he told anybody to do. This secret Mr. Rommel describes as inbreeding in the hands of a master, the surest way known to secure an improvement of stock. "Out of the dark ages of ignorance and the scrub," says Mr. Rommel, "by leaps and by bounds, using what material he had at hand and molding it to his will, the English farmer developed the modern breeds of cattle; producing tender meat where tough and leathery fiber had been before, paying the rent with cattle and sheep, and in time contributing largely to the growth of agriculture in the New World."

Breisach

The improvement in America began almost simultaneously with that in England. No sooner had the Revolutionary War closed than importations of improved stock began. This was kept up till the War of 1812 temporarily checked it.

Mr. Rommel says that the year 1817 will always be memorable in American cattle history. In that year, following the short-horn importations of 1812, came the beginning of the Devon and Hereford importations, together with still another arrival of shorthorns. Growth was slow up to 1827, when there came renewed activity, especially in shorthorns. Companies were formed and the improvement of cattle was marked. In point of numbers the short-horn breed rapidly assumed the foremost position, and till about the year 1880 was the only beef of prominence.

The expansion of the cattle business was rapid. Up to the opening of the Union Pacific railroad it was mainly carried on in the part of the country E. of the Missouri river. Then came the discovery of the great opportunities offered by the far Western plains for grazing. The growth in the cattle raising industry was then abnormal. "In the early eighties," says Mr. Rommel, "pure-bred cattle by the thousands were brought from England to supplement the American herds in breeding bulls for the range, and the nearest that the Hereford and Angus breeds ever came to having a boom in this country was at this time. After the collapse, which was bound to follow, the cattle business is now on what is thought to be a substantial and healthy foundation. Quality is being bred into the range herds by the extending use of pure-bred sires, and this, with the better methods, is bringing the range steer to a high plane of excellence. Both on the range and on the small farm improvement has gone hand in hand with increase of numbers."

Breed's Hill, a slight elevation in the Charlestown district of Boston, Mass., about 700 yards from Bunker Hill. Although the famous engagement of June 17, 1775, is known as the Battle of Bunker Hill, most of the fighting was done on Breed's Hill. Here was located the American redoubt, against which the British made their three historical charges, and here Warren fell. The Bunker Hill monument stands on Breed's Hill.

Breisach (brī'säch), **Alt**, a town of Baden, on an isolated basalt hill (804 feet) on the right side of the Rhine, 14 miles W. of Freiburg. The Mons Brisiacus of Cæsar, it was taken by Ariovistus when he invaded Gaul; being regarded as the key to Western Germany, it figured prominently in the wars of the 17th and 18th centuries. The minster is a 13th century structure.

Breitenfeld

Breitenfeld (brī'ten-feld), a village of Saxony, 5 miles N. of Leipsic, remarkable for three battles fought in its neighborhood. In the first, fought on Sept. 17 (old style, 7th), 1631, Gustavus Adolphus inflicted a decisive defeat upon the imperialists under Tilly, who, as well as his generals, Pappenheim and Fürstenberg, was wounded. The second battle was also a victory of the Swedes under Torstenson over the imperial forces under the Archduke Leopold and Piccolomini, Nov. 2 (old style, Oct. 23), 1642. The third battle was one act of the great "Battle of the Nations" at Leipsic, Oct. 16, 1813.

Bremen (brā'men), a free city of Germany, an independent member of the Empire, one of the three Hanse towns, on the Weser, about 50 miles from its mouth, in its own small territory of 99 square miles, besides which it possesses the port of Bremerhaven, at the mouth of the river. The city is partly on the right, partly on the left, bank of the Weser, the larger portion being on the former. Here in the old and business section of the town, the streets of which are narrow and crooked, and lined with antique houses, and which contains the cathedral, founded about 1050, the old Gothic Council house, with the famous wine cellar below it, the Town Hall, the Merchants' House, and the Old and the New Exchange. The Vorstadt, or suburbs, lying on the right bank, outside the ramparts of the old town, are now very extensive. The manufacturing establishments consist of tobacco and cigar factories, sugar refineries, rice mills, iron foundries, machine works, rope and sail works, and shipbuilding yards. Its situation renders Bremen the emporium for Hanover, Brunswick, Hesse, and other countries traversed by the Weser, and next to Hamburg it is the principal seat of the export and import and emigration trade of Germany. Only small vessels can pass up to the city itself; the great bulk of the shipping trade centers in Bremerhaven and Geestemünde. Bremerhaven is now a place of over 20,000 inhabitants, has docks capable of receiving the largest vessels, and is connected by railway with Bremen, where the chief merchants and brokers have their offices. The chief imports are tobacco, raw cotton and cotton goods, wool and woolen goods, rice, coffee, grain, petroleum, etc., which are chiefly re-exported to other parts of Germany and the Continent. The imports (1891), 759,763,471 marks; the exports, 714,736,065 marks. Population of city (1905) 263,440.

Bremen was made a bishopric by Charlemagne about 788, was afterward made an archbishopric, and by the end of the 14th century had become virtually a free imperial city. The constitution is in most respects republican. The legislative authority

Bremerhaven

is shared by a Senate of 18 citizens, elected for life, and an assembly of 150 citizens, elected for 6 years. The executive lies with the Senate and Senatorial committees. The revenue, in 1891-1892, was 16,718,749 marks, and the debt 80,283,600 marks, contracted entirely for public works.

Bremer, Fredrika (brā'mer), a Swedish novelist, was born at Tuorla, Finland, Aug. 17, 1801; was brought up at Arsta, about 20 miles from Stockholm. At 17 she was taken on a tour through Germany, Switzerland and France. In 1828 appeared the first volume of her "Sketches of Everyday Life," but the second volume, "The H. Family" (1833; English translation, 1844), first revealed her power. From this time she devoted herself to writing stories that quickly became popular in translations far beyond the bounds of Sweden, and she varied her literary labor by long journeys in Italy, England, the United States, Greece, Palestine, which supplied the materials for her "Homes of the New World" (1853), and "Life in the Old World" (1862), full of fine descriptions of scenery and vivid pictures of social life, with sound views on political and moral questions. The admirable

translations of Mary Howitt had preceded her in the United States as well as England, and insured her an equally warm welcome on both sides of the Atlantic. On her return to Sweden she gave herself up to philanthropy, but more particularly to the education and emancipation of women, and the consequent propagandist character of her later novels, "Bertha," and "Father and Daughter" (1859), was detrimental in no small degree to their literary value. Her religious views she set forth in her "Morning Watches" (1842). She has been called, and not inaptly, the Jane Austen of Sweden. Of her stories perhaps the most perfect is "The Neighbors" (1837). "The Diary," "The President's Daughters," "Brothers and Sisters," and "Strife and Peace, or Scenes in Dalecarlia," are only less popular. She died in Arsta, Dec. 31, 1865.

Bremerhaven (brā'mer-häf-en), the port of Bremen, Germany, on the E. shore of the Weser estuary, nearly 10 miles from the open sea, and 39 N. N. W. of Bremen. It



FREDRIKA BREMER.

was founded by Bremen, in 1827, on ground acquired from Hanover, and rapidly became a thriving place. A second dock was opened in 1866, a third in 1874; and in 1888 a great port, with docks, was undertaken at Nordenham, on the opposite bank. Bremerhaven was the scene, in 1875, of a dynamite explosion on board a mail steamship, by which 60 persons were killed. The Geeste separates Bremerhaven from Geestemünde. Pop. (1900) 20,322.

Brendan, St., of Clonfert, Ireland, born at Tralee in 484, studied under St. Jarlath of Tuam, and was ordained by Bishop Erc. His name is memorable chiefly for his voyages in search of "the mysterious land far from human ken." After seven years' fruitless wandering he returned, but once more, in a ship of wood instead of hides, set sail with 60 friends, and at length, after many wanderings, reached "that paradise amid the waves of the sea." Brendan founded a monastery at what is now Clonfert, and died in 577. His festival is on the 16th of May. The "Navigation of St. Brendan" was a very popular book in Western Europe as early as the 11th century.

Brenner, a mountain in the Tyrolean Alps between Innsbruck and Sterzing; height, 6,777 feet. The road from Germany to Italy, traversing this mountain, reaches the elevation of 4,658 feet, and is one of the lowest roads practicable for carriages over the main chain of the Alps. A railway through this route was opened in 1867.

Brennus, the name of two individuals known in history. (1) The first was the hero of an early Roman legend which relates to the migration of the Gauls into



BRENNUS BARGAINING TO QUIT ROME.

Italy and their march to Clusium and Rome. In the account given by Livy (v, 33, etc.), he figures as the Regulus Gallo- rum, or chieftain of the Gauls. When he

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Breitenfeld

Breitenfeld (brī'ten-feld), a village of Saxony, 5 miles N. of Leipsic, remarkable for three battles fought in its neighborhood. In the first, fought on Sept. 17 (old style, 7th), 1631, Gustavus Adolphus inflicted a decisive defeat upon the imperialists under Tilly, who, as well as his generals, Pappenheim and Fürstenberg, was wounded. The second battle was also a victory of the Swedes under Torstenson over the imperial forces under the Archduke Leopold and Piccolomini, Nov. 2 (old style, Oct. 23), 1642. The third battle was one act of the great "Battle of the Nations" at Leipsic, Oct. 16, 1813.

Bremen (brā'men), a free city of Germany, an independent member of the Empire, one of the three Hanse towns, on the Weser, about 50 miles from its mouth, in its own small territory of 99 square miles, besides which it possesses the port of Bremerhaven, at the mouth of the river. The city is partly on the right, partly on the left, bank of the Weser, the larger portion being on the former. Here in the old and business section of the town, the streets of which are narrow and crooked, and lined with antique houses, and which contains the cathedral, founded about 1050, the old Gothic Council house, with the famous wine cellar below it, the Town Hall, the Merchants' House, and the Old and the New Exchange. The Vorstadt, or suburbs, lying on the right bank, outside the ramparts of the old town, are now very extensive. The manufacturing establishments consist of tobacco and cigar factories, sugar refineries, rice mills, iron foundries, machine works, rope and sail works, and shipbuilding yards. Its situation renders Bremen the emporium for Hanover, Brunswick, Hesse, and other countries traversed by the Weser, and next to Hamburg it is the principal seat of the export and import and emigration trade of Germany. Only small vessels can pass up to the city itself; the great bulk of the shipping trade centers in Bremerhaven and Geestemünde. Bremerhaven is now a place of over 20,000 inhabitants, has docks capable of receiving the largest vessels, and is connected by railway with Bremen, where the chief merchants and brokers have their offices. The chief imports are tobacco, raw cotton and cotton goods, wool and woolen goods, rice, coffee, grain, petroleum, etc., which are chiefly re-exported to other parts of Germany and the Continent. The imports (1891), 759,763,471 marks; the exports, 714,736,065 marks. Population of city (1905) 263,440.

Bremen was made a bishopric by Charlemagne about 788, was afterward made an archbishopric, and by the end of the 14th century had become virtually a free imperial city. The constitution is in most respects republican. The legislative authority

Bremerhaven

is shared by a Senate of 18 citizens, elected for life, and an assembly of 150 citizens, elected for 6 years. The executive lies with the Senate and Senatorial committees. The revenue, in 1891-1892, was 16,718,749 marks, and the debt 80,283,600 marks, contracted entirely for public works.

Bremer, Fredrika (brā'mer), a Swedish novelist, was born at Tuorla, Finland, Aug. 17, 1801; was brought up at Arsta, about 20 miles from Stockholm. At 17 she was taken on a tour through Germany, Switzerland and France. In 1828 appeared the first volume of her "Sketches of Everyday Life," but the second volume, "The H. Family" (1833; English translation, 1844), first revealed her power. From this time she devoted herself to writing stories that quickly became popular in translations far beyond the bounds of Sweden, and she varied her literary labor by long journeys in Italy, England, the United States, Greece, Palestine, which supplied the materials for her "Homes

of the New World" (1853), and "Life in the Old World" (1862), full of fine descriptions of scenery and vivid pictures of social life, with sound views on political and moral questions. The admirable



FREDRIKA BREMER.

translations of Mary Howitt had preceded her in the United States as well as England, and insured her an equally warm welcome on both sides of the Atlantic. On her return to Sweden she gave herself up to philanthropy, but more particularly to the education and emancipation of women, and the consequent propagandist character of her later novels, "Bertha," and "Father and Daughter" (1859), was detrimental in no small degree to their literary value. Her religious views she set forth in her "Morning Watches" (1842). She has been called, and not inaptly, the Jane Austen of Sweden. Of her stories perhaps the most perfect is "The Neighbors" (1837). "The Diary," "The President's Daughters," "Brothers and Sisters," and "Strife and Peace, or Scenes in Dalecarlia," are only less popular. She died in Arsta, Dec. 31, 1865.

Bremerhaven (brā'mer-häf-en), the port of Bremen, Germany, on the E. shore of the Weser estuary, nearly 10 miles from the open sea, and 39 N. N. W. of Bremen. It

was founded by Bremen, in 1827, on ground acquired from Hanover, and rapidly became a thriving place. A second dock was opened in 1866, a third in 1874; and in 1888 a great port, with docks, was undertaken at Nordenham, on the opposite bank. Bremerhaven was the scene, in 1875, of a dynamite explosion on board a mail steamship, by which 60 persons were killed. The Geeste separates Bremerhaven from Geestemünde. Pop. (1900) 20,322.

Brendan, St., of Clonfert, Ireland, born at Tralee in 484, studied under St. Jarlath of Tuam, and was ordained by Bishop Erc. His name is memorable chiefly for his voyages in search of "the mysterious land far from human ken." After seven years' fruitless wandering he returned, but once more, in a ship of wood instead of hides, set sail with 60 friends, and at length, after many wanderings, reached "that paradise amid the waves of the sea." Brendan founded a monastery at what is now Clonfert, and died in 577. His festival is on the 16th of May. The "Navigation of St. Brendan" was a very popular book in Western Europe as early as the 11th century.

Brenner, a mountain in the Tyrolese Alps between Innsbruck and Sterzing; height, 6,777 feet. The road from Germany to Italy, traversing this mountain, reaches the elevation of 4,658 feet, and is one of the lowest roads practicable for carriages over the main chain of the Alps. A railway through this route was opened in 1867.

Brennus, the name of two individuals known in history. (1) The first was the hero of an early Roman legend which relates to the migration of the Gauls into



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outcome of this was his work "On the History and Development of English Guilds" (London, 1870); "Die Arbeitergilden der Gegenwart" (2 vols., Leipsic, 1871-1872). He has been professor at Breslau (1873), Strasburg, Vienna, Leipsic, Munich (1891). He supports the "Socialists of the Chair" (*Kathedersozialisten*) against the German free-trade school, and has written works on wages (1877); labor in relation to land (1877), and compulsory insurance for workmen (1881), on the English Chartists, on the Christian Socialist movement in England, and numerous polemical pamphlets.

Brentford, county town of Middlesex, England, 7 miles W. of London; with saw mills, pottery works, foundries, etc. Here Edmund Ironside defeated Canute in 1016; and Prince Rupert, Colonel Hollis, in 1642. Pop. (1901) 15,171.

Brent Goose (*anser brenta* or *bernicla*), a wild goose, smaller than the common barnacle goose and of much darker plumage, remarkable for length of wing and extent of migratory power, being a winter bird of passage in France, Germany, Holland, Great Britain, the United States, Canada, etc. It breeds in high northern latitudes; it feeds on drifting seaweeds and saline plants, and is considered the most delicate for the table of all the goose tribe.

Brescia (Latin, Brixia), a city of Lombardy, North Italy; 40 miles N. W. of Verona, and about the same distance N. E. of Lodi; on a beautiful plain on the banks of the Mella and Garza rivers; is the capital of the province of the same name. It is a handsome and flourishing city, of a square form, about 4 miles in circuit, and surrounded by walls; its streets are spacious, and its public buildings numerous, particularly its churches, which are further remarkable for the number and value of the paintings with which they are enriched. A few of them only, however, have much pretension to architectural beauty; among those that have are the cathedral, a handsome structure of white marble, and the Church of San Domenico. The other buildings most worthy of notice are the Palazzo della Loggia, and the Broletto. The first was intended for the palace of the municipality, or town hall; it is composed of the richest marbles. The Broletto, the ancient palace of the republic, combines the characters of fortress and town hall, and is surmounted by a great tower, whose deeply-cleft Italian battlements produce a singularly grand effect. The city contains also a lyceum, two gymnasia, an athenæum, a college, with a museum of antiquities, and a botanical garden; a public library, with 30,000 volumes; a theological seminary, a handsome theater, a corn exchange, an extensive hospital, and other educational and charitable establishments.

Breslau

Brescia is a place of considerable trade and manufacturing industry. Near it are large iron-works, and its firearms are esteemed the best that are made in Italy. It has also silk, linen, and paper factories, tan-yards, and oil mills, and is an important mart for raw silk. But it derives its greatest interest from its fine Roman remains, having been at one time the seat of a Roman colony. These first attracted attention in the 17th century; although, as far as regards inscriptions, they had been objects of especial care to the citizens of Brescia for two centuries before this period, but it was not till 1820 that any very earnest efforts were made to bring the buried remains of entire buildings to light. Since that period some remarkable discoveries have been made, embracing besides numerous statues and inscriptions the beautiful marble temple of Vespasian, and a number of noble and magnificent Corinthian columns, with numerous fragments of moldings and ornaments, some gilt, and all of great elegance. The city is of great antiquity, having been the chief town of the Cenomani, a Gallic tribe, who were conquered by the Romans. It became the seat of a Roman colony under Augustus about 15 B. C., and afterward a municipium. In the year 412 it was burned by the Goths, and was soon afterward destroyed by Attila; but was rebuilt about the year 452. It was taken by Charlemagne in 774. In 936 Otho I. of Saxony declared it a free city, and it so remained for nearly three centuries, taking an active part in the feuds of the Guelphs and Ghibellines, and ultimately put itself under the protection of Venice in 1426. In 1796 it was taken by the French, and was assigned to Austria by the general treaty signed at Vienna on June 9, 1815. In 1849 it was involved in the commotions of Continental Europe; its streets were barricaded; but the city was eventually captured by the Austrians under General Haynau. It was ceded to Sardinia by the treaty of Zürich in 1859. Pop. (1901) 70,618.

Breslau, a large city of the German empire, and the second in the Prussian dominions, being excelled in population only by the capital, Berlin; is the capital of the province of Silesia. It is situated in a spacious plain at the confluence of the Ohlau and the Oder, the latter dividing it into two main portions, which, with islands in the river, are connected by a large number of bridges. There are electric and other tramways. The public squares and buildings are handsome. The fortifications which surrounded the old or inner city have been converted into promenades, and the ditch into an ornamental sheet of water. The cathedral, built in 1148-1680, and restored in 1875, the Protestant churches of St. Elizabeth and St. Mary

Magdalene, the Rathhaus or town hall, a Gothic structure of the 14th and 15th centuries, the municipal buildings, the government buildings, the building for the provincial diet, the royal residence, court houses, exchange, and university buildings are among the most remarkable buildings. The university was founded in 1702 as a Roman Catholic university with which was combined the Protestant one at Frankfort-on-the-Oder, transferred hither in 1811; and there are now two faculties of theology, one Catholic, the other Evangelical, besides three others. The university has attached to it a museum of natural history, a cabinet of antiquities, a library of 320,000 volumes, including many old works and manuscripts, an observatory, a picture gallery, a botanic garden, etc. The number of students amounts to about 1,500. There are numerous other educational institutions, as well as hospitals and asylums. Breslau carries on an extensive trade in the products and manufactures of Silesia, principally in corn, wool, metals, glass, coals, and timber. The Oder is navigable and there is a connection with Berlin by the Oder-Spree canal. The industries comprise iron-founding, bell-founding, the manufacture of machinery, railway carriages, organs and other musical instruments, cigars, oil, spirits, etc., brewing, and glass-painting. Other manufactures are broadcloth and lace, woollen, linen and cotton fabrics, earthenware and jewelry. There are two annual wool fairs, which are largely attended, that occurring in June being the most important of its kind in Germany. The pop. in 1905 was 470,904.

Breslau was the seat of a bishopric by the year 1000; an independent duchy from 1163 to 1335. In the latter year, upon the death of its last duke, it fell to the crown of Bohemia. Finally it was ceded to Austria, after many wars and calamities, in 1527. It was conquered by Frederick II. of Prussia in 1741. It was from this time the scene of frequent warfare, being successively attacked by Austrians, French, Russians, and Prussians. It was twice occupied by the French, in 1807 and 1813. Its fortifications were destroyed by Napoleon in 1807; it finally remained in the hands of Prussia.

Brest, a seaport in the N. W. of France, Department of Finisterre. It has one of the best harbors in France, and is the chief station of the French marine, having safe roads capable of containing 500 men-of-war in from 8 to 15 fathoms at low water. The entrance is narrow and rocky, and the coast on both sides is well fortified. The design to make it a naval arsenal originated with Richelieu, and was carried out by Duquesne and Vauban in the reign of Louis XIV., with the result that the town was

made almost impregnable. Brest stands on the summit and sides of a projecting ridge, many of the streets being exceedingly steep. Several of the docks have been cut in the solid rock, and a breakwater extends far into the roadstead. The manufactures of Brest are inconsiderable, but it has an extensive trade in cereals, wine, brandy, sardines, mackerel, and colonial goods. It is connected with the United States by a cable terminating near Duxbury, Mass. The English and Dutch were repulsed at Brest in 1694. In 1794 it was blockaded by Howe, who won a great victory off the coast over the French fleet. Pop. (1906) 85,294.

Brest Litovsk (Polish BRZESC), a strongly fortified town of the Province of Grodno (Russian Poland), on the Bug; commands the intersection of several important railways, being 132 miles E. S. E. of Warsaw, and 682 miles W. S. W. of Moscow. It has vast magazines and military stores, and an extensive trade in its cloth manufactures, Russian leather, soap, and wood. Once the occasional residence of the Kings of Poland, it is now the seat of a Greek and an Armenian Catholic bishop. It fell to Russia in 1795. Pop. (1897) 46,542.

Bretagne (bret'än), or **Brittany**, one of the Provinces into which France was divided. It now forms the Departments of Finistère, Côtes-du-Nord, Morbihan, and Loire-Inférieure. In ancient times, under the name of Armorica, it was the central seat of the confederated Armorican tribes, who were of Celtic and Kymric origin. Traces of them still remain in the old Kymric dialect of the three most westerly Departments, and in the numerous so-called Druidical monuments. The Breton has generally a tinge of melancholy in his disposition; but often conceals, under a dull and indifferent exterior, lively imagination and strong feelings. The greater number of the people are found to be ignorant and coarse in their manners, and their agriculture is of a very rude character, by no means calculated to develop the natural resources of the country. Apart from the beauty of its scenery, Bretagne possesses great interest, as the only place where men can be seen living and acting much as our forefathers did three centuries ago. Under the Romans, the country, after 58 B. C., was made the *Provincia Lugdunensis Tertia*; but its subjugation was hardly more than nominal, and it was entirely liberated in the 4th century, when it was divided into several allied republican States, which, afterward, were changed into petty monarchies. Bretagne became subject to the Franks in the reign of Charlemagne, and was handed over by Charles the Simple to the Northmen in 912. After some fierce struggles, the

Bretons appear to have at length acknowledged the suzerainty of the Norman dukes. Geoffroi, Count of Rennes, was the first to assume the title of Duke of Bretagne in 992. The Duchy of Bretagne was incorporated with France in 1532, by Francis I., to whom it had come by marriage, and subsequently shared in the general fortunes of the Empire, but retained a local parliament until the outbreak of the Revolution. During the Revolution Bretagne, which was intensely loyal, was the arena of sanguinary conflicts, and especially of the movements of the Chouans, who reappeared as recently as 1832.

Brethren. See BROTHERHOODS.

Brethren and Sisters of the Community, a name given to the laxer of the Franciscan sect, as distinguished from the Brethren of the Observation, who were the stricter Franciscans.

Brethren of the Free Spirit, a sect which first attracted notice in the 11th century. By Mosheim it is identified with the Paulicians and the Albigenses, the Beghardæ, the Beghinæ, the Adamites, and Picards. In the 13th century they spread themselves over Italy, France and Germany. They are alleged to have derived their name from Rom. viii: 2-14, and to have professed to be free from the law. They are charged with going to prayer and worship in a state of nudity, and were treated with great severity both by the Inquisition and by the Hussites.

Brethren of the Holy Trinity, a fraternity of monks who lived in the 13th century.

Brethren of the Sack, a fraternity of monks who lived in the 13th century.

Brethren of the Strict Observance, the stricter Franciscans, or Regular Observantines.

Bretigny (bre-tên-yê), a village of France, in the Department of Eure-et-Loire. By the treaty of Bretigny, May 8, 1360, between Edward III. of England and John II. of France, the latter, who had been taken prisoner at Poitiers, recovered his liberty on a ransom of 3,000,000 crowns, while Edward renounced his claim to the crown of France, and relinquished Anjou and Maine, and the greater part of Normandy, in return for Aquitaine, Gascony, Poitou, Saintonge, Périgord, Limousin, etc.

Breton, Jules Adolphe (brā-tôn'), a French painter, born in Courrières in 1827; was educated at St. Omer and at Douai, and trained as a painter under Félix Devigne at Ghent, and in Drölling's atelier at Paris. The subjects of his earlier pictures, such as "Misère de Désespoir" (1849), are taken from the French revolutionary period; but he soon turned to the

scenes from peasant life which he has treated in a most poetic and suggestive manner, with an admirable union of style with realism. In 1853 he exhibited "Le Retour des Moissonneurs," and in 1855 his celebrated "Les Glaneuses." He is represented in the Luxembourg by "La Bénédiction des Blés" (1857), admirable for its rendering of sunlight; "Le Rappel des Glaneuses" (1859); and "Le Soir" (1861). His later works are simpler in their component parts and larger in the scale of their figures, and of these "La Fontaine" is a typical example. Breton is also known as a poet. His brother and pupil, ÉMILE ADÉLARD BRETON, was a noted landscape painter. Jules Breton died in Paris, July 5, 1906.



JULES BRETON.

Breton de los Herreros, Don Manuel (ar-rā'ros), a Spanish dramatist, born in the Province of Logroño in 1800. He was the most notable Spanish poet of the first half of the 19th century. He gave to the Spanish stage 150 plays, some of them original, others derived from ancient Spanish sources or translated from French or Italian. In him the old French comedy finds not so much an imitator as its last true representative. Among his best original comedies are "I'm Going Back to Madrid," "Here I Am in Madrid," "This World is All a Farce," "Die Once and You'll See." He was less successful in the historic drama than in comedy. He died in 1873.

Brets, Brettys, or Brits, Britons, the name given to the Welsh, or ancient Britons, in general; also, to those of Strathclyde, as distinguished from the Scots and Picts.

Bretschneider, Heinrich Gottfried von (bret'shnī-der), a German satirist, of unsettled life and eccentric habits; born in Gera in 1739; from the Moravian Institute at Elbersdorf passed to the Gymnasium at Gera, and at 17 entered the army. In 1778 he became Librarian to the University of Ofen (Buda), and in 1782 Joseph II. gave him a government appointment. Of his numerous works, including plays and poems, the chief are his satires, "Almanach der Heiligen auf 1788," and "Walters Leben und Sitten" (1793). He died in 1810.

Bretschneider, Karl Gottlieb, a distinguished German theologian, born in Gersdorf, Saxony, Feb. 11, 1776; studied theology at Leipsic, was appointed pastor at Schneeberg in 1807, general superintendent at Gotha in 1816, and afterward Councilor of the Upper Consistory there. Bretschneider established a reputation as a sound and judicious thinker of rationalistic bias, and his theological writings are admitted to have a permanent value. In 1820 appeared his "Probabilia de Evangelii et Epistolarum Johannis Apostoli Indole et Origine," an attack upon the Johannine authorship from internal evidence, and in 1824, his "Lexicon Manuale Græco-Latinum in Libros Novi Testamenti." Another work of importance is his "Handbuch der Dogmatik" (4th ed. 1838). Besides these, Bretschneider wrote on various theological questions and controversies. He died in Gotha, Jan. 22, 1848.

Bretten, a town of Baden, Germany, the birthplace of Melancthon, 16 miles E. N. E. of Karlsruhe by rail. The house in which the Reformer was born belongs now to a foundation bearing his name for the support of poor students, established in 1861. A monument was erected in 1867.

Bretts and Scots, the Laws of the (Latin, *Leges inter Brettos et Scotos*), the name given in the 13th century to a code of laws in use among the Celtic tribes in Scotland.

Bretwalda, a title assigned by the Saxon chronicle to those kings of the Heptarchy who extended their government over the entire nation. The following are mentioned by Bede, but Hallam and other historians doubt whether any sovereign in those early times possessed such authority: A. D. 492, Ella, King of Sussex; 571, Ceawlin, King of Wessex; 594, Ethelbert, King of Kent; 615, Redwald, King of the West Angles; 623, Edwin, King of Deira; 634, Oswald, King of Bernicia; 643, Oswy, King of Bernicia.

Breughel (broi'gel), the name of a celebrated Dutch family of painters, the first of whom adopted this name from a village not far from Breda. This was PIETER BREUGHEL (16th century), also called, from the character and subject of most of his representations, the Droll, or the Peasants' Breughel. He left two sons—PIETER and JAN. The former (1565-1625) is commonly known as the YOUNGER BREUGHEL, though he also obtained the name of Hell Breughel, from the many scenes painted by him in which devils and witches appear. His "Orpheus Playing on His Lyre Before the Infernal Deities," and "Temptation of St. Anthony," are especially noteworthy in the history of grotesque art. The former picture hangs in the gallery of Florence. The second brother, JAN (1568-1625), known as VEL-

VET BREUGHEL, or Flower Breughel, was distinguished for his landscapes and small figures. He also painted in coöperation with other masters, his "Four Elements" and other pictures being the joint work of Rubens and himself. Later members of this family are AMBROSE, Director of the Antwerp Academy of Painting between 1635 and 1670; ABRAHAM, who for a time resided in Italy, and died in 1690; the brother of the latter, JOHN BAPTIST, who died in Rome; and Abraham's son, CASPAR BREUGHEL, known as a painter of flowers and fruits.

Breve, in music, a note or character of time, equal to two semibreves or four minims. It was formerly square in shape, but is now oval. It is the longest note in music.

Brewer, David Josiah, an American jurist, born in Smyrna, Asia Minor, June 20, 1837; graduated at Yale College, 1856. He studied law in the office of his uncle, David Dudley Field, and was admitted to the bar in New York city in 1858. Removing to Kansas, he became prominent in his profession. He was judge of the Supreme Court of Kansas, 1870-1881, and was appointed United States Judge for the 8th Circuit in 1884. He rendered a memorable decision on the Kansas Prohibition Law, affirming the right of liquor manufacturers to compensation, for which he was severely criticised by the Prohibitionists. President Harrison elevated him to the Supreme Court of the United States in 1889. He was made a member of the Venezuelan Commission in 1896, and was chosen its chairman. He died March 28, 1910.

Brewer, Thomas Mayo, an American ornithologist, born in Boston, Mass., Nov. 21, 1814; was graduated at Harvard College in 1835. He was editor of the Boston "Atlas" in 1840. He edited Wilson's "Ornithology" and "Birds of North America," and, in conjunction with Baird and Ridgeway, wrote "A History of North American Birds." He died in Boston, Mass., Jan. 23, 1880.

Brewer, William Henry, an American scientist, born in Poughkeepsie, N. Y., Sept. 14, 1828. He was graduated at Yale Scientific School in 1852. He has made important government surveys, and since 1864 has been Professor of Agriculture at Sheffield Scientific School (Yale). He has published "Botany of California" and other similar works. He died Nov. 2, 1910.

Brewing, the operation by which beer is made, including under this term all kinds of liquors produced from grain by fermentation. The name beer, may be given to any drink produced by the fermentation of a fluid consisting of water sweetened with honey, sugar, or molasses; but, strictly speaking, the term should only be applied to beverages prepared, either wholly or

partially, from malted grain by fermentation. Wine on the other hand, is obtained by the fermentation of the saccharine juice of fruits, while spirits are produced by distilling some fermented liquor. The grain chiefly used for the purpose of making beer is barley (*Hordeum distichum*), which, after it has passed through the process known as malting, is the necessary basis of almost all malt liquors. Malted wheat is also used to a very limited extent in the preparation of the German Weizenbier.

The barley best adapted for brewing purposes should be grown on a light calcareous soil or on a rich loam; heavy clay soils are most unsuitable. The quality of barley also depends largely on the climatic conditions, on the season, and on the care taken in manuring, harvesting, and stacking the grain. The barley corn should be plump, and should possess a thin, bright, clean, and slightly wrinkled husk; while the body of the corn should be floury and should possess an uninjured germ. Hard and flinty barley can never yield a satisfactory malt, and barley which has become discolored by over-exposure to rain and heating in the stack should also be avoided for brewing purposes.

In order to prepare the barley for its use in brewing it is malted, *i. e.*, subjected to the process of germination or growing, by means of which certain *enzymes* (unorganized ferments) are produced, and by the agency of one or more of those ferments, the barley starch is so modified as to be readily converted at a later stage into less complex carbohydrates. The first operation in malting is to plunge the barley or other grain to be malted into a large cistern containing water enough to cover the whole mass. Here it is allowed to steep for a time, usually from two to four days. When the grain is sufficiently steeped the water is let off, and the grain thrown out of the cistern and piled in a heap, or, as it is technically called, a *couch*. After a few hours the bottom and inner part of the heap begins to grow warm, and the radicle or root of what would be the future plant to make its appearance. The germination thus commenced would go on rapidly but for the maltster, who, with a view of making all the grains grow alike, checks the growth of such as are in the middle of the heap by turning them to the outside, and vice versa. Thus the grain is turned backward and forward for from 7 to 10 days, at the end of which period the *acrospire*, as it is called, that is, the incipient stem of the plant, has nearly reached the end of the grain. The green malt is then transferred to a kiln, where, by means of a gradually increasing heat, it is dried and cured, at a higher or lower temperature according to the character of the beer to be brewed from it. On the character of the

malt thus produced much of the success of the later processes in brewing depends; to quote a common German saying, "the beer is made on the kiln." The malt thus made is ground, or rather crushed, and is then ready for brewing.

The first step in brewing is called mashing. It consists in stirring up the crushed malt with a quantity of hot water, when the diastatic enzymes produced by mashing attack the starch and convert it, by a process of hydrolysis, into a number of simpler carbohydrates, of which maltose and the dextrines are the chief members. The sweet liquid (wort) thus produced is drained off, leaving the husk (grains or draff) and certain albuminoids which have been rendered insoluble during the mashing process behind. The wort is then boiled for some time with the addition of some hops. Hops are the female flowers or catkins of a plant (*Humulus lupulus*) belonging to the natural order *Urticaceæ* (the nettle family). The hop plant springs up from the old roots in April, flowers in the end of June, and ripens in the end of August or beginning of September, when the flowers are gathered and dried. The best hop-growing districts in Great Britain are Kent and Sussex; and very fine hops are also grown in Bavaria, Bohemia, and many other parts of the Continent, and in America. The object of boiling the wort is, in the first place, to destroy the diastatic enzymes; further, a large proportion of the nitrogenous matter is rendered insoluble, the aromatic and bitter principles of the hops are extracted and give flavor to the liquor, and all organisms are destroyed. The boiled wort is then strained off from the hop leaves, cooled to a suitable temperature, run into large vats, and fermented by the aid of yeast. During fermentation a large proportion of the sugar of the wort is converted into alcohol and carbonic acid, and the yeast reproduces itself and is collected for future use. After a longer or shorter period of time the liquor (beer) is run off into casks or vats, where, aided in most cases by the addition of a small quantity of dry hops, it passes through a slow secondary fermentation and becomes fit for consumption.

Such in brief is the process of brewing, whether the product is to be beer, or ale, or porter. But the reader will be better able to understand how it is carried on in practice at the present day by consulting the accompanying illustration and by studying this description where A is the boiler and B the engine which are to drive the malt mill and malt elevator, the mashing machine, etc., C C is the malt store containing malt, partly loose in bins, partly in sacks. From the malt store the malt can be wheeled and emptied into the hopper F of the malt mill E. Before being

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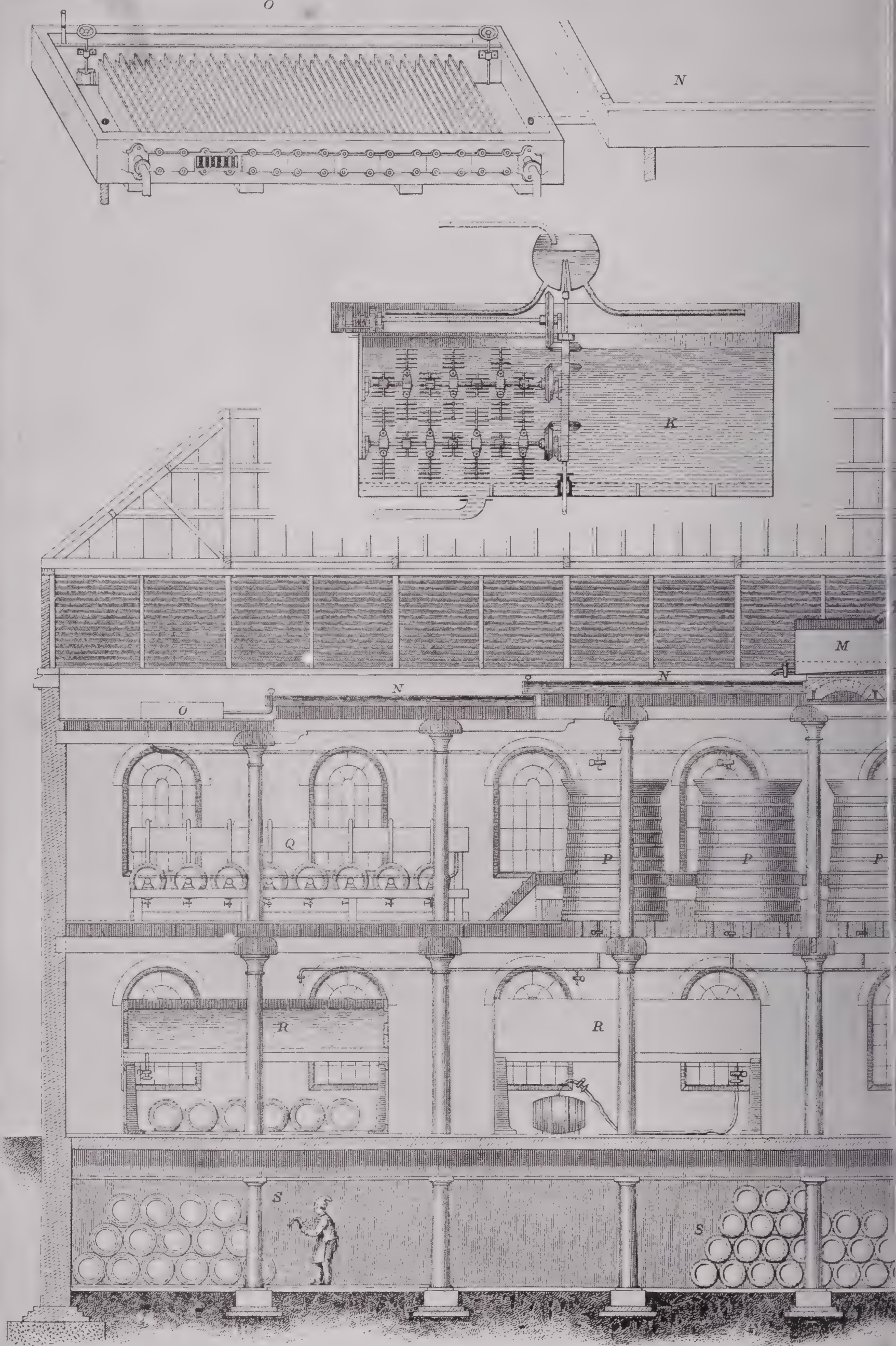
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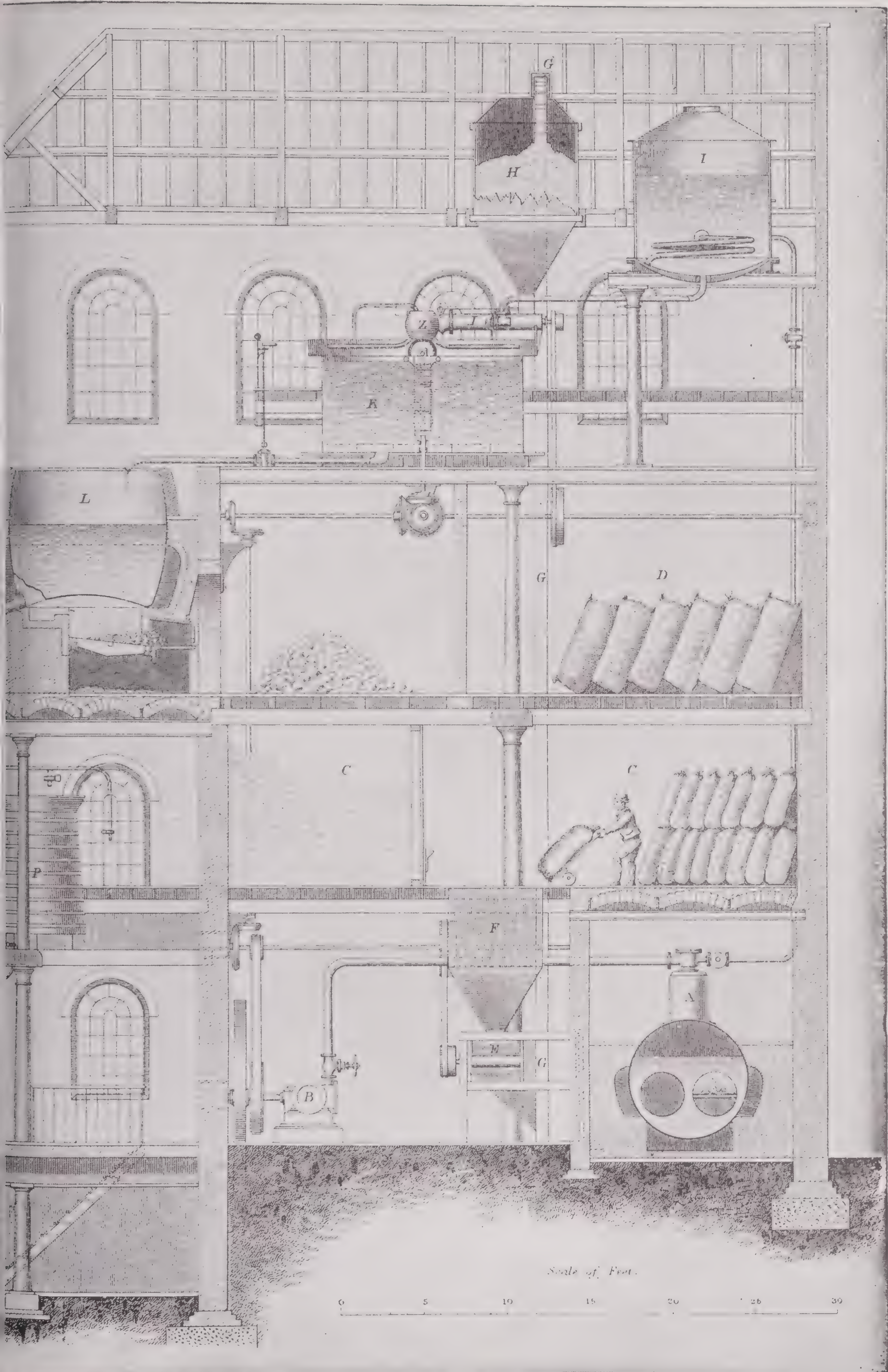
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crushed by the two rollers of the malt mill, the malt undergoes a thorough sifting in a sifting apparatus situated below the hopper so as to free it from extraneous matters, as also from the comings or dried rootlets of the malt. The sifting is accomplished by an upper sieve of a coarse mesh which allows the malt to pass through but retains the larger objects, while a lower sieve keeps back the malt but allows sand, comings, etc., to escape. On being crushed by the mill the malt slides down an inclined plane into the little buckets or boxes attached to the endless belt of the malt elevators which carries it up and empties it into the ground grist hopper H, at the very top of the building and placed over or commanding the mash-tun. It is probably better for the mill to command the grist hopper so that the ground malt falls directly into it.

The hot-water copper I is a cylindrical vessel of copper for heating the brewing water, which is pumped from the well into it. The water is heated by means of a steam coil in the inside of the copper, and by a steam-jacketed bottom. It is generally heated up to boiling-point and then cooled down to about 160° F. previous to mashing. The mashing machine J is a cylinder generally made of copper about 4 to 5 feet long and 16 to 18 inches diameter, having the one end open and the other closed. It is fitted with a spindle running through its whole length, having spokes inserted at right angles all along it, which are made to revolve at a considerable speed by means of a pulley on the end of the shaft which passes through the closed end of the cylinder. The ground malt is admitted on the top side near to the closed end by means of a sluice, and the hot water by the side just under the sluice, and by the time the mixture flows to the open end the ingredients are thoroughly broken up and intermingled. The mashing machine is fixed in a nearly horizontal position, on a level with, and the open end resting on, the top edge of the mash-tun. The mash-tun (K, shown both in position and separately on a larger scale) is a cylindrical vessel of iron about 12 feet in diameter and 6 feet deep, having a false bottom of perforated plates held about an inch from the true bottom, which has three pipes let into it so as to drain it, each with a stop-cock. These generally run into one, which passes on to the copper. It is in the mash-tun that the useful elements are produced from the malt by means of hot water, thus yielding the sweet liquor known as wort. In the mash-tun is an elaborate apparatus for stirring and properly mingling the malt with the water. A shaft passes through the bottom and up the center of the mash-tun, which has two horizontal shafts in gearing with

it. These have forked arms fastened on them at intervals and are also carried round the mash-tun by means of a small shaft in gearing with the central upright one and a toothed way on the edge of the mash-tun. When the rakes are working, the horizontal shafts revolve on their own center, and at the same time travel slowly round the mash-tun, thus ensuring the perfect mixture and uniform heat of the mash. Mashing is carried out after this fashion: The belt is put upon the mashing machine pulley and the machine thus set going. Hot water is run through the mashing machine till the false bottom of the mash-tun is just covered, and then the malt is cautiously admitted till the mixture of water and grist has the consistency and appearance of porridge, the heat of the water being watched by means of a thermometer, and tempered by means of a cold-water pipe. After all the grist is run into the mash-tun the rakes are set going and usually made to travel three or four times round the tun. The mash-tun is then covered up and allowed to stand for about three hours, after which time the taps under the tun are gently opened and the wort or extract of the malt run off into the copper L. As soon as the taps are opened, the sparger Z (shown best in the large figure K) is set going. It is a round copper vessel balanced on a spindle above the center of the mash-tun, and has two arms branching from the under side to nearly the side of the mash-tun. These arms are perforated with rows of holes along the one side in each arm, so that on water being let into the sparger the jets cause it to revolve on the Barker's mill principle, at the same time regularly sprinkling the surface of the mash with the water at the desired temperature, which percolates through the whole and absorbs the extract as it passes. This is continued till sufficient water has been run on to produce a wort of proper strength, and remove all the available extract from the malt. When the wort is all drained into the copper the hops are now added and the whole boiled for about two hours. (It generally happens that one copperful does not boil all the wort run off the mash-tun, in which case the remainder must be boiled separately and mixed afterward.) When sufficiently boiled the contents of the copper are run into the hop-back, M, a rectangular vessel say 25 feet long, 6 feet broad, and 3 feet deep, which has a false bottom about 8 or 9 inches from the true bottom. The hot wort runs through the perforations in the false bottom and thence into the cooler N, leaving the spent hops in the hop-back. The cooler is a large flat vessel 25 feet square and only 8 inches deep; here the worts are exposed to the air for a certain time. Fanners were much used in coolers long ago, but never now if

the brewer can manage without them, as the less exposure cooled worts have to atmospheric air the better. From the cooler the liquor is admitted to the refrigerator o (shown in position and separately on a larger scale), a shallow rectangular vessel, 10 feet by 6, and constructed of numerous tinned copper pipes through which cold water is made to pass. The hot worts flow from end to end, passing alternately over and under the tubes, which reduces the temperature to almost that of the cold water. A temperature of about 58° is generally what is aimed at. The worts on leaving the refrigerator are led by pipes down into the fermenting tuns p, which are large vessels made of wood. There the yeast or barm is added as soon as the wort begins to run in from the refrigerator, and in these vats or tuns the fermentation is carried on. During the operation the temperature rises considerably, and requires to be kept in check by means of a coil of copper piping having cold water running through it, lowered into the beer. The temperature should not rise above 72°.

It is at this stage that the difference of the Scotch system of brewing from the English begins. In England the worts are only kept in the fermenting tuns for about 30 hours, and are then pumped into a series of casks called unions q, in which the fermentation is finished. In Scotland the fermentation is carried on and completed in the fermenting tuns. The unions are casks suspended on pivots or trunnions by the ends in a double row of perhaps 20 or 30, having a long trough supported above and between the rows of casks, and connected by means of short pipes from the bottom with the top side of each cask. The casks are also fitted with a U-shaped pipe having one arm much longer than the other, the long end being inserted in the bung-hole, the other and shorter end over the side and into the trough above. These are called swan necks. In filling the unions the beer is pumped into the trough, runs down by the short tubes into the casks (the displaced air escaping by the swan necks), and eventually fills all the casks and an inch or so of the trough. The fermentation soon makes itself evident by the barm rising up and flowing into the trough by the swan neck, while the cask is kept filled up from the trough. This goes on for some days till the barm or yeast has finished its work, when the beer becomes comparatively clear. The casks are then emptied by means of stop-cocks in their lower sides into a trough, and from that by pipes into the settling squares r, which are rectangular wooden tanks, being somewhat shallow and fitted with cold-water pipes so as to cool down the beer. Here the yeast separates, some rising to the top and the rest falling to the bottom. In two or three days the

beer should become nearly bright, when it is carefully run off by means of a pipe and filled into the trade casks or pumped into vats.

Of the beers manufactured from grain there are a great many varieties. These have sometimes been all classified under the three heads of beer, ale, and porter, but at the present day this classification will not hold, as beer, besides being the general name for all malt liquors, is often applied as the designation of beverages which at other times are called ale. Thus the bitter beer, now so largely drunk, is also known as pale or bitter ale, and this is a very different kind of beverage from the ale known as Scotch ale, which is sweet and not bitter, containing a comparatively small quantity of hops. The terms ale and beer both belong to the early or Anglo-Saxon period of the English language, but in more modern times the term beer seems to have been applied more especially to malt liquor flavored with hops or other bitters, the use of hops being introduced from Germany about 1524.

The term ale is generally applied to beverages (whether bitter, sweet, or mild, that is, between the two) that are not intended for immediate consumption, but to be kept for a longer or shorter period. The malt for such liquors must be dried very carefully and slowly so as to be of a pale color; and the heat of the water, when poured on the mash, must be tolerably high. Great care is taken in the selection of the materials and in the whole process of brewing when a high-class pale ale is intended to be produced, such as that manufactured in the great Burton breweries. The excellence of the Burton ale depends partly on the water used, which is all drawn from wells, and contains carbonates and sulphates of lime and magnesia in large quantities, and partly on the method of brewing, the fermentation being carried on at a low temperature, and the delicate flavor of the hops thus preserved, and the keeping quality of the beer secured. The bitter beer made for home consumption is less bitter than that which is sent abroad, at least as brewed by the best brewers; but a good part of the beer sold under this name is of poor quality and would have little flavor were it not for the hops.

Porter and stout are dark in color, and are produced by the use of a large proportion of highly dried malt along with a certain proportion of chocolate malt. The mashing heats used are much lower than in the case of pale ales, and a smaller proportion of hops is added, but otherwise the process of manufacture is much the same. In the case of stouts, they are allowed to mature by going through a long, slow, secondary fermentation in large vats so as to produce the characteristic flavor of this class of malt liquor. London and Dublin are

both renowned for the quality of the stouts they produce.

German Beer or Lagerbier.—The latter name is really inaccurate when applied to all classes of German beer, for in Germany and Austria the same difference is made between draught beer (Schenkbier) and stored beer (Lagerbier) as elsewhere. In the preparation of the malt for the different classes of beers very much the same procedure is followed as already described, with this exception, that, whereas in all kilns in the United Kingdom the furnace gases are allowed to pass through the malt during the drying process, in German kilns only heated air is employed. This, as may readily be supposed, has a great influence on the character of the resultant beer. The beers brewed in Germany and Austria may be roughly divided into three classes: (1) Beers of the Pilsener type—so called from Pilsen in Bohemia, where the original beer was and is brewed—which are pale, dry beers possessing a vinous flavor. (2) Bavarian beers, dark in color and full and sweet in flavor, of which class the Munich beers are the most famous. (3) Vienna beers, which stand midway between the two previous types. The processes in brewing those different beers are, however, so much alike that they may be treated as one.

The first great difference between German and English methods of brewing is met with in the mashing process. In Germany the ground malt is run into the mash-tun along with cold water, and the two are thoroughly mixed in the usual way. After this, portions (usually two or three) of the mash are successively run into a copper and are slowly heated to boiling, whereupon they are returned to the remainder of the mash in the tun, thereby raising the whole more or less rapidly to the desired mashing temperature. After standing for some time the wort is drained off in the usual way and boiled with hops, of which a much smaller quantity is employed than in the case of British beer. The hot wort is cooled down to about 41° F. and fermented at 41°–50° F. in fermenting rooms, which are kept cool by means of cold brine circulated through pipes fixed to the roof. The fermentation is usually finished in 8 to 10 days, when the beer is run off into large store casks, which are kept in cellars cooled to the freezing point by means of brine pipes. Here the beer lies for weeks or months passing through a very slow fermentation, during which it becomes quite clear and absorbs a large quantity of carbonic acid gas. It is then run into the trade casks or is bottled for use. The yeast used in producing lager beer is what is technically known as “bottom yeast”—*i. e.* at the end of the primary fermentation it is found in a compact layer at the bottom of the tun after the beer has been run off—in contradistinction to the “top yeast” of

British beers, which rises as a thick scum to the surface of the fermenting wort.

Malt Substitutes.—Instead of using only malt in the preparation of beer it may be partly replaced by other forms of starch in the mash-tun or by various sugars in the wort copper. Rice and maize are much used, either prepared so that they may be at once added to the mash, or raw, when their starch must be gelatinized by heat before use. Barley and even oat starch may also be used.

Hop substitutes are not used by any firm with any reputation to lose. There is no substance known which can replace hops in all their functions.

Brewster, Benjamin Harris, an American lawyer, born in Salem Co., N. J., Oct. 13, 1816. He was graduated at Princeton in 1834, was admitted to the Philadelphia bar in 1838, and in 1881 became Attorney-General of the United States in President Arthur's cabinet, in which capacity he prosecuted the Star Route cases. He died in Philadelphia, Pa., April 4, 1888.

Brewster, Sir David, a Scotch natural philosopher, born in Jedburgh in 1781. He was educated for the Church of Scotland. In 1808 he undertook the editorship of the “Edinburgh Encyclopædia,” which was not finished till 1829. In 1815 he received the Copley medal for his paper on the “Polarization of Light by Reflection,” and in the following year, for his discoveries in physics, received from the Institute of France 1,500 francs. In 1816 he invented the kaleidoscope, in 1818 received the Rumford medal of the Royal Society, and in 1830 was presented with the medal of the Royal Society for his further researches on the properties of light. In the same year, with Davy, Herschel, and Babbage, he originated the British Association, the first meeting of which was held at York, in 1831. He was knighted by William IV. In 1841 he became principal of St. Leonard's College at St. Andrew's. In 1849 he was elected President of the British Association, and the same year had the high honor of being chosen, in the place of Berzelius, one of the eight foreign Associates of the French Academy of Sciences. His discoveries in reference to the properties of light have led to great improvements in the illumination of lighthouses. Among his more popular works are a “Treatise on the Kaleidoscope,” a “Treatise on the Stereoscope,” a “Treatise on Optics,” “Letters on Natural Magic,” “The Martyrs of Science,” and “Memoirs on the Life and Writings of Sir Isaac Newton.” He died in Montrose, Scotland, Feb. 2, 1868.

Brewster, William, one of the Massachusetts Pilgrims, born in Scrooby, England, in 1560. He came of a well known family; was educated at the University of Cam-

Brian

bridge, and was for a time postmaster at Scrooby. He accepted the Separatist doctrines taught by Hooker and others, and, in consequence, had to flee to Holland, where he supported himself by printing. He was one of the leaders of those who sailed for the New World in the "Mayflower," and, as elder of the church, encouraged his fellow colonists at Plymouth both by his preaching and his example. He died in Plymouth, Mass., April 10, 1644.

Brian (surnamed BOROIMHÉ, or BORU), a famous Irish king, son of Kennedy, King of Munster. He ascended the throne of both Munsters, *i. e.*, the present counties of Tipperary and Clare, A. D. 978. His earlier exploits were against the Danes of Limerick and Waterford, but, being elated by frequent successes against these invaders, he deposed O'Maelachaghlin, the supreme king of the island, and eventually became himself monarch of Ireland. He continued for many years to rule his dominions with vigor and prosperity. Having, however, disputed with Maelmora, the King of Leinster, Maelmora revolted, and, inviting a new invasion of Danes to his assistance, brought on the battle of Clontarf, in which King Brian fell, after gaining a glorious victory over the united forces of the invaders and revolted natives, on Good Friday, 1014. He was the founder of the numerous sept of O'Brien, O or Ua being a distinctive adnomen not assumed by Irish families till after his time. This national prefix means "descendant of," or, "of the kindred of," and was originally supplied by the more ancient Mac, which means "son."

Brianchon, Charles Julien (brē-än-shôn'), a French mathematician, born in Sevres in 1785. Beside some important papers contributed to French mathematical journals, he has left small treatises on lines of the second order (1817), and the application of the theory of transversals (1818). He is best known by a theorem, the correlative of Pascal's which he published in 1806. The theorem is: If a hexagon is circumscribed to a conic, the straight lines joining the three pairs of opposite vertices are concurrent. He died in 1865.

Briar. See ROSE.

Briare (brē-är), a town of France, in the Department of Loiret, on the Loire, 25 miles S. of Montargis. The canal, to which the town is indebted for its importance, is the oldest work of the kind in France, having been begun in the reign of Henry IV., though it was not finished till 1740. It establishes, by means of its junction with the canal of Loing at Montargis, a communication between the Loire and the Seine, and conveys the various

Brick

products of the province, watered by the former, to Paris. Pop. (1901) 5,630.

Briareus, a famous giant, son of Cœlus and Terra, who had 100 hands and 50 heads, and was called by men Ægeon, and only by the gods Briareus. He assisted the giants in their war against the gods, and, according to the accounts of some, was thrown under Mt. Ætna.

Bribery, in the United States, the word applied to an attempt to corruptly influence, by means of offers of reward, the course of legislation, the result of an election, the verdict of a jury, the decision of a magistrate, etc. It is not necessary to constitute an indictable offence that the bribe be accepted. The tender of the bribe is the essence of the crime. If a bribe be offered a witness to swear falsely the crime is not bribery, but is merged into subornation of perjury. The penalty for bribery is fine or imprisonment, or both.

Brice, Calvin Stewart, an American capitalist, born in Denmark, O., Sept. 17, 1845; attended Miami University, and while there enlisted in a university company in 1861. In 1862 he resumed his studies and graduated in 1863. He practiced law in Cincinnati from 1866 to 1880, when he became interested in railroad and various other financial undertakings. He was presidential elector on the Tilden ticket in 1876 and the Cleveland ticket in 1884, and chairman of the Democratic National Committee in 1888. In 1890 he was elected United States Senator from Ohio, and served on the Appropriations, Pensions, Pacific Railroad, and Public Buildings and Grounds Committees. Shortly before his death, in New York city, Dec. 15, 1898, he formed a syndicate which secured vast railroad and mining concessions in China.

Brice, St., Bishop of Tours in the beginning of the 5th century, is commemorated as a confessor. St. Brice's Day, in 1002 (in the reign of Ethelred II.), is notorious in old English history for a great massacre of the Danes. It was believed that it was a concerted attempt to exterminate all the Danes in England; but, failing of its bloody purpose, it led to reprisals by the Danish King Sweyn.

Brick, a kind of artificial stone, made of clay, molded in prismatic form, dried in the sun and baked in a kiln. The word is also applied to the block in its previous condition as a molded plastic mass, and as a dried block in which the water hygro-metrically combined with the clay is driven off. When this condition is accepted as a finality, the block so dried is an adobe. The burning of the previously dried brick drives off the chemically combined water, and forever changes the character of the mass. An adobe may become resaturated with water,

Brick

and resume its plasticity; a brick may become rotten and disintegrated, but not plastic. There are two principal kinds of brick, building brick and fire brick, and their composition depends upon the use to which they are put; a good building brick will contain about 50 per cent. silica, 25 per cent. alumina and oxide of iron, 3 per cent. carbonate of lime, 1 per cent. carbonate of magnesium, and 21 per cent of water and other constituents; while a fire brick will contain about 59 per cent. silica, 35 per cent. alumina, 3 per cent. of oxide of iron, and only 3 per cent. of carbonate of lime, carbonate of magnesia and water, combined. Fire brick is used to line furnaces, crucibles, and in other places where a high heat is maintained; and must contain as little fusible matter as possible. Some of the best clays in the world for brick making are found in New Jersey, at Perth Amboy, Woodbridge, and Trenton, and one of the largest brick making establishments in the world is situated at Haverstraw, N. Y.; where about 2,000,000 bricks are turned out per day during the working season.

Building bricks come under various names according to the use to which they are put, or the position they occupy in a building. Some of these are: Air brick is an iron grating the size of a brick, or a perforated brick, let into a wall to allow the passage of air. Arch brick usually means the hard burned, partially vitrified brick from the arches of the brick clamp in which the fire is made and maintained. A brick made voussoir shaped is known as a compass brick. A capping brick is one for the upper course of a wall; clinker, a brick from an arch of the clamp, so named from the sharp, glassy sound when struck; a coping brick, one for a coping course on a wall; feather edged brick, of prismatic form, for arches, vaults, niches, etc.; fire brick, made of intractable material, so as to resist fusion in furnaces and kilns; hollow brick, with openings for ventilation; stocks, a name given to the best class of bricks, and also locally to peculiar varieties, as gray stocks, red stocks, etc.; pressed brick another name for that class of stock brick in which the process of manufacture has been to largely reduce the bulk of the plastic material by hydraulic pressure before burning, giving to the completed brick a smooth surface and great density of body. Pecking, place, sandal, semel brick, are local terms applied to imperfectly burned or refuse brick. Bricks vitrified by excessive heat are termed burr bricks or burrs.

Bricks were manufactured at a remote period of antiquity by the Egyptians, the Babylonians, the Assyrians, and some of them, being inscribed with written characters, have been of priceless value in conveying historic facts to the present age. About A. D. 44, bricks were made in England by

Brick-Making Machine

the Romans, and in A. D. 886 by the Anglo-Saxons under King Alfred. Under Henry VIII. and Queen Elizabeth the manufacture greatly flourished. The size was regulated by Charles I. in 1625.

The following table gives the value of the brick output in the United States in 1908:

Common brick.....	\$44,765,614
Fire brick	10,696,216
Vitrified paving brick.....	10,657,475
Front brick	6,935,600
Ornamental brick	920,418

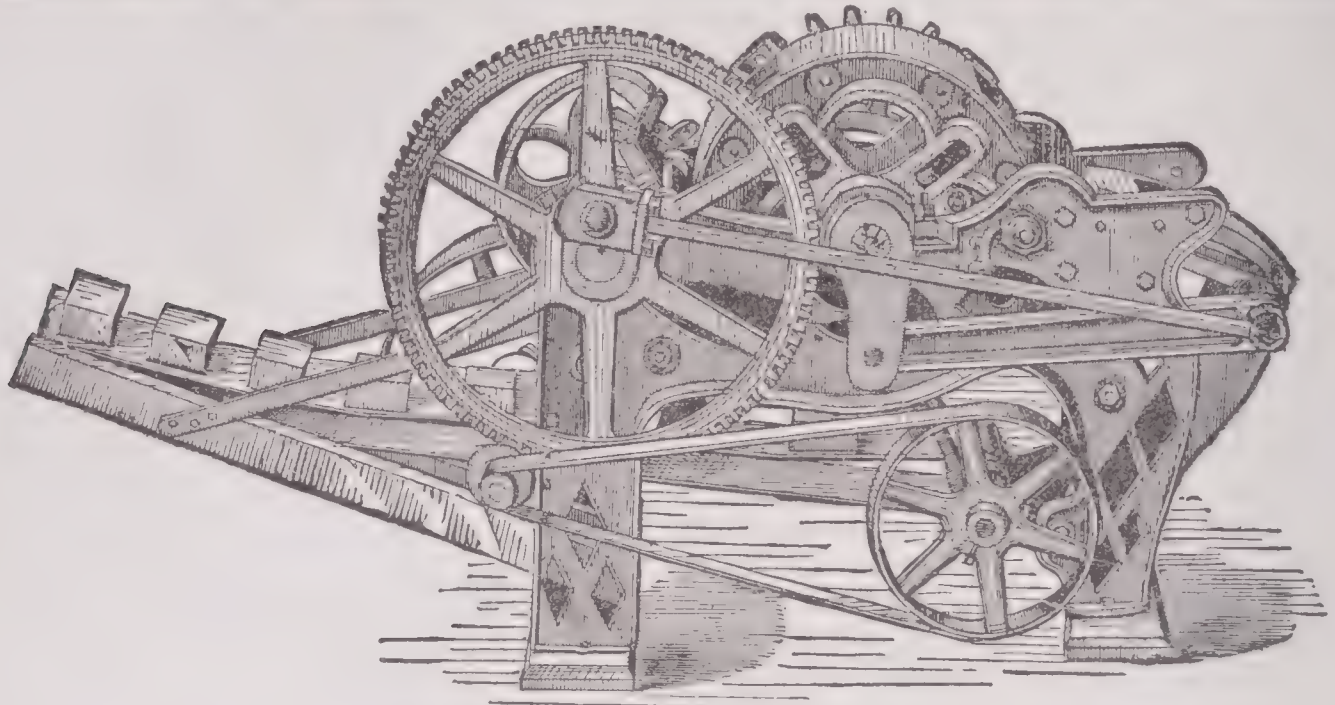
Total.....\$73,975,323

Adverse business conditions in 1908 caused a decrease in the production of common or building brick of over 20 per cent., as compared with 1907; but vitrified paving brick showed an increase of 11.63 per cent. in production. The largest producers of common brick in 1908, with values, were: New York, \$5,066,084; Illinois, \$4,834,652; Pennsylvania, \$4,539,978; of vitrified brick, Ohio, \$3,232,335; Illinois, \$1,622,496; Pennsylvania, \$1,038,254; of fire brick, Pennsylvania, \$4,252,325; Missouri, \$1,357,387; Ohio, \$1,339,810.

Brick-Making Machine, an apparatus consisting of a drum which contains four molds with movable bottoms that may be thrown out even with the circumference of the drum, or may be drawn back within the molds to a depth more than equal to the thickness of a brick. The mold bottoms have rollers on the inner sides toward the center of the drum, and, for the purpose of repressing the bricks, and forcing them out of the molds, these rollers are acted upon just at the proper time and to the proper degree by cams upon a shaft that extends through the center or axis of the drum. The shaft is given a reciprocating motion independent of the drum, by a crank fastened on one end, which is connected by a bar or lever to the plunger. The drum has an intermittent motion, and makes one-fourth of a revolution at a time. When not in motion it is held rigidly in the right position while receiving the clay pressed into the molds by the plunger repressing the bricks in the mold on the opposite side and forcing them out of the mold underneath. This motion of the drum, and holding it in position, is effected by means of two peculiarly constructed cog-wheels gearing into each other, one secured to one end of the journal on which the drum revolves, the other on the end of the main shaft. The plunger receives its motion from two connecting rods, one on each side, connecting with cranks attached to each end of the main shaft. The main shaft has also a cam in the center, which revolves against a roller in the back of the platen, and this,

at the proper time, presses the platen against the face of the mold, to prevent the escape of the clay while being repressed from the bottom of the molds.

way is known by the stress on the suspending links, the problem of statical equilibrium assumes the simplest form, and the conditions of strength and stability are



BRICK-MAKING MACHINE.

Bride, St. See BRIDGET.

Bridewell, in England a house of correction for offenders. The name is derived from the ancient London house of correction, originally a hospital founded by Edward VI. on the site of St. Bride's Well, in Blackfriars, a well known object of pilgrimage in Roman Catholic times. The original Bridewell is under the control of the Lord Mayor, and used for vagrants, etc., within the jurisdiction of the city.

Bridge (card game). See WHIST.

Bridge, a structure consisting of an arch or series of arches supporting a roadway above it, designed to unite two banks of a river or the two sides of an open space. A bridge is generally made of wood, iron, stone, steel, or of brick. The extreme supports of the arches at the two ends are called butments, or abutments; the solid parts between the arches, piers, and the fences on the sides of the road or pathway, parapets. Bridges are now of many kinds, the most usual varieties being the following:

Suspension Bridges.—These are bridges in which the roadway is suspended from chains, links, cables or ropes, passing over piers or towers, fixed or anchored at their extremities. Another line of evolution had its origin in the principle of suspension. The simplest form, if possible, is a rope, traversed by a pulley, ring, or grooved block of wood, from which a rude car is suspended, or, in some cases, only a loop, in which the passenger sits, and either works himself across with his own hands, or is drawn from side to side by a smaller line attached to the car. In the typical modern suspension bridge, when the weight of the road-

steadily determined. But when there is a shifting or rolling load on the roadway, which is heavy in proportion to the weight of the bridge, as, for example, a railway train, the conditions are involved. When the train occupies, say, only one-half of the bridge, the chain is depressed on one side, and is raised on the other side. Thus an undulation is produced in the bridge, which, especially if the train be moving rapidly, may seriously disturb the equilibrium, and even endanger the stability of the bridge. Various combinations have been devised to overcome this difficulty. The simplest and probably the best course is to stiffen the roadway, so that the stress of the passing load may be distributed over a considerable length of chain. In this manner large railway bridges have been constructed, for example, the Roebling bridge (1855) over the Niagara, $2\frac{1}{3}$ miles below the falls, having a span of 822 feet, and being 245 feet above the level of the stream.

The Brooklyn Suspension bridge, across the East river, between New York and Brooklyn, opened in 1883, is built of steel. It has a central span of $1,595\frac{1}{2}$ feet, and two land spans of 930 feet each; making, with approaches, a total length of 5,989 feet, or about one mile and one furlong. The anchorage at each end is a solid cubical structure of stone, measuring 119 feet one way, by 132 feet the other, rising to a height of 90 feet above high water mark, weighing 60,000 tons each. The towers are 278 feet high. The weight of the whole structure suspended between the towers is nearly 7,000 tons. The stress of suspension is borne by four cables of 5,296 steel wires each, $15\frac{3}{4}$ inches in diameter. The foundations of the towers were laid by means of

Bridge

caissons and compressed air, at a level of about 80 feet below high water mark. The roadway presents five parallel avenues, of an average width of 16 feet each. The two outmost avenues, 19 feet wide, are devoted to vehicles; the central avenue, 15½ feet wide, for foot passengers; and on the two intermediate avenues are laid railways for car traffic.

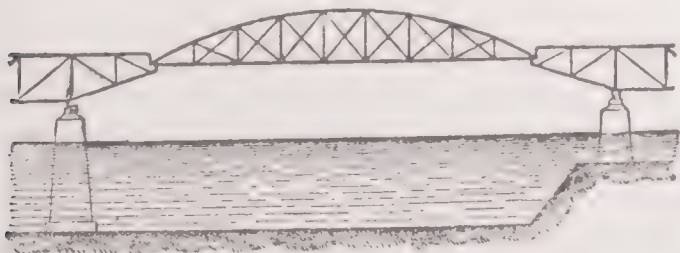
Another noteworthy suspension bridge (under construction in the summer of 1900) was one, approved by the United States War Department, to span the North river and connect New York city with Hoboken, N. J. In this bridge the towers are to be of steel 557 feet high. These will rest upon foundations of solid masonry extending 125 feet below high water. The steel framework supporting the bridge will be 200 feet high at the loftiest point. The bridge will be 125 feet wide and will be suspended from 12 steel cables. The lowest point of the flooring will be 150 feet above mean high water mark and the towers will be 3,110 feet apart, leaving the Hudson river entirely unobstructed. The principal bridges of this class are the Brooklyn and Niagara suspension in the United States, the Menai in England, and the Freiburg in Switzerland.

Cantilever Bridges.—A cantilever is a bracket. It is a structure overhung from a fixed base. The bridge across the river Forth on the North British railway system is one of the largest and most magnificent bridges in the world. The site of the bridge is at Queensferry. At this place, the estuary of the Forth is divided by



CANTILEVER BRIDGE.

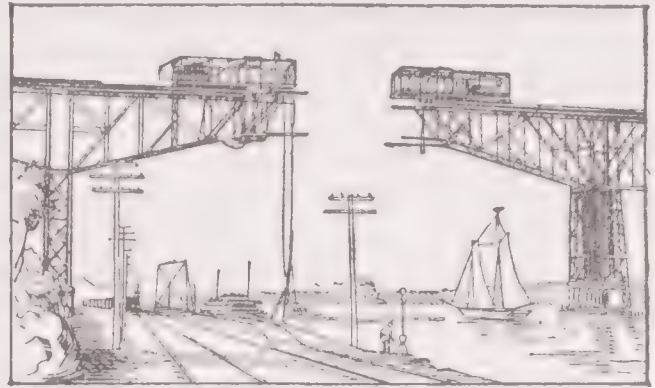
the Island of Inchgarvie into two channels, whose depth, as much as 200 feet, precluded the construction of intermediate piers. Hence, two large spans of 1,700 feet each were adopted. Between these, the central pier is founded on the island midway across, and is known as Inchgarvie pier. There are two other main piers, shore piers, known respectively as the Fife pier and the Queensferry pier. Of these three piers respectively three double lattice work cantilevers



CANTILEVER CONSTRUCTION.

Bridge

like scalebeams, 1,360 feet, or a quarter of a mile in length, are poised in line, reaching toward each other, and connected at their extremities by ordinary girders 350 feet long, by which the two main spans are completed. The bridge consists of two main spans of 1,700 feet, or nearly one-third of a mile each; two of 675 feet each, being the shore ends of the outer cantilevers; and 15 spans of 168 feet each. The total length of the viaduct, including piers, is 8,296 feet, or a little over 1½ miles, of which almost



CANTILEVER CONSTRUCTION.

exactly one mile is covered by the great cantilevers. The clear headway under the center of the bridge is 152 feet at high-water, and the highest part of the bridge is 361 feet above the same level. The bridge is taper in plan, each narrowing from a width of 120 feet, the distance apart of the lower members of each cantilever, at the pier, to a minimum of 31½ feet at the extremities of the cantilever, giving an outline, in a vertical view of it, like a truncated triangle, in order to confer a degree of stiffness laterally, for resisting irregular stresses, wind pressure in particular. The metal columns above each pier, forming the bases of the cantilever, are 12 feet in diameter. The members under compression are tubular, those in tension are of open braced forms. The wind pressure is assumed from calculation at a maximum of 56 pounds per square foot. The maximum possible stress on any member of the bridge is calculated to be at the rate of 7½ tons per square inch of sectional area, leaving a plentiful margin of strength, since the steel of which the bridge is constructed is capable of resisting a tensile stress of from 30 to 33 tons per square inch, and compression to the extent of from 34 to 37 tons per square inch. Between the two main girders a double line of railway is carried on an internal viaduct supported by trestles and cross girders. The whole of the metal work of the superstructure is of Siemens steel. The way consists of heavy bridge rails laid on longitudinal sleepers bedded in four steel troughs, into which the wheels will drop in case of derailment, when they will run on the sleepers.

In the piers there are about 120,000 cubic

Bridge

yards of masonry, and in the superstructure 44,500 tons of steel. The bent steel plates which go to make the tubes and struts, would, if placed in a line, end to end, stretch a distance of 42 miles. There are 20 acres of surface to be painted.

There are several of these bridges in the United States, the first of any size being the Niagara cantilever, built in 1883. Its total length is 910 feet, and it is 295 feet above the surface of the river, with steel towers 130 feet high. The Hudson river bridge at Poughkeepsie, built in 1889, has a length of 6,767 feet and is built in five spans; the first, third and fifth being true cantilever spans with fixed continuous spans connecting them.

The new East River bridge, in course of construction in 1901, is also a late example of the suspension bridge. The new Blackwell's Island bridge is an example of the cantilever principle. It is designed after the Forth bridge, previously described. There are four channel piers, 85 by 45 feet at the base, and 135 feet above high tide. These piers contain 810,000 cubic feet of granite. The bridge is 2 miles in length, with two channel spans of 846 feet each, and a span across Blackwell's Island of 613 feet. The distance from the floor of the bridge to the top of the girders forming the span is 100 feet, making the top of the structure 235 feet above high tide. Other notable cantilever bridges are those across the Colorado river at Red Rock, Cal., and across the Mississippi river at Memphis, Tenn.

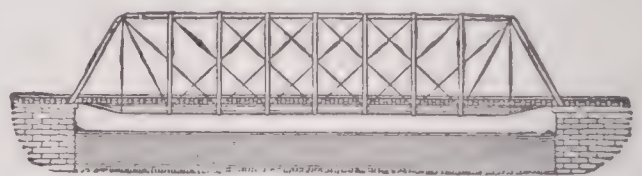
Arch Bridges.—Bridges in the shape of arches are often built in places where a more artistic structure than a truss is desired. The High Bridge and Washington Bridge across the Harlem river in New York city are examples of this style of bridge. The High Bridge was built to carry the Croton Aqueduct across the Harlem river. It consists of 13 granite arches, the highest one being 116 feet above the river. The bridge, crossing the river and valley, is 1,460 feet long. The Washington Bridge is situated a short distance N. of the High Bridge and consists of nine arches, three of granite on the E. side, four of granite on the W. and two central steel spans connecting them. The entire length of the bridge is 2,300 feet, and width, 80 feet; the central spans being each 510 feet long and 135 feet above high water. Another noted arch bridge is located at St. Louis, Mo. It has two spans of 497 feet and one of 515, with a total length, including abutments of 1,700 feet. It is a two story affair with a double railroad track below and a roadway above.

Cast-Iron Bridges.—Toward the close of the 18th century some bridges were erected the arches of which were constructed mainly of cast-iron. The first of these

Bridge

structures was the bridge over the Severn, near the town of Ironbridge, erected by Mr. Darby, of Coalbrookdale Ironworks, in 1779. The bridge consisted of a single arch, nearly semi-circular, of 100 feet span. The most celebrated bridge of cast-iron is Southwark bridge, across the Thames, designed and erected by Mr. Rennie, opened in 1824. It consists of three cast-iron arches, with stone piers and abutments. The arches are flat circular segments, the central arch having 240 feet span, with a rise of 24 feet, and springing at a level of 6 feet above high water of spring tides. The two side arches are of 210 feet span, with a rise of 18 feet 10 inches. The piers are 24 feet wide at the springings. There are eight arched ribs in the width of the bridge. The arches are 2½ inches thick, and from 8 feet deep to 6 feet deep at the crown; they are in 13 feet lengths, bolted together and joined by transverse plates of the same depth. The roadway is 42 feet wide. The weight of the central arch is 1,605 tons, and that of each side arch 1,460 tons, making a total of 4,585 tons of metal. The rise of the arch due to expansion by heat was observed to amount to 1¼ inches for 50° rise of temperature. The bridge is 718 feet long between the abutments.

American Quadrangular Girder Bridges.—One of the best examples of American long-span iron-bridge construction is the bridge across the Kentucky river on the Cincinnati Southern railroad, noteworthy for its economical design and comparatively light weight. The iron work of the bridge is 1,138 feet in length, and it consists of three spans of 375 feet each. It crosses a limestone canon at a height of 280 feet above the bed of the stream. The piers are of stone to a height of 60 feet, to clear the highest recorded floods; and they are about 34 feet thick at the flood level. Above the stonework the piers are of iron. The truss or girder is rectangular in sec-



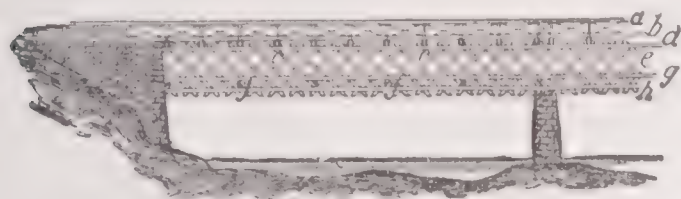
TRUSS BRIDGE.

tion, 37½ feet high, 18 feet wide, consisting of top and bottom pairs of booms, forming the corners, united by panels or frames at intervals of 18¾ feet longitudinally, stiffened and bound with diagonal tie rods. The booms each consist of flat plates placed vertically, riveted together. The piers consist of hollow pillars of plate iron riveted together in box form. The diagonal rods are pin connected, that is to say, they are connected to the framework with cylindri-

Bridge

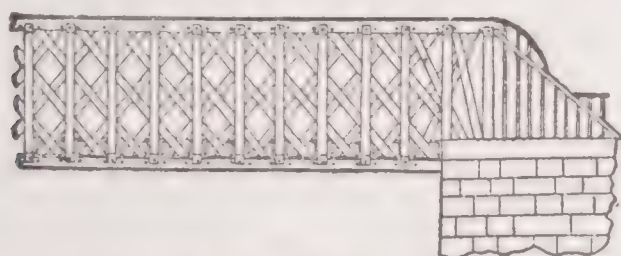
cal pins, a form of connection much practiced in the United States. The bridge was completed in February, 1877. The expansion and contraction of the bridge operate each way from the center, bending the tops of the piers correspondingly toward or from the shores; the greatest observed movement being half an inch either way. The ends of the girder rest by means of rollers on the abutments.

Lattice Girder Bridges.—The iron lattice bridge, so called from having sides constructed with cross bars, like lattice work,



LATTICE BRIDGE — SIDE ELEVATION.

is the natural outcome of the tubular bridge for long spans, developing equal strength with considerable economy of material and



LATTICE BRIDGE — DETAILS.

labor. Lattice girders are now almost universally adopted for iron bridges for long spans.

Movable Bridges.—The original movable bridges which are of any interest from an engineering standpoint are the medieval pivot or trunnion bascule bridges, which were used to span the moats surrounding fortresses or castles and which, when closed, effectually shut off communication. These bridges either revolved upon hinge pivots or trunnions in a vertical direction or were counterbalanced on the principle of the seesaw. During the first half of the century which has just closed a number of pivot bascule bridges were built, the span ranging from 20 to 50 feet. The year 1869 saw the completion at Copenhagen, Denmark, of the largest bascule bridge which had up to that time been constructed. Nine years later the honor of ranking as the largest bridge of this type passed to a structure at Rotterdam, Holland, which gave a clear channel of over 75 feet.

The development of the pivot bascule bridge led directly up to the invention of the rolling lift bridge, the latter type having been devised just as the Tower Bridge at London was nearly completed. The famous London structure was commenced in 1885 and completed in 1894. It provides a

Bridge

told, more than \$4,000,000. The advance which has been made in movable bridges of late years could not, perhaps, be better illustrated than by comparing the tower structure with a rolling lift bridge of even greater span at the entrance to the Grand Central Station at Chicago. The weight of the iron and steel in the London bridge is 14,000 tons, while that in the Chicago bridge is but 2,250 tons, and the entire cost of the latter was \$126,000, less than the cost of the operating machinery alone of the Tower Bridge.

Only three types of movable bridges have been extensively used: First, the hinged, pivot or trunnion bascule bridge; second, the rolling lift or bascule bridge, the newest type; and, third, the swing bridge, commonly denominated "drawbridge," which has been in general use for years.

The rolling lift bridges which have been constructed during the past few years in the United States constitute a distinct advance over the types of movable bridges formerly used and have aroused deep interest; and the favorable verdict upon their claims for superiority indicated by the arrangements for the installation of similar bridges abroad is particularly significant as the most distinguished European engineers have for more than a half century wrestled with the problem of highway traffic over congested waterways. The invention of the rolling lift bridge grew out of the requirements of the Metropolitan West Side Elevated railroad, which sought a way to carry the traffic of their four tracks across the Chicago river so as to enter the business center of Chicago. Various obstacles prevented the erection of a swing bridge and objections equally insurmountable precluded the possibility of operating satisfactorily a pivot bascule bridge patterned after the Tower structure in London. When it became apparent that the problem was to prove a grave one, William Scherzer set to work upon it and ultimately evolved the idea of the present rolling lift bridge.

The mode of operation of the rolling lift bridges is extremely simple. On the approach of a boat the bridge seemingly splits across the middle and each half rears itself upright on the bank on which its shore end is resting. The two great advantages claimed for the rolling bridges, aside from economic considerations, are found in the fact that since no center pier is necessary for the support of the structure the entire navigable channel is available and is unobstructed for the passage of vessels, and in the form of construction which enables the rolling lift bridge to act as a barrier when opened for the passage of vessels, thus closing the roadway and preventing the accidents which have been caused in years past by trains running into open "draws."

Bridge

Electric power is used in the operation of rolling lift bridges, but the force required is surprisingly light in view of the fact that the movable spans are perfectly counterbalanced and roll or rock with a minimum amount of friction. Trials have proved that less than 20 seconds are required for the complete operation of opening and closing the spans of one of the largest bridges. In the case of the large bridge at Boston, each double-track span is operated by means of a 50 horsepower electric motor, and the bridge is usually opened or closed in less than 30 seconds, including the time required for locking or unlocking. Moreover, the entire bridge is operated by one man.

A most interesting record is that of the Rush Street bridge, at Chicago, said to be the most active movable bridge in the world. During an average season of lake navigation comprising a little over eight months this bridge is opened between 10,000 and 11,000 times, or fully 40 times every 24 hours. Yet the power expense for the operation of this bridge by electricity does not exceed 67 cents a day. Over another rolling lift bridge in Chicago the passage of trains aggregates 1,200 daily.

A novel plan has been followed in order to make the rolling lift bridges more rapid in movement and to insure absolute safety of the working parts, even in the event of an accident to the operating machinery. The movable leaves comprising a bridge are so counterweighted that they are at rest when opened at an inclination of about 40 degrees instead of in the horizontal position which they occupy when closed. Thus, as soon as the locks are withdrawn the leaves will, without the application of any power whatever, roll back and upward and open a channel of sufficient width for the passage of vessels.

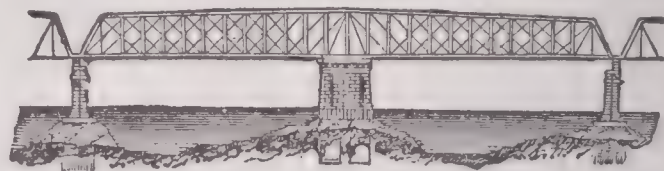
A great many movable bridges are usually required in the neighborhood of rivers, docks, wharves, canals, and like situations for the passage of ships and boats. They are variously designed and adapted to particular situations, and may be classified as (1) bascules or drawbridges, (2) swing bridges, (3) traversing bridges, (4) lift bridges, (5) pontoon bridges.

Bascules or Drawbridges.—The bascule bridge is such as is raised by turning, in one piece or in two pieces, round one or two horizontal axes or hinges. The most ancient form of the bascule was that of one flap of framed timber used to cross the moat or ditch of a fortress or castle, and capable of being drawn up by means of chains from the inside. For large dimensions it is convenient to construct the bridge in two halves, lifting from each side, and abutting together to the middle.

Swing Bridges.—Swing bridges are by far the most commonly employed of movable

Bridge

bridges. The large rivers to be crossed in the United States have demanded swing bridges of great span, with excellent contrivances for minimizing friction and insuring steadiness when closed. The swing bridge over the Raritan, in New Jersey, allows two free



PIVOT OR SWING BRIDGE.

passages, each 216 feet wide. It is what is known as a double swing bridge, the bridge being balanced on a central pivot assisted by a system of rollers, opening and closing two passages at once, and affording two passages instead of only one, as in the earlier bridges, which were generally made in two leaves to cross single passages. The Kansas City bridge crosses two passages, each 160 feet wide. The total moving weight is 303 tons. The bridge is opened by steam power in about one and a half minutes, or by manual power in two minutes. From two-thirds to three-fourths of the moving weight rests on the central pivot.

Traversing Bridges.—Movable bridges, sometimes called telescope bridges, capable of being rolled horizontally backward, or in an oblique direction, are occasionally employed. The bridge across the Arun, near Arundel, on the South Coast railway, is 144 feet long. It is traversed on wheels, and acts as a sliding cantilever, the overhanging portion resting on the opposite abutment when in place.

Lift Bridges.—Of these may be named, one over the Surrey canal, lifted by the four corners; another over the Royal canal, Dublin; and one in Chicago, Ill. In the second case, a branch railway crosses the canal at an angle of 25 degrees. The bridge first made for the situation weighed 14 tons, and was balanced by a counterpoise, consisting of a tank filled with water, the counterpoise, empty, being one ton lighter than the bridge, and, when loaded with two tons of water, one ton heavier. The bridge could thus be raised and lowered with the aid of a man at a winch. The lift of the bridge was $7\frac{1}{4}$ feet, which gave a headway for barges equal to that of the adjoining stone bridge. The supply of water for working the bridge was taken from an adjacent lock. At the four corners rams worked into cylinders, which admitted water from the lock to enter through small holes and fill the cylinders as the rams were drawn up in the raising of the bridge, acting as a check in case of accident. The bridge has been reconstructed for a greater lift.

Pontoon Bridges.—Bridges of boats are made of boats laid over with planks, fast-

Bridge

ned across the stream by means of anchors or stakes. The bridge at Rouen is 300 yards long, paved with stone for the passage of carriages and horses. The so-called flying bridge is rather a ferry than a bridge of boats.

The longest floating bridge in the world, probably, is the pontoon bridge across the river Hooghly, at Calcutta, designed and constructed by Sir Bradford Leslie. The bridge is 1,530 feet long between the abutments, and is carried on 14 pairs of pontoons, which are held in position by means of chain cables, $1\frac{3}{4}$ inches thick, and anchors weighing three tons each, laid on the up stream and down stream sides, 900 feet asunder. By their great length, the cables afford the necessary spring to allow for the ordinary rise and fall of the river, the stress on each cable varying from 5 tons to 25 tons, according to the stage of the weather and of the tide, the maximum velocity of which is 6 miles an hour. The pontoons are rectangular iron boxes, having rounded bilges and wedge shaped ends. They are each of the great length of 160 feet, made of such considerable length in order to obviate pitching motion in rough weather, with a beam of 10 feet, and depth of from 8 to 11 feet, presenting a side of from $3\frac{1}{2}$ to 4 feet above the water, according to the state of the traffic. For perfect safety, each pontoon is divided by bulkheads into 11 compartments. They are made of iron plates one-fourth inch and five-sixteenths of an inch in thickness, riveted together. The platform of the bridge is supported by trestle work on the pontoons at a clear height of 27 feet above the water, a convenient height for boat navigation. The roadway platform is of 3-inch planks of teakwood from Burma, forming a roadway 48 feet wide, with a footpath at each side 7 feet wide. An opening 200 feet wide, for the passage of ships, is made by removing, when occasion requires, four of the pontoons with their superstructure, and sheering them clear of the opening. The portion so removed is in two divisions, which are separately secured, right and left, and, when in place, are connected by draw bridges with the fixed portions of the bridge. Before launching, the pontoons were ballasted sufficiently to make them float upright; and were afterward coupled in pairs by the cills of the main trusses, when the ballast was removed. The floating bridge is connected with the shore at each end by adjusting ways hinged to the shore. The ordinary time taken to open the bridge is 15 minutes and to close it, 20 minutes. It is only opened twice a week.

Military Bridges are temporary constructions to facilitate the passage of rivers by troops, to restore a broken arch, or cross a chasm of no very great width. Those

Bridge

over a river are either floating or fixed. The former are made of pontoons, boats, casks, rafts of timber, or anything that will give sufficient buoyancy, and the latter of piles, trestles, or other timber work. Spars, ropes, and planks are used in a variety of ways for spanning narrow chasms. The pontoon bridge is the only one which is carried with an army. Enough material for 100 yards of length accompanies each army corps. All military bridges have their roadway formed in the following manner: Five to nine road bearers of stout timber support chasses or flat planks 10 feet long, held in position so as to form a level surface, by two ribands placed above them and over the outer road bearers, to which they are fastened by rack lashings. The road bearers are supported by the pontoons, casks, boats, trestles, or piles, which form the piers, usually 10 to 15 feet apart, or by transoms on the ropes in the case of suspension bridges. To prevent injury to the boats, barks of timber are built up along the keel of each for the road bearers to rest upon. A saddle on pontoons and gunnels on casks answer the same purpose, and in the latter case keep the casks together by being lashed to them. The maximum loads such bridges are usually calculated to bear are, for infantry, 500 pounds per lineal foot; for cavalry, 200 pounds; for field artillery, with 2 horses per gun only, 450 pounds. Heavy guns are better warped across on specially constructed rafts. A flying bridge is a boat or raft anchored by a long cable up stream, and carried across by the action of the current acting obliquely against its side, which should be kept at about an angle of 55° with the current.

Of the rock formations called natural bridges, the most remarkable is the natural bridge over Cedar Creek, in Virginia, 125 miles W. of Richmond. The mass of siliceous limestone through which the little river passes is presumably all that remains of a once extensive stratum. The cavern or arch is 200 feet high and 60 feet wide. The solid rock walls are nearly perpendicular, and the crown of the arch is 40 feet thick.

History of Bridges.—Bridges seem to have existed in China from a period of considerable antiquity. The word bridge does not occur in the Authorized Version of the Bible. Temporary bridges, for military purposes, were constructed before permanent structures for the convenience of the inhabitants were erected. The former were often of boats. Thus, Cyrus constructed such bridges about 536 B. C., Darius Hystaspes about 490, and Xerxes about 480 B. C. Bridges of stone or brick seem to have been first used by the Romans; there were none erected in Greece till after the Roman conquest. The first Roman bridge is said to have been one spanning the Ti-

Bridge

ber, between the Janiculum and the Aventine Mountain, built by or under Ancus Martius. Now they are universal in properly civilized countries, though in countries of imperfect civilization even yet they are few. In India they are not numerous, and most of those which exist have been erected since the occupation of the country by the British.

Following is a list of the notable bridges of the world:

Pons Sublicus, across the Tiber at Rome, built 621 B. C., by Horatius Cocles.

Cæsar's bridge across the Rhine, a wooden trestle-work, built 55 B. C.

Trajan's magnificent bridge over the Danube, 4,770 feet in length, built A. D. 115.

London Bridge. One existed at the end of the 10th century; one built of wood, 1014; a stone bridge, by Peter of Colechurch, begun 1176, was finished 1209. The new London Bridge is constructed of granite, from the designs of L. Rennie; it was commenced in 1824 and completed in about seven years, at a cost of \$7,290,000.

The bridge at Burton, over the Trent, was formerly the longest bridge in England, being 1,545 feet. It is now partly removed. Built in the 12th century.

The Bridge of the Holy Trinity, at Florence, Italy, was built in 1569. It is 322 feet long, constructed of white marble, and stands unrivaled as a work of art.

The Rialto, at Venice, is said to have been built from the designs of Michael Angelo. It is a single marble arch, 98½ feet long, and was completed in 1591.

The Bridge of Sighs, at Venice, over which condemned prisoners were transported from the Hall of Judgment to the place of execution, was built in 1589.

Brooklyn Bridge, the largest suspension bridge in the world, was commenced, under the direction of John A. Roebling, in 1870, and completed in about 13 years.

Coalbrookdale Bridge, England, was the first cast-iron bridge. It was built over the Severn in 1779.

High Bridge, New York, by which Croton Aqueduct is carried across Harlem river, is of granite throughout.

Victoria Bridge, which spans the St. Lawrence at Montreal, Canada. It is tubular and 9,194 feet, or nearly 2 miles, long. The massive tube through which the railway track is laid is 22 feet high and 16 feet wide. It was formally opened in 1860.

The St. Louis Bridge, across the Mississippi river, from St. Louis, Mo., to East St. Louis, Ill., is regarded as one of the greatest triumphs of American engineering. It was designed by James B. Eads; was begun in 1869, and was completed in 1874.

Besides the bridges here enumerated,

Bridgeport

there are many other notable specimens of bridge architecture in this country, the Mississippi river alone being crossed many times, from its source to its mouth, by magnificent structures.

Over the Ohio river, at the cities of Cincinnati, O., and Louisville, Ky., there are several fine specimens of bridge building, one at the former city for a long time ranking as first among suspension bridges in this country. The other bridges at these points are railway and passenger bridges of the pier-and-girder or pier-and-truss-arch type.

JOHN STERLING DEANS.

Bridge, Sir Frederick, an English organist and composer, born in Oldbury, Worcestershire, Dec. 5, 1844; was organist of Trinity Church, Windsor, Manchester Cathedral, and, since 1875, full organist of Westminster Abbey. He wrote the oratorio, "Mount Moriah," the cantata, "Boadicea," the cantata, "Callirhoe," the oratorio, "The Repentance of Nineveh," etc. He has set many hymns to music, notably Gladstone's Latin version of "Rock of Ages."

Bridge of Sighs, a bridge in Venice, spanning the Rio della Paglia and connecting the ducal palace with the prisons. It dates back to 1597 and forms a graceful arch 32 feet above the water, enclosed at the sides and arched overhead. It contains two passages, through which prisoners were led for trial, judgment or punishment.

Bridgeport, a consolidated town and city, and one of the county seats of Fairfield co., Conn.; on Long Island Sound, at the mouth of the Pequonnock river, and on the New York, New Haven and Hartford railroad; 18 miles S. W. of New Haven. The city is built on a plain on each side of the river, the E. portion being named East Bridgeport, and the W., lying back of the plain, rising to an elevation of about 70 feet above high water, is known as Golden Hill, and contains many elegant residences. There are three public parks, the most attractive of which is Seaside Park on the shore, having a sea wall and a picturesque drive, and containing a Soldiers' Monument and a statue of Elias Howe. The portion of the city known as Black Rock is a much frequented resort during the summer months. Bridgeport contains about 20 churches and chapels, a well endowed public library, and the winter quarters of the Barnum and Bailey circus. Among the notable public buildings are a United States Government building, containing the post-office and custom house departments; the County Court-house; a Y. M. C. A. building; the Barnum Memorial Institute, bequeathed jointly to the Historical and Scientific Societies; several hospitals, and an orphan asylum and widows' home.

Bridget

The city is noted for its large manufacturing interests, and is the seat of the Wheeler & Wilson sewing machine and the Union Metallic Cartridge works. According to the Federal census of 1890, there were 559 manufacturing establishments, employing \$19,786,572 capital and 13,131 persons, paying \$10,428,987 for material and \$7,556,913 for wages, and having a combined output valued at \$22,274,635. The principal manufacturers besides those mentioned are carriages, furniture, firearms, bicycles, typewriters, hardware, monumental bronze, cutlery, wire, silk, corsets, brass goods and other commodities. In 1900 there were 5 National banks, public school property valued at over \$800,000, and a property valuation of \$56,000,000. Bridgeport was settled in 1670, under the name of Fairfield village, and was incorporated as a city in 1836. Pop. (1890) 46,866; (1900) 70,996; (1910) 102,054.

Bridget, the name of two saints in the Roman Catholic Church. The first, better known as St. Bride, was born in Ireland about the end of the 5th century. She was exceedingly beautiful, and to avoid offers of marriage and other temptations, implored God to render her ugly, which prayer was granted. An order of nuns of St. Bride was established, which continued to flourish for centuries. St. Bride was held in great reverence in Scotland. The second St. Bridget, or more properly Birgit or Brigitte, was the daughter of a Swedish prince, born about 1302, and died at Rome in 1373, on her return from a pilgrimage to Palestine. She left a series of mystic writings which were pronounced inspired by Gregory XI. and Urban VI. Her youngest daughter, Catherine, was also canonized, and became the patron saint of Sweden.

Bridgeton, city, port of entry and county-seat of Cumberland co., N. J.; on the Cohansey river and several railroads; 38 miles S. of Philadelphia. It is a very old settlement, having been a place of considerable importance before the Revolutionary War. Its surroundings are agricultural; and it has manufactures of glass, gas pipe, nails, machinery, flour, oil cloth, woolen goods, shoes, and shirts, and also large fruit and vegetable canning interests. It has a public park, Tumbling Dam, which contains a picturesque lake and a fine athletic field. The city contains the South Jersey Institute, the West Jersey Academy, Ivy Hall Seminary, Seven Gables Seminary, a public high school, 2 National banks, good water and sewage systems, and electric lights and street railroads. Its excellent climate and scenic attractions have made the city a popular resort for summer tourists and residents. Pop. (1890) 11,424; (1900) 13,913; (1910) 14,209.

Bridgman

Bridgetown, the capital of the island of Barbadoes, in the West Indies, extending along the shore of Carlisle Bay, on the S. W. coast of the island for nearly 2 miles. Its appearance is very pleasing, the houses being embosomed in trees, while hills of moderate height rise behind, studded with villas. Bridgetown is the residence of the governor-general of the Windward Islands. Pop. in 1907 over 33,000.

Bridgewater, a town in Plymouth co., Mass.; on the New York, New Haven and Hartford railroad; 27 miles S. of Boston. It contains five villages and has a State Normal School, the State Farm, State Almshouse, a public library, a savings bank, and manufactories of iron, nails, tacks, boots, shoes, and brick. Pop. (1890) 4,240; (1900) 5,806.

Bridgewater, Francis Egerton, third Duke of, the "Father of Inland Navigation in Great Britain," born in 1736. For the purpose of connecting the two rising cities of Liverpool and Manchester, he conceived the idea of cutting a navigable canal which would commercially unite their interests. With the assistance of his celebrated engineer, Brindley, and after enormous expense and years of difficulty, this great undertaking was successfully accomplished in 1761. He afterward promoted the Grand Trunk Canal navigation, and by the two schemes, for a while, so impoverished himself that he was frequently at a loss for \$50, lived in a style of the closest frugality and denied himself almost the commonest comforts of life. He became ultimately the possessor of immense wealth, realized from the results of his life's labors. The annual value of the Bridgewater canal estate is estimated at about \$1,250,000. He died in London, March 3, 1803.

Bridgewater Treatises, a series of books, the outcome of the will of the Rev. Henry Francis, Earl of Bridgewater, who died in 1829, bequeathing a sum of £8,000, which should be paid to the person or persons chosen to write and publish 1,000 copies of a work on the power, wisdom, and goodness of God, as manifested in the creation. The result was eight works on animal and vegetable physiology, astronomy, geology, the history, habits, and instincts of animals, etc., which at one time enjoyed great popularity. The names of the writers are Dr. Chalmers, Dr. Kidd, Dr. Whewell, Sir Charles Bell, Dr. Roget, Dr. Buckland, Rev. William Kirby, and Dr. Prout.

Bridgman, Frederic Arthur, an American artist, born in Tuskegee, Ala., Nov. 10, 1847. He studied at the Brooklyn Art School and National Academy of Design, and was a pupil of J. L. Gérôme, and at

the Ecole des Beaux Arts. He has since 1871 had a studio in Paris. He is noted for figure pieces and Oriental and archæological pictures.

Bridgman, Laura, an American blind mute, born in Hanover, N. H., Dec. 21, 1829. She was a bright, intelligent child, but at two years of age both sight and hearing were entirely destroyed by fever, but she learned to find her way about the house and neighborhood, and even learned to sew and to knit a little. In 1839 Dr. Howe, of Boston, undertook her care and education at the deaf and dumb school. The first attempt was to give her a knowledge of arbitrary signs, by which she could interchange thoughts with others. Then she learned to read embossed letters by touch; next, embossed words were attached to different articles, and she learned to associate each word with its corresponding object. A pat on the head told her when she was right in her lesson. The next step was to procure her a set of metal types, with the letters cast at the ends, and a board with square holes for their insertion, so as to be read by the finger. In six months she could write down the names of most common objects, and in two years had made great bodily and mental improvement. Her touch grew in accuracy as its power increased; she learned to know people almost instantly by the touch alone. In a year or two more she was able to receive lessons in geography, algebra, and history. She received and answered letters from all parts of the world, and was always employed, and, therefore, always happy. She learned to write a fair, legible, square hand, and to read with great dexterity, and at last even to think deeply, and to reason with good sense and discrimination. She died May 4, 1889.

Bridle, a head stall, bit, and bearing or riding rein, completing the head gear of a horse's harness. The modern bridle of Europe and America consists of the following pieces: The crown piece, the brow band, the cheek strap, the throat latch or lash, the rein, and the bit. Sometimes, also, there are a nose band, blinkers or blinders, and a hitching strap.

Bridle Bit, a bit connected with a bridle. Such bits are seen in Assyrian and Egyptian paintings and sculptures, and are subsequently mentioned by Xenophon. Bridle bits may be classed under three heads: Snaffles, curb bits and stiff bits. The snaffle has two bars, joined together in the middle of the mouth, and has rings at the end for the rein. It sometimes has cheek pieces to keep the ring from pulling into the

mouth of the animal. The curb bit consists of the following parts: Cheek pieces or branches, with eyes for the cheek straps and for the reins, and holes for the curb chain; a mouthpiece, uniting the cheek pieces and forming the bit proper; sometimes a bar uniting the lower ends of the branches; a curb chain. The elastic bit consists of a chain covered by closely coiled wire between the bit rings. Another form of elastic bit is made of twisted wire with a soft rubber covering.

Bridlington Crag, a deposit belonging to the Newer Pliocene. It consists of sand and bluish clay, with fragments of various rocks. It contains mollusks, of which four species are extinct, *natica occlusa*, *cardita analis*, *nucula cobboldiæ*, and *tellina obliqua*; most of the remaining species are Arctic shells. It appears to have been deposited during the period of the greatest cold.

Brief, from the Latin *brevis*, short, a brief or short statement or summary, particularly the summary of a client's case which the solicitor draws up for the instruction of counsel. A brief may also mean, in-law, an order emanating from the Superior Courts. A Papal brief is a sort of pastoral letter in which the Pope gives his decision on some matter which concerns the party to whom it is addressed. The brief is an official document, but of a less public character than the bull.

Briel, or **Brielle**, sometimes **The Brill**, a fortified seaport town of South Holland, on the N. side of the Island of Voorne, near the mouth of the Maas. It contains a government arsenal and military magazines, and possesses a good harbor. The tower of St. Peter's Church serves as a lighthouse. Pop. 5,000, chiefly engaged as pilots and fishermen. Briel may be considered as the nucleus of the Dutch republic, having been taken from the Spaniards by William de la Marck in 1572. This event was the first act of open hostility to Philip II., and paved the way to the complete liberation of the country from a foreign yoke. The celebrated admirals De Witt and Van Tromp were natives.

Brienne (brê-en'), a town of France, in the Department of Aube; 15 miles N. W. of Bar-sur-Aube. It is remarkable as formerly possessing a military college where the Emperor Napoleon I. received the first rudiments of his education. Here also he attacked Blücher, Jan. 29, 1814, forcing him from the town, which was reduced to ashes, and compelling him, on the following day, to retreat to Trannes.

Brig

Brig (contracted from brigantine), a vessel with two masts, square-rigged on both.



BRIG.

Brigade, a portion of an army, whether infantry, cavalry, or artillery, consisting of two or more regiments, under the command of a brigadier-general. A division consists of two or more brigades under the command of a major-general, and an army corps (Fr. *corps d'armée*), the largest division of our army, consists of two or more divisions, and is commanded by a major-general.

Brigade Major, a staff officer attached to the brigade to assist the officer by whom it is commanded.

Brigadier, an abbreviation of brigadier-general. It is in common use in the armies of modern civilized nations, the forces being divided into brigades in charge of brigadiers.

Brigadier-General, a military officer of intermediate rank between a major-general and a colonel.

Brigandine, a piece of defensive armor worn in the Middle Ages, consisting of thin jointed scales of plate, generally sewed upon linen or leather, the whole forming a coat or tunic.

Brigands, a name originally given to the mercenaries who held Paris during King John's imprisonment (1358), and who made themselves notorious for their ill behavior. It was applied by Froissart to a kind of irregular foot soldiery, and from them was transferred to simple robbers; it is now used especially of such of these as live in bands in secret mountain or forest retreats. In this sense the pest has been common to most countries, by whatever name the robbers may have been known—whether the escaped slaves and gladiators of Rome, the pre-Islamite brigands of Arabia, English outlaws and highwaymen, German robber

Brigands

nobles, the later banditti of Mediterranean countries and of Mexico, American stage-coach robbers, Australian bushrangers, or the dacoits and hill robbers of Asia. It has ever flourished under weak or corrupt governments, and patriotism at times has swelled its ranks, always largely recruited from those disposed readily to join in any political movement, and has transformed them into guerilla companies, who have carried on a bitter warfare against the invader. Such Spanish bands harassed the French during the Peninsular War; in Italy the Austrian troops were frequently engaged in expeditions against the banditti led by the daring Bellino ("Il Passatore"), and in Greece the Klephts rendered brave and worthy service in the War of Independence. In Cuba, in 1888, political discontent was made the excuse for the brigandage then rampant in the island, where four provinces were on this account declared in a state of siege. Religious persecution also has encouraged brigandage; in Bosnia, which has always produced the most perfect specimens of bandits, it was formerly very common, the unhappy Christians, who were reduced by the Turks to the condition of serfs, frequently taking to the mountains in despair, and then wreaking vengeance on their oppressors. Generally speaking, in countries with a notably scanty population, which is yet in many districts as notably overcrowded, brigandage will be found still in existence. Vigorous steps have been taken during the last 50 years to repress the practice, and in some countries with signal success. In Greece, organized companies of brigands, as distinguished from bands of highway robbers, fortuitously collected, have disappeared; and, in Italy, the chiefs with whom princes made treaties are found only in history. Nevertheless, brigandage is by no means obsolete. In Hungary, where it has flourished from time immemorial, and where even the free towns in the 15th century enrolled companies for organized rapine, and thus raised it to the height of an institution, it has found a stronghold in the shades of the Bakony Forest, whose swineherds are said to be in league with the bétýars, and even to do an occasional stroke of business on their own account. In Sicily it is to be feared that this is still the only trade which really prospers in the island (see *MAFIA*); and the bands that infest the Turkish frontier are notoriously dangerous to the wayfaring merchant and the defenseless tourist. In 1887 special attention was attracted by the boldness of brigands in the Pyrenees, Tuscany, Servia, Macedonia, Asia Minor, and Mexico.

Brigantes

Brigantes, the most powerful of the old British tribes, inhabiting the country between the Humber and the Roman wall.

Brigantine, a sailing vessel with two masts, the foremast rigged like a brig's, the main mast rigged like a schooner's. Called also hermaphrodite brig.

Briggs, Charles Augustus, an American clergyman and religious writer, born in New York city, Jan. 15, 1841. For a number of years he was pastor of the Presbyterian Church at Roselle, N. J. In 1874 he was appointed Professor of Hebrew in Union Theological Seminary in New York city. He was tried for heresy in 1892, but was acquitted. In 1899 he formally severed his connection with the New York Presbytery and was ordained a clergyman of the Protestant Episcopal Church. Among his works are "American Presbyterianism" (1885); "The Messiah of the Apostles" (1886); "The Messiah of the Gospels," "The Higher Criticism of the Hexateuch," and "The Bible, the Church, and the Reason."

Briggs, Henry, an English mathematician, born near Halifax, Yorkshire, in 1561; studied at St. John's College, Cambridge. In 1592 he was appointed reader of the Physic Lecture founded by Dr. Linacre, and in 1596 first reader in geometry at Gresham House (afterward College), London, and in 1619 first Savilian Professor of Astronomy in Oxford. He made an important contribution to the theory of logarithms, of which he constructed invaluable tables. Napier, the inventor, had in 1614 published a table of the so-called natural logarithms, when Briggs observed that another system, in which the logarithm of 10 should be taken as unity, would afford great facilities of calculation. In 1616 he visited Napier at Edinburgh to discuss the suggested improvement, and again in the following year, when Napier admitted the improvement on his own system. He published his "Logarithmorum Chilias Prima" in 1617, containing the first thousand natural numbers calculated to eight decimal places. He was also the author of a tract on the "Northwest Passage to the South Seas," by way of Virginia and Hudson Bay (1622), and in 1624 he published his "Arithmetica Logarithmica," the fruit of many years of unwearied application, and giving the logarithms of 30,000 natural numbers to 14 places of figures, besides the index. His system of logarithms is that now commonly adopted. He next employed himself on a table of logarithms of sines and tangents, carried to the hundredth part of a degree, and to 15 places, which, with a table of natural sines, tangents, and secants, was printed at Gouda, in Holland, in 1631, and published in London in 1633, under the title of "Trigonometria Britannica." The

Brighton

Greek epitaph written on him by Henry Jacobs finishes by saying that his soul still astronomizes and his body geometrizes. He died in Oxford, Jan. 26, 1631.

Bright, John, an English statesman, son of Jacob Bright, a Quaker cotton spinner and manufacturer at Rochdale, Lancashire, born in Lancashire, Nov. 16, 1811. When the Anti-Corn Law League was formed in 1839 he was one of its leading members, and, with Mr. Cobden, engaged in an extensive free-trade agitation throughout the kingdom. At all times an animated and effective speaker, he was incessant, both at public meetings and in Parliament, in his opposition to the Corn Laws, until they were finally repealed. In 1845 he obtained the appointment of a select committee of the House on the Game Laws, and also one on the subject of cotton cultivation in India. A member of the Peace Society, and strenuously opposed to the war with Russia in 1854, he was one of the meeting of the Society of Friends by whom a deputation was sent to the



JOHN BRIGHT.

Emperor Nicholas to urge upon him the maintenance of peace; and in 1855 he energetically denounced the Crimean War. Elected in 1857 for Birmingham, he seconded the motion against the second reading of the Conspiracy Bill which led to the overthrow of Lord Palmerston's government. Though he only once held office in the administrations of his time—as president of the Board of Trade in 1868 and Chancellor of the Duchy of Lancaster—he is credited with having exercised a greater influence upon the conduct of public affairs in England and abroad than, perhaps, any other man. He was the greatest English orator of modern times. He died in London, March 27, 1889.

Bright, Richard, an English physician, born in Bristol, Sept. 28, 1789; studied at Edinburgh, Berlin, and Vienna. His name is associated with BRIGHT'S DISEASE (q. v.), he being the first who investigated its character. He died Dec. 16, 1858.

Brighton (formerly BRIGHTHELMSTONE), a maritime town and favorite watering place in England, county of Sussex, 50½ miles from London. It is situated on a gentle slope, protected from the N. winds by the high ground of the South Downs im-

Bright's Disease

mediately behind the town, and is well built, with handsome streets, terraces, squares, etc. In front of the town is a massive sea wall, with a promenade and drive over 3 miles in length, one of the finest in Europe. Among the remarkable buildings, all of modern date, is the Pavilion, built by George IV., which cost upward of \$5,000,000. It is in the Oriental style, with numerous cupolas, spires, etc. The building and its gardens, which are open to the public as pleasure grounds, cover about nine acres. There is a very large and complete aquarium, and a fine iron pier. Brighton has no manufactures, and is resorted to only as a watering-place. It was about the middle of the 18th century that Dr. Russell, an eminent physician, drew attention to Brighton, which subsequently was patronized by George IV., then Prince of Wales; in this way it was converted from a decayed fishing village into a fashionable and populous watering-place. It has sent two members to Parliament since 1832. The charter of the city dates from 1854. The pop. in 1801 was only 7,339; in 1901 it was 123,478, within the municipal boundaries.

Bright's Disease, a granular disease of the cortical portion of the kidneys, so called because it was first diagnostically described by Dr. Richard Bright, an English physician. It is first emphasized by the secretion of urine containing a large amount of albumen, and this symptom is followed by other complications, usually in rapid sequence. The most commonly observed pathological effects are dropsy, uræmia, and, in some cases, petrification of the kidneys and ureters. It is uniformly fatal, no remedies known seeming to have more than a slightly palliative effect upon it. It is aggravated, and indeed, in the opinion of some physicians, induced by indulgence in alcoholic drinks, and similar errors of diet.

Brihuega (brē-ā'gwa), a town of Spain, in New Castile, on the Fajuna, 20 miles E. N. E. of Guadalajara. Here Dec. 9, 1710, the French, under the Duke de Vendôme, defeated the allies commanded by Lord Stanhope.

Bril, Paul, a Belgian fresco painter, born in Antwerp in 1554. Emulating the example of his brother, MATTYS BRIL, a painter of some note in his day, he placed himself under his tuition, and assisted him in his works at the Vatican, where they were employed by Pope Gregory XIII. On the accession of Sixtus V., Bril was engaged in the Sistine Chapel, St. Maria Maggiore, and the Scala Santa of St. John Lateran. By the direction of Clement VIII., he painted his great work in the Scala Clementina, a landscape on a grand scale, 68 feet wide, in which he introduced the subject of

Brindley

St. Clement thrown into the sea with an anchor around his neck. He died in Rome in 1626.

Brillat-Savarin, Anthelme (bre-yä'-sä-vä-ran'), a French author, born in Belley, April 1, 1775. He was a deputy to the National Convention in 1789; emigrated in 1793; and passed some time in the United States; returned to France in 1796. His writings were mostly anonymous; his title to fame is the work, "Physiology of Taste," an essay on the social implications of gastronomy, written in elegant style with profound knowledge of the subject matter. He died in Paris, Feb. 2, 1826.

Brilliant. See DIAMOND.

Brindában, or Bindrában, a town of the Northwest Provinces, British India; on the right bank of the Jumna, 6 miles N. of Muttra. It is one of the holiest cities of



COIN OF BRINDÁBAN.

the Hindus, and crowds of pilgrims go there from all parts of India, more particularly in honor of Krishna; and, through the munificence of wealthy devotees, there are a large number of temples and shrines.

Brindisi (brēn'di-sē; ancient BRUNDUSIUM), a seaport and fortified town, Province of Lecce, Southern Italy, on the Adriatic, 45 miles E. N. E. of Taranto. In Ancient times Brundisium was an important city, and with its excellent port became a considerable naval station of the Romans. Its importance as a seaport declined in the Middle Ages, and was subsequently completely lost, and its harbor blocked, until the Peninsular and Oriental Steam Navigation Company put on a weekly line of steamers between Brindisi and Alexandria for the conveyance of mails and passengers between Europe and the East. From this cause the town has risen to large importance. Pop. (1901) 23,005.

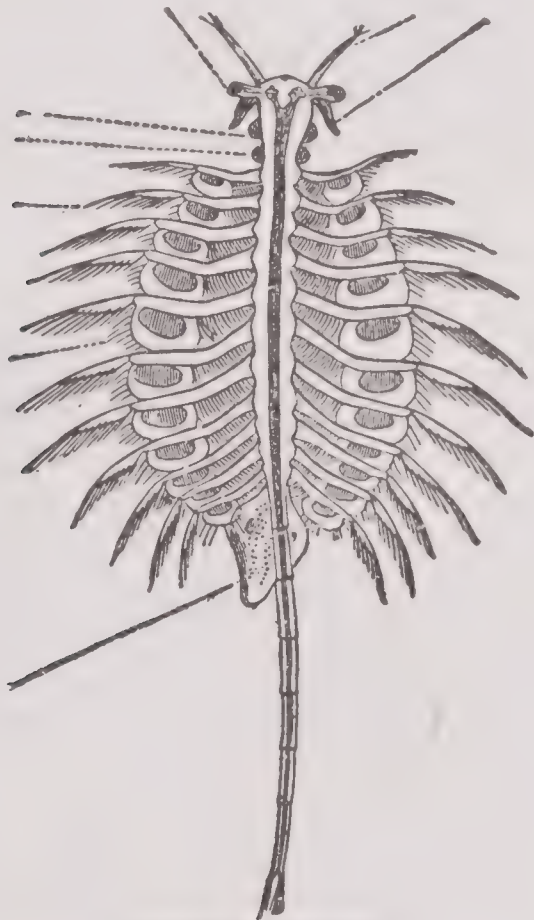
Brindley, James, an English civil engineer, born in 1716. On account of the poverty of his family, he received little more than the mere rudiments of education, and became, at 17, apprenticed to a wheelright at Macclesfield, where his natural abilities soon developed themselves. After distinguishing himself by the contrivance of water engines and other mechanical apparatus, he became known to the Duke of Bridgewater, then planning his great scheme of inland navigation for connecting Liverpool and Manchester by means

Brine

of a canal. This work, ridiculed as it had been by all the scientific men of the day, the Duke persevered in, and Brindley undertook the charge of it; when, after encountering almost insuperable difficulties, and for the time almost financially ruining the Duke, the success of this bold attempt was triumphantly established. In 1766 Brindley commenced the formation of the Grand Trunk Canal, uniting the rivers Trent and Mersey; which undertaking was completed after his death (1772), in 1777.

Brine, water saturated with common salt. It is naturally produced in many places beneath the surface of the earth, and is also made artificially, for preserving meat, a little saltpetre being generally added to the solution.

Brine Shrimp, the only animal, except a species of fly (*ephydra*), which lives in the Great Salt Lake of Utah. It is a phyllopod crustacean, with stalked eyes, a deli-



BRINE SHRIMP.

cate, slender body, which is provided with 11 pairs of broad, paddle-like or leaflike feet. It is about $\frac{1}{4}$ of an inch long. Similar forms live in brine vats in various parts of the world.

Brink, Jan ten, a Dutch novelist and critic, born in Appingedam, June 15, 1834. Besides many essays on the literature of his own country, of France and of England, he has written several novels, among them, "Mrs. de Roggeveen's Son-in-Law," "Holland Dames and Cavaliers," "Jan Starter and His Wife," and a "Historic Essay on the French Revolution." He died in 1901.

Brinton, Daniel Garrison, an American surgeon, archæologist and ethnologist, born

Brisbane

at Thornbury, Pa., May 13, 1837. During the Civil War he was a surgeon in the Union army. From 1867 to 1887 he was editor of the "Medical and Surgical Reporter." In 1884 he was appointed Professor of Ethnology at the Academy of Natural Sciences in Philadelphia; and, in 1886, Professor of American Linguistics and Archæology in the University of Pennsylvania. Among his many works are notes on the "Floridian Peninsula" (1859); "American Hero Myths" (1882); "Aboriginal American Anthology," "Primer of Mayan Hieroglyphics" (1896); "Religions of Primitive Peoples" (1897), etc. He was a high authority on all American archæological topics. He died in Atlantic City, N. J., July 31, 1899.

Brinvilliers (brañ-vē-yā'), **Marie Marguerite, Marquise de**, a notorious French poisoner, born about 1630; was the daughter of Dreux d'Aubray, Lieutenant of Paris, and received a careful education. In 1651, she was married to the Marquis, and formed an improper attachment to St. Croix, a young cavalry officer. The latter was imprisoned in the Bastille, and there learned from Exili, an Italian, the composition of poisons, which art he afterward taught to his mistress. They then commenced a series of poisonings, the first victim being the marquise's father, then his two brothers and his sister, with a view to the ultimate possession of their fortunes. These crimes were not discovered until the death of St. Croix, in 1676, when there were found on him some papers which cast suspicion on the Marchioness. She fled, but was arrested at Liège, and beheaded, in 1676.

Briquette (brē-ket'), the name, originally French ("small brick"), given to a comparatively new form of fuel, made mostly from waste coal dust, and used, not merely for household purposes, but in various industries. A briquette is simply an admixture of coal dust with pitch, molded under pressure and heat, the pitch or some similar substance being introduced to form the cementing material.

Brisbane, the capital, a seaport and chief seat of trade of Queensland, Australia, situated about 500 miles N. of Sydney, in Moreton District. It stands about 25 miles from the mouth of a river of its own name, which falls into Moreton Bay, and it is divided into the four divisions of North Brisbane, South Brisbane, Kangaroo Point, and Fortitude Valley. Pop. of portions within a 10-mile radius (1909), 137,670. Brisbane possesses broad and handsome streets, and some fine buildings, among the chief of which are the Houses of Legislature, which cost £100,000, the post-office, telegraph office, the viceregal lodge, and the Queensland National Bank. It is the seat of an Anglican and of a Roman Catholic bishop.

Brisbane

There are some 40 churches, the chief being the two cathedrals; and several daily and weekly newspapers are published. The export trade, which is large, includes gold, wool, cotton, sugar, tallow and hides; and the imports, most of the articles in use among a thriving community. Regular steam communication is kept up with the other Australian ports, as well as with London (11,295 miles), and there is an extensive system of wharfs on both sides of the river.

Brisbane was settled as a penal station, in 1825, by Sir T. Brisbane, Governor of New South Wales. In 1836 the town comprised the houses of the commandant and other officers, barracks, a tread mill, stores, etc. Three years later the convict settlement was broken up. In 1842 the colony was opened to free settlers. The Brisbane river rises in the Burnett Range, and receives the Bremer and other rivers before its entrance into Moreton Bay, below the town of Brisbane. The Victoria lattice girder bridge (1,080 feet long), connecting North and South Brisbane, was destroyed by a flood, in 1893, which laid half of South Brisbane in ruins.

Brisbane, Sir Thomas MacDougall, a Scotch soldier and astronomer, born in 1773. After serving in Flanders and the West Indies he commanded a brigade under the Duke of Wellington during the Peninsular War, and took part in the battles of Vittoria, Orthes, and Toulouse. In 1821 he was appointed Governor of New South Wales, where his administration tended greatly to promote the prosperity of the colony. At the same time he devoted himself to astronomy, and, from his observatory at Paramatta, catalogued 7,385 stars until then scarcely known. On his return to Scotland he continued his astronomical pursuits, and died in 1860.

Briseis (brī-sē'is), a girl of Lyrnessus, called also Hippodamia. When her country was taken by the Greeks, she fell to the share of Achilles in the division of the spoils. Agamemnon afterward took possession of her, and Achilles thereupon made a vow to absent himself from the field of battle at Troy. This incident Homer makes one of the chief features of his "Iliad."

Brisson, Barnabé (brē-sôn'), a French jurist, born in 1531. Henri III. commissioned him to collect and edit the ordinances of his predecessors and his own, which appeared under the title "Code de Henri III." In 1589, he was made first President of the Parliament, and after Henri's death, in August of the same year, proclaimed the Duke de Mayenne, the Chief of the League, Lieutenant-General of the Kingdom. Brisson soon after became suspected by the faction of the "Sixteen," who ruled in Paris, and who thought that he was favor-

Brissot de Warville

able to Henri IV. He was accordingly arrested and summarily hanged, Nov. 15, 1591.

Brisson, Eugene Henri, a French politician and journalist, born in Bourges, July 31, 1835. He entered the Chamber of Deputies, in 1871, and won much attention by urging amnesty for the Communists and other political offenders. Since then he has been one of the foremost members of the Radical Party. He was elected President of the Chamber, in 1881, and retained that office until the overthrow of the Ferry ministry, in 1885, when he accepted the Premiership. He was re-elected to the Presidency of the Chamber in 1894, and, in 1895, he retired from the ministry and was a conspicuous candidate for the Presidency of France.

In 1898 he again accepted the premiership, but his cabinet was soon overthrown on the army question.

Brissot de Warville, Jean Pierre, a French political writer; born in 1754; was designed for the law; and placed with

a procurator in Paris; but turned his attention to public affairs, associating with Pétion, Robespierre, Marat, etc. In 1780 he published his "Theories des Lois Criminelles," and two years afterward an important collection called the "Bibliothèque des Lois Criminelles." He was suspected of the authorship of an anonymous pamphlet, and thrown into the Bastille. On his liberation he engaged with Clavières and Mirabeau in some works on finance, which appeared under the same name of the latter. Threatened with a new arrest, he escaped to England, and being there introduced to the Society for the Abolition of Negro Slavery he resolved to form a similar society in Paris. Embracing the Revolution, he was elected to the National Assembly for Paris and to the Convention for the department of the Eure et Loir. As leader of the Girondist party, his history belongs henceforward to the history of France. He voted, out of policy, for the death of Louis XVI., subject to confirmation by the vote of the people; and he caused war to be declared against Holland and England in February, 1793. This was his last political act. He was executed in Paris, Oct. 30, 1793. Until the



JEAN PIERRE BRISSOT.

Bristles

close of his career he was engaged in defending himself against the Montagnards. Brissot was inferior to Vergniaud as an orator, but his writings exercised a powerful influence on the Revolution. In the early part of his career his opinions were very extreme. In a passage which was afterward used against him he carried his advocacy of individual rights so far as to justify not only theft, but cannibalism.

Bristles, the strong hairs growing on the back of the hog and wild boar, and extensively used in the manufacture of brushes, and also by shoemakers and saddlers. They form an important article of British import, between 2,000,000 and 3,000,000 pounds being annually imported, chiefly from Russia and Germany; but they are also obtained from France and Belgium, and large quantities of inferior quality have recently been received from China. From Russia, including Siberia, the average annual quantity of bristles is declining. Rather more bristles now go to Great Britain from Germany, but none of these are so valuable as the best qualities from Russia. From France fully 100,000 pounds are annually received, and smaller quantities are obtained from Denmark, Holland and Belgium. The supplies from the United States and East India have risen into importance within the last few years. The quality of bristles depends on the length, stiffness, color, and straightness—white being the most valuable. The best bristles are produced by hogs that inhabit cold countries. The Russian hog is a long, spare animal, and the thinner the hog, the longer and stiffer the bristles. When it is sent to the S. and fattened, the bristles become soft, and, of course, depreciated in value. In the summer the hogs are driven in herds through the forests, to feed on soft roots, etc., when they shed their bristles by rubbing themselves against the trees. The bristles are then collected, sewed up in horse or ox hides, and sent to fairs, whence they find their way, through agents, to all countries.

Bristol, a town in Hartford co., Conn.; on the New England railroad, 17 miles W. of Hartford. It has a public library, electric light and street railroad plants; National and savings banks; manufactories of clocks, brass goods, table ware, tools, woolen and knit goods and bicycle and other bells. Pop. (1900) 9,643; (1910) 13,502.

Bristol, a borough in Bucks co., Pa.; on the Delaware river, the Pennsylvania railroad and the Pennsylvania canal; 21 miles N. E. of Philadelphia. It has a National bank, high school, electric light and street railroad plants, and a noted mineral spring, and manufactories of carpets, hosiery and foundry products. It is in a rich fruit and truck farming region, and is the center of considerable trade. Pop. (1910) 9,256.

Bristol

Bristol, town, port of entry, and county-seat of Bristol co., R. I.; on Narraganset Bay and the New York, New Haven and Hartford railroad, 15 miles S. E. of Providence. It has an excellent harbor, facilitating a large daily passenger and freight service for Fall River and Providence. It is the seat of the widely known Herreshoff shipbuilding works, where a number of noteworthy sailing and steam yachts and torpedo boats have been constructed; and also of the Saunders & West yacht building yards. The town has large market gardening and coast trade interests and manufactories of rubber, woolen and cotton goods. Bristol is the site of the residence of King Philip, the great Narraganset chief. Pop. (1900) 6,901; (1910) 8,565.

Bristol, a city in Sullivan co., Tenn., and Washington co., Va.; on several railroads; 130 miles E. by N. E. of Knoxville. The boundary line between Tennessee and Virginia runs E. and W. along the main street of the city. Bristol is the seat of King's College (Presbyterian), Sullins College, and the Southwest Virginia Institute for young ladies; and is principally engaged in the manufacture of tobacco, cotton and woolen goods, iron, lumber and leather. Pop. (1890) 6,226; (1900) 5,271; (1910) 7,148.

Bristol, a cathedral city of England, a municipal and a parliamentary borough, situated partly in Gloucestershire, partly in Somersetshire, but forming a county in itself. It stands at the confluence of the rivers Avon and Frome, which unite within the city, whence the combined stream (the Avon) pursues a course of nearly 7 miles to the Bristol Channel. The Avon is a navigable river, and the tides rise in it to a great height. The town is built partly on low grounds, partly on eminences, and has some fine suburban districts, such as Clifton, on the opposite side of the Avon, and connected with Bristol by a suspension bridge 703 feet long and 245 feet above high water mark. The public buildings are numerous and handsome, and the number of places of worship very great. The most notable of these are the cathedral, founded in 1142, exhibiting various styles of architecture, and recently restored and enlarged; St. Mary Redcliffe said to have been founded in 1293, and perhaps the finest parish church in the kingdom. Among modern buildings are the exchange, the guild hall, the council house, the post-office, the new grammar school, the fine arts academy, the West of England and other banks, insurance offices, etc. The charities are exceedingly numerous, the most important being Ashley Down Orphanage, for the orphans of Protestant parents, founded by the late George Müller, which may almost be described as a village of orphans. Bristol has a number of endowed schools, the

Bristol Bay

principal of which are the grammar school, Queen Elizabeth's Hospital, the Red Maids' School (which educates and provides for 80 girls, and gives them marriage portions), Colston's Hospital, the Trade School, and the Cathedral School. Among the educational institutions are the University College, the Theological Colleges of the Baptists and Independents, Clifton College, and the Philosophical Institute. There is a school of art, and also a public library. Bristol has glass works, potteries, soap works, tanneries, sugar refineries, and chemical works, ship building and machinery yards. Coal is worked extensively within the limits of the borough. The export and import trade is large and varied. There is a harbor in the city itself, and the construction of new docks at Avonmouth and Portishead has given a fresh impetus to the port. Bristol is one of the healthiest of the large towns of the kingdom. It has an excellent water supply, chiefly obtained from the Mendip Hills.

In old Celtic chronicles we find the name *Caer. Oder*, or "the City of the Chasm," given to a place in this neighborhood, a name peculiarly appropriate to the situation of Bristol, or rather of its suburb, Clifton. The Saxons called it *Briegstow*, "bridge-place." In 1373 it was constituted a county of itself by Edward III. It was made the seat of a bishopric by Henry VIII. in 1542 (now united with Gloucester). In 1831 the Reform agitation gave origin to riots that lasted for several days. The rioters destroyed a number of public and private buildings, and had to be dispersed by the military. Sebastian Cabot, Chatterton, and Southey were natives of Bristol. Pop. (1901) 328,842.

Bristol Bay, an arm of Bering Sea, lying immediately to the N. of the peninsula of Alaska, receives the waters of two large lakes, by which communication with the interior is opened up for a considerable distance.

Bristol Channel, an arm of the Atlantic, extending between the S. shores of Wales and the S. W. peninsula of England, and forming the continuation of the estuary of the Severn. It is remarkable for its high tides.

Bristol, or Bristow, Diamond, a species of rock crystal, sometimes colored, sometimes transparent. Specimens of the latter kind have frequently considerable beauty, only inferior to diamonds. It is found chiefly in the St. Vincent rocks near Bristol, and is also known as Bristol stone.

Bristow, Benjamin Helm, an American lawyer, born in Elkton, Ky., June 20, 1832. He was admitted to the bar in Kentucky in 1853. He served with distinction in the Civil War, and at its close was appointed

Britannicus

United States District Attorney of Kentucky. In 1874 he became Secretary of the Treasury, and made his name memorable by the exposure and prosecution of a notorious whiskey ring. He died in New York city, June 22, 1896.

Bristow Station (old form, now **Bristoe**), a village in Prince William Co., Va.; 4 miles S. W. of Manassas Junction. On Aug. 27, 1862, a drawn battle took place here between the Federal army under General Hooker, and a Confederate one under General Early, and on Oct. 14, 1863, the Federal troops under General Warren repulsed with severe loss a Confederate attack under Gen. A. P. Hill.

Brisure, any part of a parapet or rampart which is constructed in a direction different to that part of the fortification of which it forms a continuous portion. In field works, the term *brisure* is applied to the faces of a star fort, or those of any line of defensive works consisting of a series of re-entering and salient angles.

Britain. See **BRITISH EMPIRE**.

Britannia, the name applied by Cæsar and other Roman writers to the island of Great Britain; Aristotle having referred to the *Nēsoi Bretannikai* (British Isles) as early as the 4th century B. C. According to Rhys, Britannia has nothing to do with the Welsh *brîth*, "spotted, tattooed," from which it is commonly derived; but, so far as we know, the only Celtic words which can be of the same origin are the Welsh vocables *brethyn*, "cloth," and its congeners; in which case the Britons may have styled themselves "cloth-clad," in contradistinction to the skin-wearing neolithic nation that preceded them (see **CELTS**). Though the Romans kept possession of Britain for nearly four centuries (43-410 A. D.), their occupation of it remained essentially military, and consequently the influence of their civilization was to a great extent restricted to the towns. The general tendency of their government was to break up the native tribal system, and substitute their own in its stead, but in this they did not succeed so completely as in Gaul and Spain, neither did the Latin language displace the native British, as it did in those countries.

Britannia Metal, an alloy of brass, tin, antimony, and bismuth. It is used to make cheap spoons and teapots.

Britannia Tubular Bridge, an iron tubular bridge across Menai Strait, which separates Anglesea from Wales, about one mile from the Menai suspension bridge. It has two principal spans of 460 feet each over the water, and two smaller ones of 230 feet each over the land; constructed 1846-1850.

Britannicus, son of the Emperor Claudius, by his third wife, Messalina. His original name was Tiberius Claudius German-

British Association

icus, to which was subsequently added Britannicus, from the conquests which were made in Britain. He died in 56; poisoned by Nero in his 14th year.



BRITANNICUS.

British Association for the Advancement of Science, a society first organized in 1831, mainly through the exertions of Sir David Brewster, whose object is to assist the progress of discovery, and to disseminate the latest results of scientific research, by bringing together men eminent in all the several departments of science. Its first meeting was held at York, on Sept. 26, 1831, under the presidency of Lord Milton; and all the principal towns of the United Kingdom have on different occasions formed the place of rendezvous, a different locality being chosen every year. The séances extend generally over about a week. The society is divided into sections, which, after the president's address, meet separately during the séances for the reading of papers and conference. Soirées, conversations, lectures, and other general meetings are usually held each evening during the meeting of the association. As the funds which the society collects at each meeting are more than sufficient to cover its expenses, it is enabled to make money grants for the pursuit of particular scientific inquiries which otherwise could not be conducted so efficiently, if at all.

British Central Africa Protectorate, The, former name (since 1907 the NYASSA-LAND PROTECTORATE) of the part of British Central Africa bordering the shores of Lake Nyassa. It includes all British Nyassaland, as well as the Shire Highlands, and the greater part of the basin of the river Shire. The expenses of administering the Protectorate are partly met out of revenue locally raised, and further by an annual grant from the Imperial Government. The administration is in the hands of a commissioner acting under the Foreign Office. The port of British Central Africa is Chinde, at the mouth

British Columbia

of the Zambesi, where a small concession has been granted by the Portuguese Government. The area of the Protectorate is over 42,000 square miles; the European population numbers about 500, and the native inhabitants are estimated at 900,000. A number of forts, strongly built, guard the frontier in all directions, especially on the N. and S. E., from the ingressions of the slave-trading Arabs and Yaos. The armed forces of the Protectorate consist of about 1,500 natives and Sikhs under British and Sikh officers who are mainly lent to the Protectorate by the Indian Government. The principal occupation of the European settlers is planting; and many thriving plantations of coffee, sugar, cinchona, and tobacco have been established. The chief towns are Blantyre, Chiromo, Zomba (headquarters of the administration), Fort Johnston (the principal port on Lake Nyassa and naval depot), Karonga (N. end of Lake Nyassa), the starting point for Tanganyika, and Kotakota (W. coast of Lake Nyassa). The Protectorate is divided into 13 districts, and these are managed by a number of collectors and assistant collectors, judicial officers, etc. There is at least one judicial officer, and in some cases more, in each district. Almost the entire trade of British Central Africa is with the United Kingdom. There is telegraphic connection through Salisbury with the South African system. See RHODESIA.

British Columbia, a province (including Vancouver Island) of the Dominion of Canada, bounded on the N. by the 60th parallel of lat.; E. by the Rocky Mountains; S. by the United States; and W. by Alaska, the Pacific Ocean, and Queen Charlotte Sound; area, 372,630 square miles; pop. (1910) 321,733; capital, Victoria.

Topography.—The coast line is much indented, and is flanked by numerous islands, the Queen Charlotte Islands being the chief after Vancouver. The interior is mountainous, being traversed by the Cascade Mountains near the coast, and by the Rocky Mountains further E. There are many lakes, generally long and narrow, and lying in the deep ravines that form a feature of the surface, and are traversed by numerous rivers. Of these, the Fraser, with its tributary, the Thompson, belongs entirely to the province, as does also the Skeena; while the upper courses of the Peace river and of the Columbia also belong to it. All except the Peace find their way to the Pacific. Its mountain ranges (highest summits: Mount Hooker, 15,700 feet, and Mount Brown, 16,000 feet) afford magnificent timber (including the Douglas pine and many other trees); and between the ranges are wide, grassy prairies. The climate is mild in the lower valleys, but severe in the higher levels; it is very healthful.

British Columbia

Mineralogy.—It is to its mineral wealth that British Columbia owes its present importance. Gold was discovered in 1857, and was the cause of the establishment of the separate colony. In 1897 the disclosing of the phenomenal gold field in the Klondike region led to great excitement throughout both Canada and the United States. It was at first believed that the Atlin Lake deposits were in the Northwest Territory; subsequently they were declared to be in this Province. Now some of the greatest gold mines in the world are being worked at Rossland, B. C.; among these are Le Roi, War Eagle, Iron Mask, Center Star, and Idaho. Of these, the Le Roi was sold in 1890 for \$10, to pay for recording the others, and it was afterward sold to a London syndicate for \$3,000,000. The five mines mentioned had a market value in 1900 of \$20,000,000. The Le Roi is believed to have a productive capacity of 600 tons of ore per day for 10 years. The ore averages about 40 pounds of copper, worth \$6.40, and \$7 in gold, per short ton. The rapid development of the mines here has led to great improvements in smelting operations. A smelter at Northport can calcine and matte the Le Roi ore at less than \$3 per ton, and the War Eagle ore is treated at a much less cost. A new plant, called the New Zealand dredge, is now used in placer mining. Four men are required to manage each dredge, and water is used to separate the gold from the earth. It is found that gravel from the Saskatchewan river will produce an average of 25 cents per cubic yard, and that this earth can be handled for two cents per cubic yard, and 3,000 yards can be handled per day. In the calendar year 1899, the output of all precious metals in British Columbia was gold, placer, 67,245 ounces, valued at \$1,344,900; and lode, 138,315 ounces, valued at \$2,857,573; silver, 2,939,413 ounces, valued at \$1,663,708; copper, 7,722,591 pounds, valued at \$1,351,453; and lead, 21,862,436 pounds, valued at \$878,870. Coal was mined to the extent of 1,306,324 long tons, valued at \$3,918,972; and the manufacture of coke yielded 34,251 long tons, valued at \$171,255. Other mineral products had a value of \$206,400, making the total value of the mineral products \$12,393,131.

Soil.—The soil varies from a deep black to a light brown loam. The northern section is exceedingly fertile, and all the Canadian fruits, vegetables, and cereals yield more abundantly than in any other part of the Dominion. In the southern and middle parts, the land is well adapted to pasturage, and, with proper irrigation, to agriculture. In these parts, land 1,700 feet above sea level has produced, under irrigation, 40 bushels of wheat to the acre. The Province contains an abundance of forest land, yielding timber of high commercial

British East Africa

value. A noteworthy specimen is the Douglas fir, a tree of great size, often from 150 to 300 feet in height, and celebrated for its straightness. Lumber 90 feet long and 43 inches square has been cut from these trees. At Burrard Inlet are pines measuring 27 and 30 feet in diameter. The Government leases its timber land.

Fisheries.—This Province has probably the richest fisheries in the world, the only obstacle to their rapid development being their remoteness from the consumers. Salmon is the principal catch, and is famous all over the world. Sturgeon, weighing as much as 500 pounds, are plentiful. Other fish abounding in British Columbia are cod, halibut, anchovies, herring, etc. The value of the fish caught in 1897 aggregated \$6,138,865, of which salmon yielded \$5,185,576; herring, \$18,065; and halibut, \$98,375. The capital invested in all fisheries in 1898 was \$2,514,660, and the value of the total catch fell to \$3,713,101.

Government.—The public affairs of British Columbia are administered by a Lieutenant-Governor, appointed by the Canadian Governor-General-in-Council, and a ministry of five members, and a Legislative Assembly of 33 members, elected for a term not exceeding four years. British Columbia sends three members to the Dominion Senate, and six to the House of Commons. Justice is dispensed by a chief justice and four assistant justices.

Education.—Education is free to all; the schools are non-sectarian, and are supported entirely by the Government. In 1899 there were 244 common schools, with an enrollment of 7,430, an average attendance of 4,280, and 449 teachers and assistants; 32 graded schools, with an enrollment of 11,265, an average attendance of 7,722, and 169 teachers and assistants; 4 high schools, with 490 students enrolled, and 302 in average attendance, 12 teachers and assistants. There were 38 schools for Indian youth, with an enrollment of 1,507, and an average attendance of 1,034. The total expenditure of the Government for school purposes during the year was \$336,016.

Churches.—The Church of England is the strongest denomination, having a membership in 1891 of 23,619. The Roman Catholic Church had 20,843 members; the Presbyterian, 15,284; the Methodist, 14,298; the Baptist, 3,098; and other denominations, 21,031.

History.—British Columbia was originally a portion of the Hudson Bay Territory, and known as New Caledonia. In 1858 it was created a colony; in 1866 the colony of Vancouver Island was united to it; and in 1871 the united colony was admitted to the Dominion of Canada.

British East Africa, an immense territory of East Africa, between German East

Africa and the Italian protectorate of Somaliland. In 1910, under international agreements and a re-arrangement of boundary lines, it comprised the NYASSALAND PROTECTORATE, area, 43,608 square miles, pop. 948,276, seat of administration, Zomba; the EAST AFRICA PROTECTORATE, area, 189,838 square miles, pop. 4,000,000, seat of administration, Mombasa; the UGANDA PROTECTORATE, area, 118,000 square miles, pop. 3,240,000, seat of administration, Eutebbe; the ZANZIBAR PROTECTORATE, area, 1,020 square miles, pop. 226,000, seat of administration, Zanzibar; and the SOMALILAND PROTECTORATE, area, 68,000 square miles, pop. 300,000, seat of administration, Berbera. The first three protectorates were under the administration of a governor and commander-in-chief; Zanzibar, of British officials appointed by the Sultan; Somaliland, of a British commissioner and commander-in-chief. The coast extends from Wanga, 4° 40' S. lat., to the mouth of the Juba river, 0° 15' S. lat. The S. boundary line runs to a point, on 1° S. lat. on Lake Victoria Nyanza, and continues on that parallel to 30° E. long., when it turns N. to Darpur and Kordofan, including these countries. The territory contains the valley of the Upper Nile and the mountainous region of Equatorial Africa, in which are the high mountains of Kenia, Elgon, and Ruwenzori. The inhabitants comprise Bantu tribes, among which are the Waganda and Wangora, Musai and Galla tribes, Swahili on the coast, and negroes on the Nile. Ivory, gum, India rubber, sesame seeds, cocoanuts, copra, coir maize, rice and hides are exported.

British Empire, The, Britain, or rather Britannia, was the name which was given by the Romans to modern England and Scotland. According to the testimony of ancient writers (especially Aristotle), the island in the remotest times bore the name of Albion. Until the time of Julius Cæsar Britain was probably never visited by the Romans. But the Phœnicians, Greeks, and Carthaginians, especially the first, were acquainted with it from a very early period, being accustomed to obtain tin here. Cæsar undertook two expeditions to Britain (55 and 54 B. C.). He defeated the inhabitants and continued a short time on the island. At this time the country was fairly populous, and in the S. E. at least tolerably advanced in civilization. The people cultivated corn, owned numbers of cattle, were governed by petty kings or chiefs, employed war chariots armed with scythes, and possessed ships that could take part in a sea fight. Money had been coined by some of the tribes long before this time. Iron was moderately plentiful, and tin was exported. Most of the inland inhabitants grew no corn, but lived on meat and milk, and clothed themselves with skins. Druidism was an im-

portant institution. The ancient Britons were doubtless mainly Celts by race, but there may have been among them an Iberian element due to an earlier immigration. It was not until the time of Claudius (A. D. 43) that the Romans began the conquest of Britain. A great part of the country had been overrun by A. D. 62, when the revolt of Queen Boadicea and the entire overthrow of the Iceni occurred. Agricola, A. D. 78-85, completed the conquest of England and Wales and subjugated Southern Scotland, running a line of forts across from the Clyde to the Forth.

But the Romans were unable to retain their conquests in the N. part of the island, and were finally forced to abandon the fortified line between the Forth and Clyde, and retire behind a second wall built by Hadrian in 122 between the Tyne and Solway. A turf wall between Clyde and Forth was built by Antonius Pius in 143, but Hadrian's wall remained the permanent boundary on the N. Thus the S. part of the island alone remained Roman and became specially known as Britannia, while the N. portion was distinctively called Caledonia. In 210 Roman Britain was divided by Septimius Severus into two provinces, Britannia Superior and Britannia Inferior. It was afterward divided into four, and ultimately into five provinces, namely, Britannia Prima, Britannia Secunda, Maximo Cæsariensis, Flavia Cæsariensis, and Valentia. Under the dominion of the Romans, which lasted till early in the 5th century, flourishing towns arose, great roads were made, the useful arts and many of the refinements of life found their way into the S. part of the island, while Christianity was introduced and took the place of the Druidism of the native Britons. Thus from the time of the Roman conquest, and still more decidedly after the Saxon invasion of the 5th century, the history of Britain divides into a history of the S. part of the island, or England, and a history of the N. part, or Scotland, and it was not till the union of the crowns in 1603 that the destinies of England and Scotland were again united.

History of Great Britain.—The name Great Britain was applied to England and Scotland after James I. ascended the English throne in 1603, and we shall here give an outline of the history of the United Kingdom from that period. Under the articles ENGLAND, SCOTLAND, and IRELAND, the histories of the respective countries will be found.

With Elizabeth, who died in 1603, ended the line of princes of the house of Tudor. James VI. of Scotland, son of the unfortunate Mary Queen of Scots, was the only near relation of Elizabeth (his great-grandmother, Margaret, was daughter of Henry VII. of England, grandfather of Elizabeth),



and was named by her a short time before her death as her successor on the English throne. James was acknowledged without opposition; and thus two countries which had lived for ages in strife and bloodshed with each other, were henceforth linked together.

James was not destitute of natural abilities, and had acquired a more than ordinary share of literary knowledge, for which he was largely indebted to the celebrated George Buchanan. When he ascended the throne of England, the Episcopalians, the Roman Catholics, and the Puritans formed three antagonistic parties. The Catholics expected toleration from a prince who was born of Roman Catholic parents, baptized with the rites and ceremonies of the Church of Rome, and whose royal mother had died a martyr for the cause. The Puritans, on the other hand, expected that a monarch bred up in Presbyterian principles would naturally cast his influence in their favor; while the bishops awaited his accession with fear and trembling. But James soon dissipated the fears of the one, and the hopes and expectations of the other parties. He had acquired a strong dislike to the Presbyterian form of religion, while a desire of unlimited power and authority was the ruling passion of his heart, both of which he had carefully concealed while he reigned in Scotland. Instead of restraining, he increased the power of the Episcopal hierarchy; and some of the Roman Catholics were so provoked at the disappointment of their expectations of toleration at least, that they formed a plot for the purpose of cutting off, not only the king and his ministers, but the whole of his Parliament. This conspiracy, well known by the name of the Gunpowder Plot, was happily prevented, and the principal conspirators suffered that punishment which they merited.

England and Scotland were now ruled by the same prince, and James wished to make the union still more complete; but national animosities were not yet sufficiently extinguished, and national prejudices were too prevalent. It was James' misfortune that he had imbibed exalted notions of the royal prerogative, and wished to govern by the arbitrary maxims that had distinguished Queen Elizabeth, the glories of whose reign were, in the eyes of her subjects, some atonement for her occasional acts of despotism. But the nation, in consequence of the progress of political and religious knowledge, and the increasing diffusion of commercial wealth and prosperity through the whole community, was beginning to question the divine right of kings, and to wish for an extension of popular privileges. James' whole reign was therefore a continued contest between the prerogative of the crown and the freedom of the people. The Parliament refused to give supplies to a prince

who was always reminding them of his prerogative, and who at the same time was destitute of vigor to enforce his pretensions. Accustomed as James had been, while he wielded the Scottish scepter, to support the splendors of regal dignity on a very slender revenue, it was reasonable to expect that when he ascended the English throne frugality would have been a marked feature of his royal rule; but his behavior disappointed these expectations. Careful, though indeed from a constitutional timidity of character, to avoid wars, his system was entirely pacific during the whole course of his reign; yet his profusion was such that it uniformly exceeded his income; for he kept up three courts, one for himself, one for his queen, and a third for his son. Moreover, not content with bestowing on his favorites the most lucrative offices of the State, and considerable grants from the royal domains, he lavished upon them large sums of money. During his whole reign Ireland continued to be a heavy load on England, occasioning large sums of money to be constantly remitted to support a standing army, which at one time amounted to 19,000 men, as also to supply the deficiencies of the Irish treasury. His wants, occasioned by his profusion, kept James engaged in constant disputes with his Parliament, who would not grant him money equal to his demands, and as a result he resorted to monopolies, loans, benevolences, and other illegal methods. Among other expedients he sold the titles of baron, viscount, and earl at the rates of from £10,000 to £15,000, and sometimes even £20,000. In his reign the hereditary title of baronet first originated. In 1611 93 baronets were created, the sale of whose patents produced £98,550, or £1,095 each. Yet of the £800,000 which Holland owed to Elizabeth, James was content to take one-half, and he surrendered up the cautionary towns for a fourth of their value; and suffered the Dutch to dispossess the English of their factories in the East Indies. He also meanly consented to accept £60,000 instead of £300,000, which Elizabeth had lent to Henry IV. of France; and in order to gratify the Spanish court he sacrificed the brave Sir Walter Raleigh. His ambition was more to shine as a theologian than as a prince; and he succeeded for a time in establishing Episcopacy in Scotland, though it by no means rested on a secure foundation. In fine, though the nation undoubtedly prospered in wealth and commerce, yet his reign was inglorious; and he died disliked by the majority of his subjects, in 1625, after a reign of 22 years over England, without having performed one great or glorious deed to exalt his own character or that of the nation.

His son Charles I., who succeeded, inherited the same exalted notions of royal prerogative, but was very different from his

father in most respects. Religious and strict in his way of life, though somewhat cold and reserved, he could inspire respect and even affection. His marriage with a Roman Catholic princess (Henrietta Maria of France), who had perhaps undue influence over him, and his resolute adherence to arbitrary maxims and illegal methods of raising money without consent of his Parliament, gradually widened the breach between him and his subjects. His government grew more unpopular daily, and the Commons would vote no supplies without redress of grievances; which, instead of diminishing or complying with the wishes of his Parliament, and thereby soothing them into a more submissive temper, he constantly augmented by proceeding from bad to worse: dissolving Parliaments, imprisoning members, and raising prosecutions in the star chamber against the most popular characters in the kingdom. He intrusted the keeping of his conscience entirely to Laud, who, in conjunction with Wentworth, Earl of Strafford, entangled him in a most expensive and disastrous contest with his Scottish subjects, and afterward with his Parliament, the latter encouraged by the successful resistance which the Scots had made to arbitrary power. When war actually broke out success at first was various; but the king was destitute of money to pay his troops, while the Parliament had at their disposal the whole resources of the nation. Charles was at last involved in such distress that he fled for protection to the Scottish army, which, in conjunction with the Parliament, maintained the struggle against arbitrary power. There he endeavored, by various machinations, to sow dissension between them and the English Parliament, and to engage them in his interest, but entirely failed in the attempt. The Scots had no intention of involving themselves in a war for the sake of a prince who had forfeited all confidence by keeping his word no longer than it suited his convenience, and therefore delivered him up to the Parliamentary commissioners.

One part of the Parliament and of the nation were of opinion that now the constitution ought to be rectified; that the limits between the prerogatives of the king and the privileges of the people ought to be accurately determined; that after such salutary regulations the king ought to be restored to his throne, and to that share of power which was consistent with the happiness of his subjects; and that all past transactions ought to be buried in oblivion. But the Parliamentary army had reduced the king to subjection, and its leaders were loath to give up the power they had acquired; and they had also to consult their own safety, and could hardly trust to any engagement made by the king. Cromwell,

and the success of his conduct, acquired an influence that nothing could resist. Under his guidance the army loudly declared for a commonwealth, and for the trial of the king, the invader of his people's rights. The king was tried: as might have been foreseen, he was condemned, and on Jan. 30, 1649, was beheaded before his own palace of Whitehall.

Cromwell's power in the army, and consequently in the nation, was supreme. The success of his schemes had perhaps exceeded his own expectation. He was dazzled with the splendor of a high station, pleased with the exercise of authority, and consequently unwilling to abandon that which he had so successfully acquired. The king had fallen before him; nothing remained but to overthrow the Parliament. This to Cromwell was no difficult undertaking. He went at the head of a chosen party of soldiers to the place where they were assembled, told them that "the Lord had no more occasion for them," turned them out of the house, and carried the keys along with him.

Had Cromwell assumed the title of king perhaps all his abilities might not have been able to withstand the fury of the party by which the very name of king was abhorred; but he had too much knowledge of human nature not to perceive that words have the greatest influence in the conduct of men. He knew he had the power of a king, and he was content with the title of lord protector. Under this appellation he exercised a more unlimited authority than had ever been exercised by any of the English monarchs. During the whole of his administration Cromwell retained that vigor and decision which had characterized him throughout the Parliamentary wars. He formed no system of politics by which he might regulate his transactions with foreign nations; but the promptitude of his measures, and the terror of his fleets and armies, rendered him no less respected abroad than he was at home. After a short reign, during which he endured all the miseries of grandeur and the anxieties of distrust, he died in 1658. Cromwell had so firmly established his authority that his son Richard was called to assume the authority of protector; but Richard's temper was totally unlike that of his father. He preferred the calm of private life to the turbulence of power and the cares of ambition. The Republican party soon perceived that Richard could not, like his father, render himself formidable to them. They began, therefore, to resume the power which they had formerly possessed; and again arose that anarchy by which the nation had formerly been convulsed. In such revolutions the opinion of the people at large is seldom consulted. Harassed by commotions which had long prevailed, the nation hated equally the tyranny of a protector and the anarchy of a pretended

republic. The restoration of their old constitution, and of their former race of monarchs, was the general desire. Taking advantage of this prevalent deposition, General Monk, who had commanded under Cromwell, and who was now at the head of a considerable force, formed the resolution of restoring Charles, son of Charles I. Monk was compelled to temporize, lest the Republicans should suspect his designs; but such was the caution with which he took his measures, and such the general disposition of the nation, that in 1660 Charles was recalled and placed on the throne, under the name of Charles II. In the measures of a crowd there is seldom moderation; and such on this occasion was the enthusiasm of loyalty that the king was restored to the throne without any restraint upon his authority, and without any attempt to define the prerogatives of the crown and the privileges of the people.

Charles II. seems to have profited little by his father's misfortunes. More attached to the pleasures of life than anxious faithfully to discharge the duties of his office, he appears to have considered sovereignty chiefly as an acquisition by which he could, with more ease, indulge himself in licentiousness and profligacy. Had the House of Commons been sufficiently liberal in their grants, and not very scrupulous in demanding an account of the manner in which these grants were expended, Charles would, perhaps have permitted them to conduct the affairs of the nation in the way most agreeable to themselves. But the Commons were parsimonious. The king, resolved on satisfying every passion, scrupled not in order to obtain money to adopt the most illegal measures. The Parliament began once more to express that jealousy of the kingly prerogatives which had formerly involved the nation in so much confusion. The king continually demanded supplies; the Parliament answered him by remonstrances regarding his conduct. The Duke of York, brother to the king, and heir presumptive to the crown, had openly declared himself a Roman Catholic, a circumstance than which nothing could more excite the national terror. The Commons persisted in withholding supplies; the king became daily more needy, more peevish, and less scrupulous in his conduct; and at length, perceiving that he was to expect from his Parliament only reproaches, he dismissed it, resolving never to assemble another; and from that moment managed the reins of government in a manner altogether arbitrary.

The English, and indeed every nation of Europe at this time, seem to have been anxious to humble the growing power of France; but in this respect the opinion of Charles was different from that of his people. The French monarch supplied Charles

with money, of which he was continually in want, and thus engaged him in hostilities with Holland. The naval power of the Dutch was at that time truly formidable. Only the English could pretend to rival them at sea. Many engagements were fought with uncommon obstinacy and consummate skill; and though the Dutch, seizing a favorable opportunity, sailed up the Thames and insulted their enemy in his own harbors, the naval strength of the English was gradually acquiring an irresistible superiority.

Charles died Feb. 6, 1685, and as he left no lawful issue, his brother, the Duke of York, succeeded to the throne, under the name of James II. During the life of Charles, James had always asserted the doctrine of passive obedience; and that he might the more evince his sincerity, he practised in his life that doctrine of which he inculcated the belief. What he so willingly had yielded to his sovereign he hoped his subjects would have no aversion to yield to himself; and he proceeded to act with all the perverse obstinacy of a narrow mind. To render himself still more odious he exerted that power which he pretended to be unlimited in a design than which no other could be more generally abhorred; he labored to establish in his dominions the Roman Catholic faith. His design was opposed with a vigor which ought to have convinced him that it was impracticable; but opposition served only to intensify his determination and to render him more obstinate. Matters soon came to such a situation that it was evidence that the monarch intended to establish Popery at the risk of his own ruin. In this extremity the nation turned their eyes to William, Prince of Orange, celebrated for his military capacity and his political virtues. Though his prince was nephew, as well as son-in-law to James, he eagerly accepted an invitation to enter the kingdom for the purposes of relieving the people from their apprehensions of Popery, and bringing the infatuated monarch to a more reasonable mode of action. No sooner had William landed than James was deserted by almost all his remaining adherents. Forgetting that bravery which he had exhibited when Duke of York, in his engagements with the Dutch, he resolved, according to the advice of some who pretended to be his friends, to leave the kingdom. He fled to France. The throne was declared vacant. After some debates the Prince of Orange and his wife, the Princess Mary, were called to be the King and Queen of England. The people, convinced by the transactions of their preceding monarchs that the surest way of securing the peace of the nation was to define the power of the prince and the privileges of his subjects, adopted a mode of conduct which ought to have been followed at the Restoration. They

framed the Bill of Rights, which fixed the English government in that state of freedom and moderation which has characterized it. This important revolution was effected in 1688.

Though the revolution had been brought about with much appearance of unanimity, and though it secured to the nation inestimable privileges, the accession of William III. did not meet with universal acquiescence, nor had James lost all his friends. In Ireland particularly, as it abounded in Roman Catholics, that unfortunate monarch had many adherents. James appeared among them in person, and was soon at the head of an army; but William, by gaining the battle of the Boyne, annihilated James' hope of restoration. William prosecuted hostilities with France, with various success, till the battle of La Hogue (1692) made an impression on the French navy from which it could never afterward recover. The English had defined the privileges of their kings; but they found that war could not be conducted without more money than they were willing to grant; what the king could not procure as a gift he borrowed; and at this time the funding system began to be considered as a national resource—a system which British ministers have been careful not to forget.

After a reign in very few respects remarkable, William, in 1702, was succeeded by Anne, daughter of James II., and the next Protestant heir to the throne. Anne's administration was distinguished by the violent animosities of the existing factions; but in the midst of these an important measure was passed—the union of England and Scotland. These countries had since the time of James I. been governed by a single sovereign; but they had separate Parliaments, and indeed might still justly be called separate and independent kingdoms. It had often been proposed, by a union, to consolidate the power of the island; but every proposal for that purpose had hitherto been unsuccessful. This measure, of so much importance to each of the countries, was resumed by Anne; and after a violent opposition, particularly by the Scots themselves, the English and Scots were, in contradiction to the decided opinion of a majority of the latter, declared to be one people. Thus, in 1707, England and Scotland ceased to be distinct kingdoms; and the island was distinguished by the appellation of the United Kingdom of Great Britain. This union, however it might be opposed by the prejudices, and even by the immediate interests of particular men or particular ranks of men, when it was first effected, has certainly contributed much to the prosperity of the empire. Great Britain attained an importance at which England and Scotland, while separate kingdoms, could never have arrived. The Act of

Union consisted of 25 articles, among which the following deserve notice. It was agreed that the succession to the kingdom of Great Britain should remain as it had formerly been settled for England. That Britain should have only one Parliament; and that all rights and privileges should be common to both nations, except where otherwise expressly agreed. That in all parts of Britain the English coins, weights, and measures should be considered as the standards. That the laws relating to trade, customs, and excise should be the same in both parts of the kingdom. That to the House of Peers the Scots should send 16 representatives; and that the number of the Scottish members in the House of Commons should be 45. That all the Scottish peers should be peers of Britain; and that, except sitting in the House of Lords and voting on the trial of a peer, they should have all the privileges of peers. That the Established Churches of England and Scotland should remain unaltered, and be considered as forming an essential part of the union. A general clause reserved to the united Parliament the power to alter these articles for the benefit of Scotland; and under cover of this clause some fundamental changes were afterward made. Though the union of England with Scotland tended ultimately to increase the power and importance of both, yet it was not immediately followed by any important result. The measures of the nation, both in foreign and domestic policy, continued in a great degree unaltered.

The British arms, under the command of Marlborough, had succeeded in checking the ambitious designs of Louis XIV.; but a party at home, instigated partly by envy at the renown which Marlborough had acquired, partly by considerations of the inutility of all continental conquests, and of the immense taxes which the acquisition of such empty celebrity brought upon the nation, and irritated too by the evident coldness of the continental powers in a quarrel which was properly their own, loudly demanded peace, and steadfastly counteracted all the designs of Marlborough and his friends. Harley and Bolingbroke at last succeeded in supplanting him in the favor of the queen. The command of the army was taken from him, and given to the Duke of Ormond; and after many negotiations at Utrecht, a treaty was signed by the belligerent powers on March 31, 1713. By this treaty the British right of sovereignty over Hudson bay, Newfoundland, Nova Scotia, Minorca, and Gibraltar was acknowledged. The peace which had just been concluded was extolled by the Tories in the most unqualified terms; while by the Whigs it was censured in terms no less unqualified. The remainder of Anne's reign was distracted by the never-ending altercations of domestic parties. She died on Aug. 1, 1714; and with her ended

the line of the Stuarts, who had swayed the scepter of England 112, and that of Scotland 343 years.

It has been supposed by some that Anne intended to have used her influence in altering the line of succession; but either she had formed no such design, or she had not abilities to carry it into effect. At her death George I., Elector of Hanover, maternally descended from Elizabeth, daughter of James I., according to the Act of Settlement, ascended the throne of Britain. The Whigs under this prince regained that superiority in the national councils of which they had long been deprived. George was greatly attached to his paternal continental dominions, and in the struggle of the two factions was often accused by the Tories of sacrificing the interests of Britain to those of Hanover. The suspension of the Habeas Corpus Act, and some other extreme measures, increased the irritation of the weaker party, and in 1715 the standard of rebellion was erected in the Highlands of Scotland by the Earl of Mar, who proclaimed the Chevalier St. George, the heir of the family of Stuart, king. A few persons in the N. of England, under the Earl of Derwentwater, joined in the same design, and proclaimed the Pretender at Morpeth and Alnwick; but the attempt was feebly conducted, and tended only to the ruin of those who had engaged themselves in so hopeless an undertaking. The Duke of Argyle in the N., and General Willes in the S., dispersed the forces of the rebels; and the Chevalier, accompanied by Mar, Drummond, and a few other persons of distinction, made his escape to the Continent.

In 1718 an alliance, known by the name of the Quadruple Alliance, was formed between Great Britain, France, Germany, and Holland; and of this alliance a rupture with Spain was the immediate consequence. In 1718 Sir George Byng engaged and captured the Spanish fleet in the Mediterranean. The Spaniards endeavored to retaliate by dispatching a powerful armament to support the claims of the Pretender in Britain. But the fleet was entirely dispersed by a storm off Cape Finisterre; and the Earls Marischal and Seaforth, and the Marquis of Tullibardine, who had been landed in Scotland, with difficulty made their escape again to the Continent. In 1720 the Irish Parliament was deprived of its right of final jurisdiction, and thus rendered dependent on that of Britain. In the same year the South Sea Company obtained an act to increase their capital by redeeming the public debts. The greater part of the nation now became stock-jobbers, and South Sea stock rose to 1,000 per cent. This extraordinary rise was followed by an equally sudden depression; the shares fell to 150 per cent., and many families were ruined by their connection with the scheme.

The Parliament which met in 1722, had its attention engrossed by new reports of real or pretended plots in favor of the Pretender. Lacy, a young templar, was convicted and executed, and Atterbury, Bishop of Rochester, banished on the charge of being connected with this conspiracy. Hosier's unfortunate expedition to the West Indies to intercept the Spanish galleons was one of the last events of George's reign. He died in Osnabrück on June 11, 1727, in the 68th year of his age.

George II. inherited his father's partiality for his continental dominions as well as his crown. He continued Sir Robert Walpole, who had been minister to his father, at the head of the treasury. The British monarchs had now learned to act on principles of policy different from those of their predecessors. They were now convinced that to oppose openly the will of Parliament was to plunge themselves into inevitable destruction. Instead, therefore, of opposing the House of Commons, they now endeavored by every means to procure in that assembly a majority favorable to their designs. Walpole is said to have been the first minister who resorted to the employment of undue influence in elections. But whatever were the means which he used, he successfully engaged the nation in all the schemes of their sovereign. It was soon discovered, however, by the other nations of Europe, that the British minister would sacrifice almost every interest to his attachment to peace; and under this impression of his character the arms of Britain, formerly so much dreaded, were now treated with something that approached to contempt. Walpole, like every man in power, had many enemies; and this part of his conduct was eagerly seized to degrade the minister in the opinion of the public. The failure of an attempt on Carthage, together with other unfortunate naval operations, completed Walpole's disgrace. And in the meantime the Prince of Wales, having differed from his father, and consequently from the minister, became the leader of the opposition. The minority, animated by so illustrious a leader, acquired new boldness; the election of a new Parliament approached, and the influence of the prince filled it with Walpole's enemies. Unable longer to maintain his ground, the minister resigned; and as a reward of his services was created Earl of Orford. But the succeeding administration following the steps of its predecessor, became equally unpopular.

The German empire at this time was involved in many troubles. By a treaty between several of the continental powers known by the name of the Pragmatic Sanction, the succession to the whole of Charles' dominions had been insured to his daughter; but the treaties of princes are binding only while they are supported by the force which

made them. The emperor was no sooner dead than different parts of his dominions were seized by the surrounding potentates, and in a short time the whole German territory was a scene of warlike tumult. In these commotions there was nothing materially to interest Great Britain; but Hanover was threatened, and the British monarch was anxious to rescue from the danger of invasion his paternal dominions. A numerous army was therefore equipped for an expedition to the Continent; and George, among whose faults cowardice could not be numbered, having put himself at its head, encountered the French at Dettingen, and obtained a complete victory. France now threatened Great Britain with a new invasion in favor of the Pretender; but Sir John Norris, with a superior fleet, kept their armament in check. The battle of Fontenoy decided the French preponderance on the Continent; but Admirals Rowley and Warren supported the honors of the British flag at sea.

A fresh attempt was now made to restore the Stuart family to the throne. Charles Edward, son of the Pretender, having been furnished by France with a small supply of money and arms, landed on the coast of Lochaber in the Western Highlands in 1745, accompanied by the Marquis of Tullibardine, Sir John Macdonald, Sir Thomas Sheridan, and other adventurers. Marching S. with 1,500 Highlanders, he caused his father, then resident in Rome, to be proclaimed king at Perth. His force increasing as he advanced, he entered Edinburgh without opposition; and having defeated Sir John Cope, near Prestonpans, marched into England, accompanied by the Earl of Kilmarnock, Lords Elcho, Balmerino, Ogilvy, and Pitsligo, and the eldest son of Lord Lovat. Having taken the town and castle of Carlisle, he advanced through Lancaster, Preston, and Manchester, to Derby, within 100 miles of London; but finding himself disappointed of expected succors from France, and the English Tories, contrary to his expectations, keeping aloof he commenced his retreat into Scotland, closely pursued by the king's troops, whom he again defeated at Falkirk. With this victory his good fortune terminated. The Duke of Cumberland having arrived from the Continent — where he had gained considerable military experience — put himself at the head of the forces which were destined to check the rebels; and the armies having met at Culloden, near Inverness, Charles was completely defeated. The fugitive prince, after lurking for six months amid the wilds of Inverness-shire, and trusting his life to the fidelity of numerous individuals, at length, with much difficulty, escaped with Cameron of Lochiel in a vessel which his friends had hired for the purpose. The abolition of the heritable juris-

dictions in 1748 laid a solid foundation for the civilization and improvement of the Highlands.

The war on the Continent in the meantime, continued with undiminished fury. The success was various; but the British and their allies — of whom some were unwillingly engaged in the contest — were generally unfortunate. The success of the British at sea, however, compensated for their disasters on land; for though Boscawen, in the East Indies, failed in performing what was expected of him, yet Hawke, Anson, and several other naval officers, reduced the French navy to a degree of extreme insignificance. Both parties, however, had reason to desire peace. A negotiation to this effect was opened, and in 1748 a peace was concluded at Aix-la-Chapelle, the basis of which was a general restitution of conquests. Pelham, who continued to be the chief person in administration, and who enjoyed an uncommon share of popularity, showed himself worthy of the national support, by adopting and encouraging every scheme which could forward the national prosperity. Under his administration trade acquired a vigor which it had never formerly attained; and notwithstanding the enormous expense which had been incurred in the war just terminated, and the consequent accumulation of the national debt, the credit of government had not been injured. On the contrary, Pelham succeeded in reducing the interest of the public debt from 4 per cent., first to 3½, and afterward to 3 per cent. The colonization of Nova Scotia, and the alteration of the style according to the Gregorian calendar, by merging the 11 days between the 3d and 14th of September, 1752, were among the most remarkable events which took place during the short interval of peace. At the same time the 1st of January was fixed as the opening day of the year, instead of the 25th of March, which, being the first day of the ecclesiastical year, was up to this time considered by many as New Year's Day.

To diminish the trade of Great Britain now became one of the chief aims of her continental adversaries, in order to enable them to renew the war with a greater probability of entire success. But the great object of the French was to straiten the boundaries of the British colonies, and, if possible, either to wrest them from the mother country, or to involve them in unavoidable ruin. With a view to the execution of this purpose, the French used every art to ingratiate themselves with those Indian tribes by which the British settlements in America were surrounded. Animosities which in some cases were already excited, and for which there existed plausible reasons, were inflamed into implacable resentments. To give the greater

efficacy to their designs the French built forts upon different parts of the inland frontiers, and took every opportunity to render the situation of new settlers extremely perilous. An army of experienced troops was also collected, and was about to be embarked for America, where, as they had little to defend, they must undoubtedly have intended to become aggressors. But the British ministry had for some time foreseen that war would be unavoidable, and the proposed embarkation of troops seemed to be an evident signal for commencing hostilities. Without waiting therefore till the French declared war, Boscawen was dispatched with a fleet to the American coast, where he took two French men-of-war, and chased the rest of the fleet up the St. Lawrence river. At the same time orders were issued for seizing the vessels of France wherever found; and before the end of 1755, about 500 of them, together with about 8,000 sailors, were in the possession of Britain; and before the conclusion of 1757, 30,000 French seamen were made prisoners. In 1755 General Braddock was sent to attack the French forts upon the inland frontiers of the American settlements; but he suffered himself to be surprised by an ambuscade near Fort Du Quesne. General Johnson attacked the French near Crown Point, on Lake Champlain, and was more successful than the unfortunate Braddock. In 1758, after various inferior transactions, the British made themselves masters of Frontenac and Fort Du Quesne, as well as of Louisburg, and of the chief French settlements in North America. Near Ticonderoga, indeed, the British were again defeated; but the attack made by Wolfe on Quebec in 1759 was completely successful. Wolfe purchased his victory and his reputation with his life; but Monkton and Townshend, who succeeded him, ably supplied his place; and Amherst soon overran the whole of Canada, and almost annihilated the colonial empire of the French.

The latter had not confined their undermining acts of policy to America. In the East Indies also they had carefully ingratiated themselves with the native powers, and incited them to engage in hostilities with the British. Their success in this undertaking, however, was, if possible, less than in America. The British arms under Clive were so completely successful in every quarter that the power and influence of Great Britain in the East were more than ever extended, and the foundation laid of her magnificent empire in that quarter. The French were driven from their few India possessions, and have never been able to reëstablish their importance in that part of the world. But the exertions of the British were not equally successful in the Mediterranean. Byng, with a fleet at least

equal to that of the French, having been encountered and defeated by La Galissonnière, was tried for cowardice, and shot on board the fleet at Portsmouth; and General Blackney, in consequence of Byng's failure, was compelled to abandon Minorca. About this time Mr. Pitt was introduced into the administration. This minister adopted a new system of operations against France by fitting out an expedition to carry the armies of Great Britain into her enemy's country. It sailed under Mordaunt, on Sept. 8, 1757, but returned without effecting anything; and the French having attacked the electorate of Hanover, compelled the Duke of Cumberland to sign a disgraceful capitulation. In the following year his Britannic majesty entered into a treaty of mutual defense with Prussia, and the Hanoverian forces under the Prussian general drove the enemy from their dominions. France now projected another invasion of her great rival's country; but toward the conclusion of 1759, when the invasion was to be attempted, the Toulon fleet was defeated by Boscawen, and the Brest fleet by Hawke. In 1760 George II. died, and was succeeded by George III., his grandson.

When George III. succeeded to the throne, he was extremely willing to procure peace to his dominions; but it was judged prudent to continue hostilities till terms honorable and advantageous to the country could be procured. The French were by no means willing to accede to such conditions as the British thought due to their success in several parts of the world; and for the purpose of making a more formidable impression on Great Britain, a compact had been formed among the branches of the Bourbon family to unite in carrying on the war. This rendered it necessary to declare war against Spain, hitherto pretending to be neutral, but on every occasion almost openly espousing the cause of France. When Spain took part in the war, an invasion of Portugal from that country was immediately attempted; but, by the assistance of a party of British troops, the Spanish arms were soon repelled. Hostilities, in the meantime, were carried on in Germany with undiminished fury, and generally to the advantage of France; but the unsuccessful exertions of the British upon the Continent were more than compensated by their acquisitions in other quarters of the world. They had already taken from the French all their possessions on the American continent; and their colonies in the West Indies now experienced the same fate. The French islands of Martinique, Grenada, the Grenadillas, and St. Vincent were taken possession of; and Havana, the most important West Indian fortress belonging to the Spaniards, was wrested from them. The conquest of Pondicherry completed the degradation of the French arms in the East;

and the reduction of Manila placed the Spanish possessions in a perilous state. These acquisitions were important, and the enemies of Great Britain, compelled by her numerous conquests, now acceded to terms sufficiently advantageous to the British. The French relinquished all their possessions on the continent of North America; and the whole of that continent, to the E. of the Mississippi, was yielded to Great Britain. The islands of Martinique, Guadeloupe, Mariegalante, and Deseada (Desirade) were yielded to the French; the island of Cuba, to Spain; the other conquered islands were allowed to remain in the power of the British; the possession of Senegal, in Africa, was secured to Great Britain; and Goree was yielded to France. The East India Company restored to the French all their possessions in Asia, on condition that they should maintain neither forts nor troops in Bengal; and Manila was resigned to the Spaniards, who in return allowed the British to cut logwood in the Bay of Honduras. In Europe everything was restored to that state in which it had been before the war. This peace was concluded in Paris on Feb. 10, 1763.

The terms of this treaty were not such as the country had expected. Pitt, who had retired from office some time before, characterized it as "obscuring all the glories of the war, surrendering the dearest interests of the nation, and sacrificing public faith, by an abandonment of its allies." Lord Bute, "the new favorite," as he was called, felt himself unable to keep his ground as premier against the opposition, now composed of the ablest and most distinguished men of the country, and, making a merit of necessity, gave in his resignation, and was succeeded by Grenville. A general coalition of parties was soon after attempted, but without success, and party spirit raged with more keenness than ever. Among the political publications of the day, the "North Briton," edited by John Wilkes, member of Parliament for Aylesbury, was distinguished by its boldness and virulence. A prosecution was commenced against its author, but the proceedings instituted against him only tended to establish him more and more as the idol of the people. The new minister, however, got Parliament, after a hot debate, to declare the 45th number of the "North Briton" "a false, scandalous, and seditious libel"; and after this petty triumph, plunged himself into new and still more threatening difficulties. During the war, which had been undertaken chiefly for the defense of the colonies in America upward of £72,000,000 had been added to the national debt. When the ardor of conquest had abated, the payment of the interest of a debt so enormous excited many complaints. It appeared to the people of Great Britain to be extremely

just, that the Americans, on whose account great part of the debt had been incurred, should assist in the payment of the interest. The Americans, on the other hand, did not deny the justice of subjecting the colonies to taxes, but insisted that if the British Parliament claimed the right of taxing the colonists, these colonists had a right to be represented in Parliament, in order that, like other British subjects, they might be taxed only in consequence of their own consent. Grenville, however, was tenacious of his purpose, and introduced a bill for imposing certain stamp duties on the American colonies and plantations. General Conway and Colonel Barré in vain opposed the measure, and protested against the right thus assumed by the legislature; the minister carried his point, and the memorable decree went forth, which proved such a monument of British folly. Grenville's party, however, was shortly after supplanted by the Rockingham administration, which effected an important concession to the American colonies; but its measures gave offense to a high personage; and Pitt, now advanced to the peerage by the title of the Earl of Chatham, was directed to form a new ministry.

The new administration renewed the foolish plan of taxing the colonies; and, on Lord North's introduction into it, Lord Chatham again retired from office. Nothing could be more impolitic and unfortunate than North's administration for 12 successive years. The act of 1767, imposing certain port duties, was followed by the appointment of an American board of commissioners; and all the representations and complaints, as well as the demonstrations of excited feeling on the part of the Americans, were utterly lost on the infatuated ministry. In 1775 Lord Chatham's bill for settling the troubles in America was rejected by a majority of 61 to 32 voices; and next day Lord North moved an address to the king, declaring America in a state of rebellion. The humiliating result of the struggle which now ensued between the mother country and her colonies was such as the wise foresaw. Meantime London, in the month of June, 1780, exhibited a frightful scene of confusion and riot, in consequence of the popular agitation on the subject of the Roman Catholic Relief Bill, fomented by the insane conduct of Lord George Gordon. A heavy misfortune was also experienced this year, in the capture, by the Spaniards, of the East and West India fleets in the Bay of Biscay. The famous confederacy established by the Empress of Russia, under the name of the Armed Neutrality, aimed a severe blow at English continental connections at this juncture; and the appearance of Hyder Ali in the East threatened the safety of the British possessions in India. The raising of the

siege of Gibraltar, the taking of St. Eustatia, the action between the Dutch and British fleets on the Dogger bank, and the capture of a large part of the French Indian fleet, form the principal events in the concluding years of North's administration, who was driven from the helm in 1782.

The Marquis of Rockingham, as first lord of the treasury, and the Earl of Shelburne and Charles Fox, as secretaries of State, had conducted the new administration for a short period, when the death of the former nobleman led to new ministerial arrangements, and Pitt, the younger son of Lord Chatham, was appointed chancellor of the exchequer. On Nov. 30, 1782, the long-protracted struggle between Britain and her American colonies was brought to a close by the signing of provisional articles of peace at Paris. But ministerial propositions having been rejected in the meeting of Parliament after the recess, a resignation followed, and the celebrated coalition ministry, with the Duke of Portland as first lord of the treasury, and Lords North and Fox as secretaries of State, was organized. This ministry enjoyed a mere ephemeral existence. On the rejection of the India Bill, the two secretaries were required to deliver up their seals of office, and a new ministry was appointed on the succeeding day, at the head of which Pitt, then only 24 years of age, was placed as first lord of the treasury and chancellor of the exchequer. The affairs of Ireland and India, and the impeachment of Hastings, were among the first subjects which occupied the attention of Pitt's ministry. A treaty of defensive alliance between Great Britain and the United Provinces, and a similar treaty with Prussia, were signed in 1788. The discussion on the Regency Bill engrossed the attention of Parliament in the ensuing session.

The situation of France in the following year presented an object of engrossing and overwhelming interest to all Europe; nor was Great Britain the least interested spectator of that extraordinary moral and political revolution which convulsed her hereditary foe. Burke's "Reflections on the French Revolution," Paine's celebrated "Rights of Man," and Mackintosh's "Vindiciæ Gallicæ," contributed not a little to direct and inflame the zeal of the conflicting parties in Great Britain whose violence in several instances carried them far beyond the bounds of moderation. On the execution of Louis, an order was issued for the departure of the French ambassador at the court of London within eight days; and war was declared by the National Convention of France against Great Britain and Holland, on Feb. 1, 1793. The British ambassador had indeed been recalled from Paris during the insurrections which occurred in that city in the autumn of the

preceding year; but the declaration of war proceeded in the first instance from Paris. A speedy termination of the struggle, in favor of the allied powers, was certainly anticipated by Pitt before he lent himself to the coalition against France; but it soon appeared that the national resources of France had been greatly underrated. These, joined to the national enthusiasm, and in the hands of able and vigorous minded men, were such as enabled France, single-handed, to contend successfully against all Europe. The career of her armies, under such men as Bonaparte, Moreau, Kleber, and Hoche, was everywhere triumphant; and on the conclusion of the peace of Campo Formio, in 1797, Great Britain stood alone in the conflict. But the war now becoming strictly maritime, her attitude, not less strikingly than that of France in 1794, exhibited the advantage possessed by a nation when combining its resources on its proper element. In this first great contest France and Great Britain were placed successively in opposition to a confederacy of the other European powers, and successfully resisted the fearful odds brought against them; each nation also added largely to its territorial possessions; and each, though exhausted, continued capable of prolonging the contest.

The naval successes of Jervis off St. Vincent and Duncan off Camperdown were followed, when Napoleon led an expedition into Egypt having India as its ultimate object, by the victories of Nelson in Aboukir bay and Abercromby at Alexandria, the latter costing the commander's life. In 1798 a rebellion in Ireland, fomented by a body whose aim was to employ French assistance in securing Irish independence, had to be crushed. Peace was made in 1802 by the treaty of Amiens, only to be broken by another declaration of war in 1803, as the ambitious projects of Napoleon became evident. In spite of the efforts of Pitt (who died in 1806) in the way of forming and supporting with funds a new coalition against France, the military genius of Napoleon, by a series of great victories, culminating in Austerlitz and Jena, swept away all opposition on land, though the naval victory of Trafalgar (1805), in which the greatest of British seamen fell, established Great Britain's supremacy at sea. Napoleon, who had assumed the title of Emperor of the French in 1805, and was now virtually the ruler of Europe, put forth his Berlin Decrees in 1807, prohibiting all commerce with Great Britain wherever his power reached, set his brother Joseph on the throne of Spain, and occupied Portugal. But the spirit of resistance had now taken deep root in the British people, and the offers of peace made at Erfurt, by the Emperors of Russia and France were rejected by the British government. In 1808 troops were sent into Spain under Sir John Moore,

and a year later Wellington, then General Wellesley, landed in Portugal. Then began that famous series of successful operations known as the Peninsular War, which drove back the French into their own country, and contributed greatly to the ultimate downfall of the immense fabric of Napoleon's conquests. The main features of this war were the crushing defeat of Marshal Victor at Talavera; Wellington's formation of the celebrated lines of earthworks, the lines of Torres Vedras, by which he protected Lisbon and held the French armies under Masséna in check till he had accomplished the liberation of Portugal, and his subsequent victorious march through Spain, marked by many brilliant successes such as the capture of Almeida, Ciudad Rodrigo, and Badajos; the defeat of Marmont at Tormes, near Salamanca; the brilliant victory at Vittoria (1813); and the capture of St. Sebastian.

In the spring of 1814 the tide of battle rolled through the passes of the Pyrenees into the S. of France, where this great struggle was concluded by the crowning victory of Toulouse. Paris was occupied by the allies in 1814, and Napoleon was deposed and exiled to Elba. The restoration of the Bourbons in the person of Louis XVIII. followed the expulsion of Napoleon, and the French received a constitution based upon liberal principles. Great Britain gave back, without hesitation, all her French conquests, with the exception of Tobago, St. Lucia, and the Isle of France (Mauritius). At the same time she retained, of her Dutch conquests, the Cape of Good Hope and Dutch Guiana; of her Danish, Heligoland; and of her Italian, Malta; and she also obtained the protection of the Ionian Isles. Her acquisitions, in respect to territorial possessions and political importance, were therefore very great; especially as, at the same time, her East Indian dominions were increased by the acquisition of the territories of the King of Candy; so that the whole of Ceylon became subject to the British crown. Hanover likewise received considerable additions, and the name of a kingdom. On Feb. 26, 1815, Napoleon left the place of his exile, was joined by an army, and entered Paris on March 20. He sought to prevent the union of the Prussian troops of Blücher with the Anglo-Belgic force under Wellington, and to destroy both; a plan which, had it been successful, would have reëstablished his power. On June 16 he met and defeated the Prussians at Ligny, but his plan failed, and his own army suffered a crushing and final defeat at Waterloo on the 18th of the same month, and thus the great struggle terminated.

The political attitude of Great Britain had been for 23 years warlike. But victory brought bitter fruits even to Great Britain, which, after several years of peace,

came to maturity. A debt, of which the capital amounted to more than 40 years' revenue of the kingdom, and internal disturbances which threatened the greatest danger, demanded from the ministry the most cautious and judicious measures. The absurd opinion that war opens up such sources of prosperity to a country as compensate for the resources which it consumes had been contradicted by experience. Frugality and forbearance from all superfluous expense, particularly from war, have therefore been, since 1815, a guiding principle with most British governments, and the policy of Great Britain has become as peaceful as it had formerly been warlike. Great Britain formally opposed the principle, maintained by some of the other European powers, that the European association of States has a right to put down by force any attempt on the part of the people of an existing government to overturn it, namely, the right of armed interference, as it is called; and on the entrance of Canning into the department of foreign affairs, after the suicide of Londonderry, the British withdrew from the continental system of politics.

After the termination of the wars with Napoleon, notwithstanding the economy of the government, particularly shown in the reduction of the army, so great a burden was left upon the nation, and the bad harvests of 1816 and 1817 had made the necessities of the working people so urgent that this class of inhabitants were reduced to despair. A corn law passed in 1815 aggravated the seriousness of the situation, by prohibiting the importation of wheat till the price had reached 80s. per quarter. Discontent was expressed not merely in words but in acts. Riots were burned, machinery destroyed, and other measures, indicative of dangerous unrest, were resorted to by those on whom the troubles of the time lay heaviest. But the most important element in the situation was the rapid revolution in industrial conditions which was then in progress, and to the immediate results of this change much of the wretchedness of the lower and poorer classes was due. The various alleviating agencies, such as the enforcement of factory regulations and the growth of trade-unionism, which were later to spring from that revolution, were not then in existence, at least as effective forces; and thus large numbers of the working-classes were left exposed to the full fury of an unaccustomed change in industry at a time when even under normal conditions their lot would have been a hard one. In June, 1819, disturbances began in the manufacturing districts. Meetings were held, in which annual parliaments and a radical reform in the election of members were the great topics of declamation. The well-known Hunt was conspicuous on these oc-

casions. The assemblies went so far as to choose delegates for a new Parliament; and no one knew what a mob of many thousands might undertake next. Serious measures were therefore adopted. Such a mob at Manchester (Aug. 16, 1819) was dispersed by the authorities of that place by means of military force. On this occasion many persons were killed and wounded. The authorities were reproached, not only with having used force without necessity, but also as having violated the forms of law. Judicial proceedings were instituted against them, which ended with their acquittal. These violent excitements continued to assume every day a more dangerous character, and the ministry were compelled to propose to Parliament, at the end of the year, certain extraordinary measures, which were adopted by the Parliament, and were to be continued for five years. They consisted of five articles: (1) a prohibition of private military exercises; (2) of the possession of weapons; (3) of the liberty of holding meetings of the people without the permission of the local authorities; (4) a more rigorous punishment of libels, and of seditious or irreligious writings; lastly, (5) the acceleration of judicial proceedings in case of small offenses.

The long reign of George III. came to an end by his death on Jan. 29, 1820, his successor being his son George IV. The dangers of radicalism vanished, as peace, the consequent diminution of taxes, the increased demand for manufactures abroad, particularly in Spanish America, better harvests, and cheaper means of living, again improved the situation of the manufacturers. The renewal of specie payments, by which the value of the paper currency was increased, was also of great effect, and was particularly favorable to the manufacturers. The last convulsion of this disorder was the conspiracy of a band of desperate men, under the conduct of Arthur Thistlewood, a man who had sunk from a respectable standing by misconduct, to assassinate all the ministers. They were betrayed. Thistlewood and four of the other conspirators were executed, and four others were transported for life to Botany Bay.

If much revolutionary spirit had really existed in Great Britain, and given occasion to these disorders, instead of their having sprung, as they did, merely from want, it would have taken a very dangerous turn at the time of the trial of the queen. This trial, which was brought on by faults and passions on both sides, and in which all regard to female dignity and princely honor was trodden under foot, gave a new pretext, a new rallying point, to the discontented. It began, on the return of the queen to England (June 6, 1820), by a message to the Parliament to inquire into her conduct; whereupon a ministerial motion followed,

proposing an injudicious personal penal law (bill of pains and penalties), discreditable to the British legislature. The purport of the bill was, that Queen Caroline had forfeited the title, rights, and prerogatives of a Queen of England, and that her marriage with the king was to be regarded as dissolved. The shameful charges brought against the queen in Parliament were retaliated by the most bitter satire upon the king. The opposition among the people to this measure was so great that the ministers dared not bring into the lower house the bill passed in the upper. The time was likewise too dangerous, as the revolutions in Spain, Portugal, and Naples followed each other in quick succession.

The assassination of the Duke of Berry (Feb. 13, 1820), the Cato Street conspiracy (Feb. 23), were important symptoms. The crisis in Great Britain, however, passed quickly over. The disturbances among the manufacturers ceased as their wants were alleviated; the popularity of the king was reestablished by a journey through his dominions; and the queen was almost forgotten when she died, Aug. 7, 1821. (See GEORGE IV.)

But much more serious disorders, in the internal relations of Great Britain, appeared (1822), and showed the consequence of that disproportion which exists in the British Islands between the great landed proprietors and the actual cultivators of the ground. The property of the soil is in comparatively very few hands. Besides the clergy, who possessed about 6,000 estates, and the corporations, whose possessions might be reckoned at an equal number, there were then in England but about 20,000 landholders. The British law, which gives to the eldest son all the real estate, is itself sufficient to keep together large masses of landed property; but the pressure of war has done still more. In 1786 there were 250,000 landed proprietors. The small farmers are now, almost without exception, tenants; of whom Mr. Coke alone had 500 around him. In Scotland, the ancient common possessions of the clan have passed to the chief. In Ireland the ancient proprietors were almost all displaced by the confiscations of Elizabeth, Cromwell, and William III., and their landed estates divided among a few English families. Besides their own possessions, the established clergy in England have tithes from almost all real estate. In 1818 the high price of corn had sunk; and in 1820 the value of money was increased by the renewal of specie payments at the banks; so that ruin threatened the tenantry (in England the strength of the nation, and in Ireland the great mass of the people), from their inability to fulfil the terms of their leases, which had been made when the value of money was less. In England they expected

general poverty. In Ireland a famine arose in consequence of a bad harvest. In Scotland large numbers were expelled from their places of residence. One proprietor (in April, 1820) removed 600 families from their holdings, in the county of Ross; in the county of Sutherland, the Marchioness of Stafford did the same toward 15,000 persons, turning their farms into sheep-walks, for the sake of greater profit! In England, this state of the agricultural population excited far more anxiety than the disturbances of the manufacturing districts, because it affected a more important and energetic part of the nation, and sprang from a deep and permanent cause; but the means proposed to remedy the evil were various.

The ministry pointed out, as the true cause of this evil, the abolition of the income tax by act of Parliament, which they had, even in 1816, declared a victory of the rich over the poor, the consequences of which were now developed. By this victory all personal estates, the revenue from capital and from the colonial possessions, were exempted from taxation; in consequence of which the burden fell almost entirely upon the working class, and on the consumption of the necessities of life. The assertions of the opposition that the distress of the country was the consequence of the excessive taxes, were indeed not without foundation; but all the possible means of saving, particularly the abolition of sinecures, including clerical ones, could have afforded no real remedy, which was to be looked for in a more equal division of taxes,—a measure as disagreeable to the opposition as to the ministerial party. No one even dared to propose the obvious measure of the reduction of rents in proportion to the rise in value of the paper, consequent upon the resumption of specie payments by the bank. This increase in value amounted to 15 per cent.; and the rents should have been reduced in proportion. Some proprietors reduced the rents of their tenantry 10, 15, and even 30 per cent.; but we cannot say what proportion of them did so.

Great Britain was neutral during the French invasion of Spain, in 1823; allowed her subjects to aid the cause of Greece, and acknowledged the Greek insurgents' right of blockade. She concluded a treaty of trade and alliance with the new American republics, which she formally acknowledged in 1825. A bill for the removal of the Catholic disabilities was brought forward in this session and passed the House of Commons, but was lost in the House of Lords; and the disorders in Ireland continued. Between 1824 and 1826 a war was carried on with the Burmese, which resulted in the latter year in the cession of Aracan and the Tenasserim provinces to the East India Company.

In 1825 and 1826 great commercial difficulties took place, in consequence of a mania for speculation in foreign loans, and in costly undertakings, conducted by joint-stock companies, together with an overloading of foreign markets with British manufactures. Numerous bankruptcies took place, and credit experienced a great shock. Ministers availed themselves of this opportunity to mitigate the strictness of the corn laws.

The sympathies of all Christendom having been outraged by the events of the war going on between the Turks and Greeks, the British cabinet entered into an arrangement with Russia, to compel the Porte, dissuasion failing, to cease hostilities against its Christian subjects. On April 13, 1827, the Canning administration was formed; the French government soon after acceded to the Greek protective alliance; and a Turco-Egyptian fleet was annihilated by the allied fleet in the battle of Navarino, Oct. 20. Previously (Aug. 8) Canning died, and the premiership devolved on Lord Goderich. On Jan. 8, 1828, the latter resigned, and the Duke of Wellington formed a Tory cabinet, which abolished the Corporation and Test Acts; and in April, 1829, allowed the Catholic Relief Bill to pass. On June 26, 1830, George IV. died, and was succeeded by his brother; the Duke of Clarence, who took the title of William IV. Next month, a revolution and change of dynasty took place in France, which had a great effect in strengthening the ever-growing desire for reform in Great Britain. The duke, having expressed a determination to resist all radical changes, was outvoted on a critical question, and (Nov. 16) retired from office, when a reform administration succeeded, headed by Earl Grey. Lord John Russell brought in the first Reform Bill, March 1, 1831; but it was rejected. A second bill passed in the House of Commons, and finally a third bill was successfully introduced. The next great public measure was the abolition of slavery in every British possession, by an act passed Aug. 1, 1834. Other acts of great importance passed during William's reign were the Poor Law Amendment Act of 1834, and the epoch-making Municipal Corporations Act of 1835, now superseded, with all its amending acts, by the more recent act of 1882.

William IV. died June 20, 1837, and was succeeded by Victoria, daughter of the Duke of Kent, the fourth son of George III. The accession of the queen caused the separation of the kingdom of Hanover from that of England, for, in virtue of the law which excluded women from the Hanoverian throne, her uncle, the Duke of Cumberland, became king of that country. Queen Victoria was crowned on June 28, 1838, and was married to Prince Albert of Co-

burg-Gotha, Feb. 10, 1840. Their eldest son, afterward Edward VII., was born on Nov. 9, 1841. The reign of Victoria was specially noteworthy for social legislation and its association with the development of the great self-governing colonies. In 1846 the efforts of the Anti-Corn-Law League were crowned with success in the bill by which Sir Robert Peel inaugurated the free-trade policy of Britain. The famous Chartist movement was in full vigor during the first decade of the reign (see CHARTISM). In 1833 an act had been passed to limit the hours of children's labor in factories, and this was followed during the forties by several acts, culminating in the Ten Hours Act of 1847, which may be regarded as closing the first phase of factory legislation. To the same period belong the two noteworthy movements in the Scottish churches, by which were formed the Free Church (1843) and the United Presbyterian Church (1847), since 1900 joined together as the United Free Church of Scotland. The part of the late queen's reign that preceded the middle of the century was darkened by wars in Afghanistan and elsewhere, and in 1837-1838 the government had to deal with a rebellion in Canada. In 1851 (May 1) the Crystal Palace, or great museum of the world's industry, was opened. In 1852-1853 dissension arose regarding the rights of the Latin and Greek Churches to preferable access to the "holy places" in Palestine. The Emperor of Russia, resenting concessions made to French devotees, sent Prince Menschikoff to Constantinople, to demand redress for the pretended wrong. The result was a war in which Russia was opposed to Great Britain, France, and Turkey. The Crimea became the chief seat of the war, though military operations were also carried on between the Turks and Russians on the Danube, and several naval expeditions were sent to the Baltic.

Scarcely was the Crimean War over when Great Britain was threatened with the loss of her possessions in India through the mutiny of the Sepoys; but within eight months there were 70,000 British troops in India, and by the end of 1858 the rebellion was entirely crushed. One result of the mutiny was that, by a bill passed Aug. 2, 1858, the sovereignty hitherto exercised over the British possessions in India by the East India Company was transferred to the crown.

Before the mutiny was at an end Great Britain was engaged in hostilities both with China and with Persia. In the Chinese war the British were assisted by the French, and the war ended with the treaty of Tientsin (1858), by which five Chinese ports were opened to trade. The Persian war, which was of little importance, arose from the interference of Persia with He-

rat. The Chinese soon broke through the treaty of Tientsin, and hostilities were resumed. Peking was surrendered to a French and English force, and a fresh treaty made, October, 1860. Shortly before this began the volunteer movement which has been so successful. The Civil War in the United States, between 1861 and 1865, had a most injurious effect on one of the most important British industries. It almost entirely stopped the supply of raw cotton, and in consequence of this a large number of hands engaged in the cotton manufacture, chiefly in Lancashire, were thrown out of employment and reduced to the greatest distress. A matter which grew out of this war was the Alabama question, which for some years caused a good deal of bitterness of feeling between England and the United States, till it was settled by arbitration at Geneva in 1872. The society calling itself the Fenian Brotherhood, which had for its object the separation of Ireland from the United Kingdom, caused no little alarm between 1861 and 1867.

Another step in the direction of parliamentary reform was taken by the government of the Earl of Derby in 1867, when a bill to establish household suffrage became law. Two events worthy of mention marked the colonial and foreign policy of Lord Derby's government. One was the passing, in 1867, of a bill for the formation of the Dominion of Canada; the other was the sending out of an expedition to Abyssinia for the release of the British consul and the European missionaries who had been imprisoned by King Theodore. The expedition started in the autumn of 1867, and effected its object in the spring of 1868, but not before Lord Derby had retired from office owing to failing health. His successor was Mr. Disraeli, who had previously been chancellor of the exchequer under Lord Derby. A general election held in 1868 having left Disraeli's party opposed to an immense Liberal majority, he tendered his resignation (Dec. 2, 1868), recommending Mr. Gladstone as his successor. The administration of Mr. Gladstone was distinguished by a series of measures which made important changes both in Church and State. The session of 1869 saw the passing of a bill providing for the disestablishment and disendowment of the Irish Church on Jan. 1, 1871. In 1870 the Irish Land Bill, having for its object the regulation of the relations between landlord and tenant, became law; and during the same session an act of Parliament establishing a national system of elementary education for England was passed. In 1871 the purchase of commissions in the army was abolished by the use of the royal prerogative. Next followed the Eallot Act (1872), at first limited to eight years, but afterward made permanent,

and the Scotch Education Act (1872). Early in 1874 Mr. Gladstone dissolved Parliament, and a large Conservative majority being returned to the new Parliament, Mr. Disraeli (afterward Lord Beaconsfield) again became premier. The Ashanti war, begun the previous year, was brought to a successful termination early in 1874. In 1876 the title of Empress of India was added to the titles of the queen. The growth of the sentiment known as imperialism is usually dated from about this time, and the impulse toward it is largely to be attributed to Disraeli. During the Russo-Turkish war of 1877-1878 Great Britain remained neutral, but took an important part in the settlement effected by the Berlin Congress, and acquired from Turkey the right to occupy and administer Cyprus.

The Afghan war of 1878-1879 and the Zulu war of 1879 belong to the closing years of Lord Beaconsfield's administration. The general election of 1880 gave the Liberals a large majority. Mr. Gladstone again became premier, and during his five years' ministry the following among other acts were added to the statute book: A new Irish Land Act (1881); an act for putting down crimes in Ireland (1882); Corrupt Practices Act (1883); a new reform act equalizing the borough and county franchise (1884); and a Redistribution of Seats Act (1885), the last two secured by an agreement with the opposition leaders. The annexation of the Transvaal, carried out in 1877 by the previous ministry, led to war with the Transvaal Boers in 1880-1881. Before this war had proceeded far the British troops in Natal had met with serious reverses at Laing's Nek and Majuba Hill, and (as the Orange Free State threatened to join the Transvaal) Mr. Gladstone thought it prudent to conclude peace with the Boers on the basis of a limited independence of the Transvaal. The limitations were largely done away with in 1884, and the Transvaal became known as the South African Republic. The rebellion of Arabi Pasha in Egypt in 1882 led to the bombardment of Alexandria by the British fleet and to military operations in Northern Egypt; and the revolt in the Sudan under Mohammed Ahmed, known as the Mahdi, led to the separation of the S. provinces from Egypt. The failure to relieve Khartum and save General Gordon contributed largely to make the ministry unpopular. A new Parliament was elected in the end of 1885, and for a brief period Lord Salisbury was premier, but in February, 1886, he made way for Mr. Gladstone. The Liberal leader had now determined to adopt the plan of Home Rule, which had for some time been demanded by Irishmen, and in 1886 he introduced his first Home Rule Bill. On its defeat in the Commons he appealed to the electorate, who declared

against it, and Lord Salisbury again became prime minister.

The most important acts passed under the second Salisbury administration were the Local Government (England and Wales) Act (1888) and Local Government (Scotland) Act (1889), which established county councils; and the Free Education Act (1891). At the general election of 1892 the Home Rule party obtained a small majority in the House of Commons, and Mr. Gladstone entered on his last term of office. His second Home Rule Bill (1893) passed the lower House, but was rejected in the House of Lords. Of the measures which became law under this administration the most notable are the Local Government Act of 1894, under which Parish and District Councils were formed; and the Finance Act of 1894, which made important changes in the death duties. Mr. Gladstone's health compelled him to resign the premiership in 1894 (four years before his death), and Lord Rosebery then became head of the government. A general election took place in 1895, with the result that the Conservative-Unionist party obtained a very large majority. Lord Salisbury again formed a ministry, under which the chief statutes and events were the following: Agricultural Rates Act (1896); the Education Act (1897), giving greater financial assistance to voluntary schools; Workmen's Compensation Act (1897), superseding and extending the Employers' Liability Act of 1880; the Vaccination Act (1898), a partial concession to the opponents of vaccination; the Local Government (Ireland) Acts (1898 and 1900), extending to Ireland the system of local government enjoyed by England and Scotland; the recapture of Khartum and the reconquest of the Egyptian Sudan (1898); the settlement of the Venezuela boundary dispute by arbitration (1899); and the Commonwealth of Australia Constitution Act (1900), by which the federation of the Australian colonies was finally accomplished. Early in October, 1899, war broke out with the Boer republics of South Africa, a war which proved to be perhaps the most serious waged by the country since Waterloo (see SOUTH AFRICAN WAR). Fighting also took place in 1900 in Ashanti and China. Toward the end of 1900 Lord Salisbury appealed to the country, and a new general election gave his party a majority of about 130. On Jan. 22, 1901, took place the death of Queen Victoria in her 83d year. Her jubilee (1887) and diamond jubilee (1897) had been celebrated with great pomp and rejoicing, and her death was not only the cause of sorrow throughout the whole of the widespread British empire, but called forth tributes of sympathy from all civilized peoples. Her reign of 63½ years is the longest in the history of the United Kingdom.

and witnessed greater material and intellectual progress than any previous one. She was succeeded by her eldest son, Albert Edward, Prince of Wales, who has elected to be known as Edward VII. He was married in March, 1863, to the Princess Alexandra of Denmark (now Queen Consort), and their son, Prince George, became heir-apparent to the crown.

Constitutional History, Government, Etc.—The British constitution is in nearly every important respect unique. It is a conspicuous instance of gradual evolution, resulting in the end in the creation of a system of law and government superior in comprehensiveness, in stability, in elasticity, to any of the numerous constitutions drawn up on what were supposed to be the most enlightened and logical principles. One of the best examples of the characteristically English development of important institutions entirely outside of written law or formal legislative enactment is the position occupied by such a body as the cabinet, a body never officially recognized by any act of Parliament, and wholly unknown to the written law, yet practically the highest executive body in the kingdom, though nominally the executive government is vested in the sovereign. On this subject the late Mr. Bagehot remarks: "The efficient secret of the English constitution may be described as the close union, the nearly complete fusion, of the executive and legislative powers. According to the traditional theory as it exists in all the books, the goodness of our constitution consists in the entire separation of the legislative and executive authorities, but in truth its merit consists in their singular approximation. The connecting link is the cabinet. By that new word we mean a committee of the legislative body selected to be the executive body." The English constitution does not exist written in any single document, nor even in a few or in many documents; much of it, indeed its most vital and important part, is based on custom hardened into inviolable precedent, and is in a sense unwritten. The principal sources of British constitutional law have been arranged under four heads, namely: (1) Treaties or quasi-treaties, (2) the precedents and customs known as common law, (3) compacts, and (4) statutes. The last is at the present day practically the only method by which the British constitution may receive additions and modifications, and to its scope there are no theoretical limitations. The treaties of constitutional importance are the Act of Union with Scotland, passed in 1707, and the Act of Union with Ireland, passed in 1800, each consisting really of two statutes, and these created the United Kingdom and the Imperial Parliament. The second source, customary law,

though unwritten in a sense, is now embodied in a mass of judgments, opinions of eminent lawyers, and other similar documents. It includes—and this is most characteristic of English institutions—many of the most important matters of public polity, such as the organization and inter-relations of the crown, cabinet, lords, and commons. The compacts refer to the powers of the crown considered as distinct from and opposed to the nation, and include the Great Charter of 1215, the Bill of Rights of 1689, and the Act of Settlement of 1700, which have been called "the title-deeds of English political liberty." They have something of the character of ordinary statutes, but differ in the peculiar part played by the king in respect to their provisions. The great extension of the franchise brought about by recent statutes and the introduction of voting by ballot have had the effect of giving the constitution far more of a democratic character than formerly, with what result in further legislation remains to be seen. The existence of a body of hereditary legislators is objected to by many, but the question of "ending or mending" the House of Lords can hardly as yet be said to have become a "burning" one.

The Sovereign.—Under the title of a constitutional and hereditary monarchy the government of Great Britain is vested in the sovereign and the two houses of Parliament—the House of Lords and the House of Commons. The fundamental maxim upon which the right of succession to the throne depends is that the crown is, by common law and constitutional custom, hereditary, and that the right of inheritance may from time to time be changed or limited by Parliament; under which limitations the crown still continues hereditary. It descends to the males in preference to the females, strictly adhering to the rule of primogeniture. The sovereign is of age at 18 years. The heir to the crown has, since the time of Edward III., inherited the title of Duke of Cornwall, and receives that of Prince of Wales by letters patent. The power of the sovereign is limited by the laws. The divine right, so obstinately maintained by the Stuarts, was never recognized by the nation, and William III., Mary, and Anne ascended the throne, according to express declarations, only by virtue of a transmission of the crown to them by the nation. One of the most important attempts to override the law by the authority of the crown was the abuse by James II. of the dispensing power, an infringement of the ancient liberties of the realm which was one of the chief causes of the Revolution of 1688. The maxim has, however, been acknowledged, particularly since the Restoration, that there is no power in the State superior to the royal

prerogatives; the acts of the king are therefore subject to no examination, and the king is not personally responsible to any tribunal; hence the maxim, "The king can do no wrong." Yet there is sufficient provision for confining the exercise of the royal power within the legal limits. (1) All royal acts are construed in accordance with the laws, and it is taken for granted that the king can never intend anything contrary to law. (2) The counsellors of the king are responsible for the royal acts, and, as well as all those who are concerned in the execution of them, are liable to impeachment and examination, without the right of defending themselves by pleading the royal commands. (3) The Parliament and the judicial tribunals have also the right to discuss freely such royal acts, and, in particular, Parliament and each individual member of the upper house, has the right to make remonstrances to the crown. (4) Individuals are protected from any abuses of the royal power by the Habeas Corpus Act of 1679, the liability of the agents to prosecution, the right of complaining to Parliament, recourse to the courts of justice, and the liberty of the press. The Habeas Corpus Act was not an enactment of a new principle, but rather, like several other great measures in English history, a redeclaration, accompanied by stringent regulations, of a long-recognized though often violated principle. The same purpose is served in Scotland by the Wrongous Imprisonment Act of 1701. A sovereign determined to use the extensive power ascribed to him under the constitution could, in spite of these safeguards, cause considerable trouble to Parliament and the nation, but revolution remains as a last resort. For long, however, and especially during the reign of Victoria, the Crown has virtually left the business of the country in the hands of the legislature and the officers of State.

The king is the supreme head of the State in peace and war, the lord paramount of the soil, the fountain of justice and honor, and the supreme head of the Church. The supreme headship of the Church as belonging to the sovereign dates only from the ecclesiastical changes of Henry VIII.'s reign. The king also has the prerogative of rejecting bills in Parliament, which, however, has not been exercised for some 200 years. As the generalissimo, or the first in military command within the kingdom, he has the sole power of raising and regulating fleets and armies, which, however, is virtually controlled by the necessity he is under of obtaining supplies from Parliament. As the fountain of justice, and general conservator of the peace of the kingdom, he alone has the right of erecting courts of judicature, and all jurisdictions of courts are derived from the Crown

As the fountain of honor, of office, and of privilege, he has the power of conferring dignities, privileges, offices, etc. In the foreign relations of the nation he is considered the nation's representative, and makes treaties, declares war, etc. As advisers he has the privy council and the cabinet. The former of these developed out of the old Anglo-Saxon Witenagemôt through its feudal equivalent, the Commune Concilium, but the latter as already indicated, is a much more recent and far more important development. We can trace germs of a cabinet under Cromwell and Charles II., but it did not really assume its distinctive form till after the great revolution. Under William III. and his immediate successors it grew in power, reaching a culminating point under Walpole. During the earlier years of the reign of George III. it declined, but with the younger Pitt and his successors it again took an important place in the political system; and since then it has grown steadily in power until now it has virtually gained the right of determining the bills to be submitted to Parliament. In the cabinet are included all the greater officers of State, such as the first lord of the treasury, the secretaries of State for foreign affairs, for the home department, for the colonies, and for India, and others, and thus the cabinet is in reality at the head of the administration. Consequently it forms a link between the legislative and executive departments of the State, as above pointed out.

The Parliament.—The origin of the Upper House of the British Parliament has been sought rightly enough in the Witenagemôt (literally "meeting of the wise men") or national assembly of the Anglo-Saxons, which under some of the kings had much the character of a royal council. In a somewhat different form, due to its adaptation to feudal territorial conceptions, the Witenagemôt was continued in the Norman times. Gradually, however, the Great Council, as the Witan was called under the Norman kings, began to divide into sections, owing to the great increase in its business which took place after the Conquest. Its judicial functions were step by step separated from its legislative and executive and its financial work, and from this separation, begun under Henry I., greatly advanced under Henry II., and completed in its main features under Edward I., arose several of the leading elements in the British national constitution. The Exchequer represents the Great Council as the supreme financial body, the Courts of King's Bench, Common Pleas, etc., continue its judicial functions, the Privy Council retains in part its administrative character, while the House of Lords, though retaining a small portion of the judicial authority of its progenitor, mainly performs

another function virtually inherent in the Great Council, that of legislation. For the origin of the Lower House, or House of Commons, we must look elsewhere, namely, to the old shire courts, which originally dealt only with local affairs, but latterly sent elected representatives to a central body to act for them in national affairs, and especially to provide the necessary taxes. When the boroughs increased in importance and numbers they were similarly represented; and in De Montfort's Parliament of 1265 there appeared representatives not only of the greater barons, including the greater ecclesiastics, but also of the shires and of the boroughs. In the Parliament summoned by Edward I., 30 years later, the same mode of representation was carried out in a more thorough manner. The shire and borough representatives, though at first distinct, gradually coalesced, and thus the Parliament came to be regarded as including three estates, now known as the lords spiritual, the lords temporal, and the commons.

In the reign of Edward III. (1327-1377) the separation of the estates into two houses—the House of Lords, consisting of the lords spiritual and the lords temporal, and the House of Commons, consisting of the knights, citizens, and burgesses—became settled, though the time at which the Commons began to sit as a separate assembly is not definitely known. The Upper House is thus an older institution than the Lower. All the peers were not originally entitled to a seat as a matter of right, but only those who were expressly summoned by the king. Every peerage of the United Kingdom conferred now, however, gives the right of a seat in the House of Lords or Upper House. The number is indefinite, and may be increased at the pleasure of the crown, which, however, cannot deprive a peer of the dignity once bestowed. The Upper House at present comprises about 580 members. By the act of union with Scotland, 16 representatives of the Scottish peerage are elected by the Scottish nobility for the duration of each Parliament, and 28 are elected for life by the peers of Ireland. No parliamentary measure can become a law till it has passed the House of Lords as well as the House of Commons. In the Upper House the lord-chancellor presides, holding the position of the speaker in the Commons, with this difference, that he has the right to take part in debate as an ordinary member of the House. All grants of subsidies or parliamentary aids must originate with the House of Commons, and the Lords have not the right to amend, but only to accept or reject, a money bill.

The Parliament is not permanent, and it is the royal prerogative to summon and dissolve it. As the Parliament is sum-

moned, so it is prorogued, by the royal authority. A dissolution of Parliament is effected either by the authority of the crown or by length of time. The House of Commons being chosen but for seven years, at the expiration of that time Parliament is dissolved *ipso facto*. The Lower House of Parliament has the direction of all financial concerns; and there is perhaps no subject which may not be brought before it by petition, complaint, or motion of a member. The Upper House is the supreme court of judicature in the nation. In civil cases (as now represented by the Lords of Appeal in Ordinary) it is the supreme court of appeal from the superior tribunals of the three kingdoms. In indictments for treason or felony, or misprison thereof, where the accused is a peer of the realm, the House of Lords are the judges of the law and the fact. In cases of impeachment by the House of Commons the House of Lords are also the judges. All the forms of a criminal trial are then observed, and the verdict must be by a majority of at least 12 votes. The House of Commons is in no sense a court of law, and, powerful as it is, it cannot revise, amend, or in any way interfere with a judgment duly given in a court of law.

Parliamentary Reform.—The House of Commons in the first Parliament of Henry VIII. consisted of 298 members, a number largely increased by royal charters and by the Acts of Union, which gave 45 members to Scotland and 100 to Ireland. Just previous to the Reform Bill of 1832, therefore, it consisted of 658 members, of whom 513 were for England and Wales, 45 for Scotland, and 100 for Ireland. In this representation there were great injustices and anomalies. Many of the boroughs had quite fallen into decay, so that a place like the famous Old Sarum, which consisted only of the ruins of an old castle, sent two members to Parliament, while great manufacturing towns like Manchester and Birmingham were absolutely without representation. Not only the rotten boroughs, as these decayed constituencies were called, but also in many cases the towns, in which the right of suffrage belonged to a small number of freeholders, were practically in the hands of a single family, and in this way a few great houses—Norfolk, Bedford, Devonshire, and the Pelhams, etc.,—commanded more than 100 seats in Parliament. For the few places that were in the hands of independent voters a shameless system of bribery existed, in spite of the prohibitory laws, and the prices of votes were generally well known: a seat for a small place cost about £5,000. This state of matters led to long-continued agitation for parliamentary reform, and ultimately, on March 1, 1831, Earl Grey being then premier, Lord John Russell in-

introduced a plan of reform proposed by the government. On the 22d the English bill passed its second reading in the Commons by a majority of one, but the government suffered defeat in committee on a proposal not to reduce the number of members for England and Wales. A dissolution followed, but the Whigs again came into power under the same prime minister, and on June 24 Lord John Russell brought his second Reform Bill before the newly-elected House. This bill, in which the proposed diminution of the number of English members was abandoned, finally passed the Commons on Sept. 21 by 349 to 236, but was rejected by the Lords by 199 to 158. On Dec. 6, when Parliament met after the prorogation, a third Reform Bill was introduced by Lord John Russell, and passed the Commons on March 23, 1832. In the Upper House the government was defeated on an amendment proposed by Lord Lyndhurst, whereupon Earl Grey asked the king either to create sufficient new peers to carry the bill, or to accept his resignation. The latter alternative was adopted, and the Duke of Wellington undertook the impossible task of forming an anti-reform ministry. On May 18 the Whigs were reinstated with the assurance of being provided with the means of passing the bill, and finally it passed the Lords by 106 to 22, owing to the absence of many of the opposition, who did not want to force the creation of new reform peers. The royal assent was given on June 7. The Reform Bill of 1832 brought great changes. Occupiers of lands or tenements in counties at yearly rent of not less than £50, and occupiers as owner or tenant of a house or shop in a borough of a yearly value of £10, now received the franchise. Fifty-six rotten boroughs were wholly disfranchised; 30 boroughs were deprived of 1 member; and 1 borough (Melcombe-Regis cum Weymouth, which had 4) of 2 members; 22 boroughs were created in England to return 2 members each, and 20 boroughs to return 1 member each. Besides taking away the right of election from many insignificant places, and vesting it in large, or at least in tolerably populous constituencies in new boroughs, the act introduced something like uniformity in the qualifications of the voters of the old boroughs and cities, and extended the elective franchise from close corporations, or privileged bodies to the citizens at large.

The Reform Bill had not been long in force when a further extension of the franchise began to be demanded. After several unsuccessful attempts by Lord John Russell, Lord Palmerston, and Mr. Gladstone to pass reform bills, in 1867 Mr. Disraeli, then chancellor of the exchequer, succeeded in carrying through a bill which conferred the borough franchise on all householders

who had resided in the borough for 12 months previous to the last day of July in any year, and had been assessed for and paid poor rates, and on all lodgers who had occupied for a like period lodgings of the yearly value of £10 unfurnished. In counties the franchise was bestowed on occupiers as owners or tenants of subjects of £12 ratable value, and the copyhold and leasehold franchise was reduced from £10 to £5. This bill related only to England and Wales, but bills of a similar character were passed for Scotland and Ireland in the following year. In this way the electorate, which was 1,352,970 in 1867, rose to 2,243,259 in 1870, but the total number of members still remained at 658. To Manchester, Liverpool, Birmingham, and Leeds were assigned 3 members each, and to London University 1. Populous counties were further divided, and to many of the divisions 2 members each were given. This act, though in some ways it did not effect so great a change as that of 1832, is of even greater importance, since it may be regarded as marking the beginning of the present democratic system of representation.

From the union of Scotland with England in 1707 till 1832 the former returned 45 members to the House of Commons, 30 for the 33 counties, and 15 for 15 districts of burghs. Superiors, or persons holding directly from the crown, alone voted in the counties. In 2 counties there were only 3 real voters in each. The number of persons who actually voted at the elections of the burghs was very inconsiderable, consisting, in general, of the magistrates and town council, amounting only to 20 in each burgh, or in all the 66 burghs to 1,320. By the Scotch Reform Act of 1832, 9 members were added to the representation; Edinburgh and Glasgow receiving 2 each, and Aberdeen, Dundee, Greenock, Perth, and Paisley 1 each. The right of voting was also placed as near as possible on the same footing as in England; but the number of members, though increased, was not in proportion with those allotted to England, or even to Ireland. By the Scotch Reform Act of 1868 the burgh franchise was assimilated to that of England, being conferred on householders, but in counties the occupation tenure was £14 or upward. Seven additional seats were given: 1 to the universities of Aberdeen and Glasgow jointly, 1 to those of Edinburgh and St. Andrews (the university electors being the members of the general councils), 1 to Glasgow city (which now had 3), 1 to Dundee (which now had 2), and 1 each to the counties of Lanark, Ayr, and Aberdeen, which were divided into 2 divisions, each returning a member.

Since the legislative union with Great Britain in 1801 Ireland had sent 100 members to the House of Commons, 64 for the

32 counties, 2 each for Dublin and Cork, 1 each for 31 other cities and boroughs, and 1 for Dublin University. By the Reform Act of 1832, 5 members were added, namely 1 each to the towns of Belfast, Galway, Limerick, and Waterford, and 1 to the university; and £10 copyholders, etc., were admitted among the classes of county voters. In 1850 occupiers of land rated at £12 a year were admitted to vote. In the borough franchise the £10 qualification for owner or occupant was adopted in the reform of 1832, much the same as in England; and by the act of 1850 the franchise was further extended to £8 occupiers. By the Reform Bill of 1868 the occupation franchise in towns was reduced from £8 to £4, and for lodgers it was fixed at the same as in England and Scotland.

The Representation of the People Act of Dec. 6, 1884, established a uniform householder and a uniform lodger franchise throughout the kingdom, and increased the electorate by about 2,500,000 voters. Equally important changes were effected by the Redistribution Act passed in June, 1885. By it 79 small boroughs in England and Wales (including four districts of boroughs in the latter) and 24 in Ireland ceased to return members separately, while in Scotland the Haddington and Wigtown districts of burghs lost the burgh franchise. In England 36 small boroughs, and in Ireland 3, lost one member each. The members for Liverpool were increased to 9, for Birmingham, the Tower Hamlets, and Glasgow to 7 each, for Manchester to 6, for Leeds and Sheffield to 5 each, and other important centers in proportion. Thirty-three new boroughs, chiefly in the London metropolitan district, were created. Many of the larger boroughs were divided and a member given to each division; large counties were dealt with in a similar way. The numerical strength of the House was also raised, the gross number of members being 670, of which England gets 465 (2 additional), Wales 30 (as before), Scotland 72 (12 additional), and Ireland 103 (2 less). The following is a summary of the distribution of members according to the act of 1885:

ENGLAND.	
4 counties with 2 members each, 5 with 3 each, 9 with 4 each, 5 with 5 each, 4 with 6 each, 5 with 7 each, 5 with 8 each, Lancashire with 23, Yorkshire with 26, Rutland and Isle of Wight with 1 each.....	234
8 cities and boroughs with 1 each, 28 with 2 each, 9 with 3 each, and 5 with 4 each..	187
Leeds and Sheffield 5 each, Manchester 6, Birmingham and Tower Hamlets 7 each, and Liverpool 9	39
Universities	5
	465
WALES.	
8 counties 1 each, 3 with 2 each, Glamorgan 5	19
7 districts of boroughs 1 each, Swansea and Merthyr Tidyvil 2 each.....	11
	30

SCOTLAND.	
23 counties with 1 each, 5 with 2 each, Lan- arkshire 6	39
16 burghs with 1 each, 2 with 2 each, Edin- burgh 4, Glasgow 7.....	31
Universities	2
	72
IRELAND.	
21 counties with 2 each, 8 with 4, 1 with 7, 1 with 1, 1 with 3.....	85
6 boroughs with 1 each, 2 with 4 each, 1 with 2	16
University	2
	103
Total	670

Ranks and Titles.—The laws acknowledge only two distinctions of rank or civil status, the nobility and the commonalty. The distinction is by no means like that between the patricians and plebeians in ancient Rome, nor that between the nobles and citizens of France in the 18th century, and the peculiar privileges of the nobility are few and insignificant. Intermarriages with commoners are usual, and the sons of peers mingle with commoners in the House of Commons, where wealth, talent, and industry are at least as well represented as birth. Moreover, the House of Lords is continually recruited from the general body of commoners by the conferring of peerages on distinguished men. The peers are exempted from the performance of certain unimportant public services, such as sitting on juries, etc. They have also a right to be tried by the House of Lords on indictments for treason, or felony, or misprison thereof; but the administration of justice before this tribunal is as strict as in the ordinary courts. Their persons cannot be arrested in civil cases. The titles borne by those who form the peerage are, in a descending scale, duke, marquis, earl, viscount, baron. Of these, earl is the oldest, this title dating from the Anglo-Saxon period when it was equivalent to that of *ealdorman* or governor of a shire (see ANGLO-SAXONS). After the Conquest the title of baron came into use. The barons formed an inferior class of nobles to the earls, though the term was also used to include all tenants-in-chief. The title of duke arose under Edward III., who created his eldest son Duke of Cornwall (1337). The title of marquis was introduced in the time of Richard II.; that of viscount during the reign of Henry VI. It is only the actual holders of these titles who are, strictly speaking, the nobility; their families are only noble by courtesy. The chief privilege that the titles confer is a seat in the House of Peers or—since the term lord is often used as equivalent to peer—the House of Lords. The Scottish and Irish peers sit in the House only by deputation; but many Scottish and Irish peers have also titles belonging to the peerage of Great

Britain or the United Kingdom in virtue of which they sit; thus, the Marquis of Lothian sits as Baron Ker. The titles of nobility just mentioned are inherited by the eldest son, who, during the life of the father, as a rule bears by courtesy his next highest title if he is a duke, marquis, or earl; if the father be a viscount or baron, the son is only an "honorable." Any of the sons of a duke or marquis is called lord, but only the eldest son of an earl is so called. Next below the rank of the nobility are the baronets. This dignity was created by James I. in 1611, and descends to the eldest son. There are no privileges annexed to the baronetcy, but the title is considered an honor, and is often bestowed on men who have distinguished themselves in a civil or military capacity. Below the baronets are knights (who also have Sir before their names) and esquires, and all others that may be classed among the gentry. The knights are either members of one of the orders of knighthood, or they are knights bachelors. The term gentry is sufficiently vague, but may be said to include the richer landed proprietors, and all to whom wealth, office, or talents have secured a certain respect and standing in society. All these may be said to have a claim to be considered as of the rank of esquires, which, however, by law is somewhat restricted in its application.

Army and Navy.—The British army is raised on the authority of the sovereign, who is looked upon as its head, and from whom all officers derive their commissions; but the number of troops maintained and the cost of the different branches are regulated annually by a vote of the House of Commons. The maintenance of a standing army in time of peace without the consent of Parliament is prohibited by the Bill of Rights of 1689. From that time onward to 1879 an act called the Mutiny Act was annually passed for regulating the management of the army and enabling the sovereign to frame the Articles of War to serve as the military code. An Army Annual Act is now passed for the same purpose, and the regulations accompanying it contain the military law of the country. Till recently the whole of the military departments of the army were under the commander-in-chief as supreme head, the civil department being under the financial secretary; at present the secretary of State for war exercises control over all departments of the military service of the country, and the heads of departments, whether military or civil, are responsible to him. No British citizen is obliged to bear arms except for the defense of his country, but all able-bodied men from 18 to 30 years of age (with the exception of certain classes) are liable to service in the local militia, the militia being raised when

required by ballot. Enlistment among the regulars is either for 12 years' army service (long service), or for 7 years' army service and 5 years' reserve service (short service). The regular army of Great Britain consisted in 1902 of a total of about 180,000 men of all ranks besides about 74,000 serving in India. There were in addition the four classes of reserve or auxiliary forces, namely, the militia, the army reserves proper, the volunteers and the yeomanry cavalry. The grand total of all branches at home and abroad amounted to fully 740,000 men. The volunteer force has been in existence only since about 1859. The British army is small when compared with that of some of the Continental States, but the reverse is the case with the navy, which is to be regarded as the main defense of the empire and its extensive commerce.

Alfred the Great is commonly regarded as the founder of the British navy, but as a permanent establishment its origin is rather to be attributed to Henry VIII. Under him were established the admiralty office and the dockyards of Deptford, Woolwich, and Portsmouth, the personnel of the navy at this time numbering about 8,000 men. Under Elizabeth the strength of the navy was greatly increased, and it continued to advance till at the Revolution of 1688 the navy was manned by over 40,000 men. About the middle of the following century there were some 70,000 seamen and marines serving in the navy. The end of the 18th and the early part of the 19th century formed a glorious period in English naval history. In 1814 the navy consisted of some 900 vessels, manned by 146,000 men. After the peace the naval forces were greatly reduced in strength and the number of men employed has never been so great since. The introduction of steam as a propelling power, and of iron and steel as materials of construction, has worked an immense change in the character of the navy, and the "wooden walls" of England have become a thing of the past. In 1902, including officers, seamen, boys, and marines, there were about 106,000 of all ranks in the British naval service. Formerly the navy was under the administration of a Lord High Admiral, but since the accession of William III. such an official has rarely been appointed, and a board of admiralty has taken his place. This board now consists of six members, at their head being the "first lord," who is always a member of the cabinet, and is responsible for the general direction and supervision of all naval business. Under him are four naval lords (men holding a distinguished position in the service) and a civil lord.

Finances, Revenue, and Expenditure.—The practice of borrowing money in order to defray a part of war expenditure began

in the reign of William III. At first it was customary to borrow on the security of some tax, or portion of a tax, set apart as a fund for discharging the principal and the interest of the sum borrowed. This discharge was, however, very rarely effected. The public exigencies still continuing, either the loans were continued, or the taxes were again mortgaged for fresh ones. At length the practice of borrowing for a fixed period, or, as it is termed, upon terminable annuities, was almost entirely abandoned, and most loans were made upon interminable annuities, or until such time as it might be convenient for the government to pay off the principal. Owing partly, perhaps, to the scarcity of disposable capital at the time, but far more to the supposed insecurity of the revolutionary establishment, the interest paid by the government on these loans was comparatively high, and it was, moreover, subject to considerable variation. As the country became richer and the confidence of the public in the stability of the government was increased, ministers were able to take measures for reducing the interest.

In the reign of George II. it was determined that the practice of varying the interest should be stopped. Instead of varying the interest on the loan, the rate was generally fixed at 3 or $3\frac{1}{2}$ per cent., the necessary variation being made in the principal funded. Thus, if the government were anxious to borrow in a 3 per cent. stock, and could not negotiate a loan for less than $4\frac{1}{2}$ per cent., they effected their object by giving the lender, in return for every £100 advanced, £150 3-per-cent. stock—that is, they bound the country to pay him or his assignees £4, 10s. a year in all time to come, or, otherwise, to extinguish the debt by a payment of £150. In consequence of this practice the principal of the debt now amounts to far more than the sum actually advanced by the lenders. Some advantages, however, are derivable from this system. It renders the management of the debt and its transfer more simple and convenient than if it consisted of a great number of funds bearing different rates of interest.

At the time of the death of William III., the public debt, partly by reason of the long wars, amounted to £16,394,702, the public income being £3,895,205. By far the greater part of the next reign also was a time of war, and on the death of Queen Anne the national debt amounted to £54,145,363. The reign of George I. was undisturbed by war, which enabled the government of the time to reduce the debt by £2,053,125, so that at the accession of George II. the whole amount of the debt was £52,092,238. The first 12 years of the reign of the new king were passed in profound peace, but during the latter years of his reign the

country was engaged in extensive wars. The total expense of the wars that were carried on between 1739 and 1748 was estimated at £46,418,680, and the cost of the Seven Years' War was £111,271,996. At the conclusion of the peace of Paris in 1763, after the Seven Years' War, the total debt amounted to £138,865,430. Between the peace of Paris in 1763 and the outbreak of the American war in 1775 the national debt was again reduced, the amount of the reduction being £10,281,795. Thus, at the outbreak of the American Revolution the national debt was £128,583,635. To this that war added £121,267,993, but above £10,000,000 was cancelled between the close and the commencement of the French war, when the debt stood at £239,350,148. During the French war £601,500,343 of new debt was contracted, and on Feb. 1, 1817, when the English and Irish exchequers were consolidated, the total debt was £840,850,491. A considerable reduction was effected between that year and the outbreak of the Crimean War, which again added nearly £33,000,000 to the total, so that in 1857 it amounted to £837,144,597. Since then the debt has been greatly reduced. In 1875 a special act was passed providing for the reduction of the debt, and on March 31, 1901, the whole amount of it was £690,992,622, carrying an annual interest charge of £19,835,489. This includes both a funded and an unfunded debt. The latter species is that for which no formal provision has been made, or for which the provision has proved insufficient, or has not been forthcoming at the time when it was required. The form in which it mostly exists is that of exchequer bills, which bear interest at so much per cent. per day, and pass from hand to hand like bank-notes. After a certain time they are received in payment of taxes or other moneys due the government, and the interest due on them is allowed in the payment. These bills were first issued in 1696. There are none now issued under £100, and many are for £500, £1,000, and larger sums. They are frequently converted into funded debt by granting capital in some of the stocks to the holders. In 1901 the total debt was divided as follows: Funded, £551,182,153; terminable annuities, estimated capital value at 3 per cent., £61,677,469; unfunded, £78,133,000; total, as above, £690,992,622; other capital liabilities, £14,731,256; grand total, £705,723,878. Against this might be put certain assets, more especially the shares acquired by Great Britain in the Suez Canal, the market value of which was £25,806,000. The national debt amounts to about £17, 0s., 5d. per head of the population, and the annual charge on account of it is about 8s, 9½d. per head. The British national debt is much below that of France and is considerably exceeded

by that of Russia. The charges on account of the debt form the largest item of expenditure, as appears from the accompanying table, which also shows how public revenue and expenditure have increased in different years, from 1852-1853 down to 1899-1900.

DESCRIPTION OF BRITISH ISLES.—*Geography*.—These islands form a kind of archipelago in the N. W. of Europe. The principal islands are Great Britain and Ireland, separated from each other by the Irish Sea, which, near the center, attains its greatest width of about 130 miles; but between Holyhead in Wales, and Howth Head in Ireland, in the track taken by the English packets, is not wider than 60 miles; and between the Mull of Cantyre in Scotland, and Fair Head in Ireland, narrows to about 12 miles. Great Britain, the larger and by far the more important of the two islands, is situated between lat. 49° 57' 42" and 58° 40' 24" N. It is the largest island in Europe, and the seventh largest in the world; the only islands ranking before it in this respect being Australia, Borneo, Papua, Sumatra, Nippon, and Madagascar. Its nearest approach to the continent of Europe is at its S. E. extremity, where the Strait of Dover, separating it from France, is only 21 miles broad. On both sides of the strait the distance is rapidly increased. The contour of Great Britain is so very irregular that it seems vain to compare it to any mathematical figure. The N. part of the island in particular, exhibits on its E. coast a succession of large salient angles, while the W. coast is broken and ragged in the extreme; the land ever and anon jutting out into the sea, and the sea making deep inroads into the land, as if the two elements had not yet ascertained their boundaries, and were contending for mastery. The greatest length of Great Britain, measured on a line bearing N. by W. from Rye to Dunnet Head, is 608 miles. The breadth, necessarily modified by the numerous indentations of the coast, varies exceedingly. The longest line which can be drawn across the island, in a slanting direction, is W. S. W. to E. N. E., 367 miles from Land's End to Lowestoffe; but the longest line, measured from the W. to the E. coast on a parallel of latitude, between St. David's Head, in Pembrokeshire, and the Naze, in Essex, is only 280 miles. The breadth is least in the N. parts of the island. Between the Clyde at Dumbarton, and the Forth at Alloa, it is only 33 miles; in the Oikel, which falls into Dornoch Firth, the tide ascends till within 18 miles of the W. coast, and the remarkable chain of lochs between the Moray Firth and Loch Linnhe leaves so little land intervening between the opposite coasts that the communication

Years.	REVENUE.						
	Customs.	Excise.	Stamps.	Land Tax and House Duty.	Property and Income Tax.	Post Office & Telegraphs.	Total.
1852-3.	£22,137,045	£15,746,055	£6,907,757	£3,382,351	£5,509,637	£2,373,907	£57,535,215
1866-7.	22,303,000	20,670,000	9,420,000	3,468,000	5,700,000	4,470,000	69,434,568
1885-6.	19,827,000	25,460,000	11,540,000	2,890,000	15,160,000	9,890,000	89,581,301
1899-1900	21,770,000	29,850,000	19,200,000	2,450,000	18,300,000	16,500,000	111,157,000
Years.	EXPENDITURE.						
	Interest and Management of the Nat. Debt.			Civil Charges, Civil List, etc.	Army, (including general war expenditure, etc.).	Navy.	Total.
	Funded.		Unfunded, Sinking Fund, etc.				
	Permanent.	Terminable Annuities.	Total Funded and Unfunded.				
1852-3.	23,708,026	£3,822,856	£27,934,534	£6,604,546	£9,879,962	£6,625,944	£55,117,656
1866-7.	23,415,726	2,378,164	26,081,778	10,523,019	14,675,540	10,676,101	66,780,396
1883-4.	20,098,157	7,854,888	31,241,173	17,181,935	18,140,326	10,728,781	86,999,564
1899-1900	.....	.....	23,000,000	24,930,000	20,617,000	26,595,000	110,927,000

¹ Including £11,150,000 for Estate Duty.

² Exclusive of South African War Vote, £10,000,000.

left unfinished by nature has been completed by art, and now forms the Caledonian Canal. The area of Great Britain, including the groups of the Orkneys, Shetlands, and Hebrides, is 120,979 square miles; of England and Wales alone, 58,309; of Scotland, 29,785 square miles.

Ireland, as already mentioned, lies to the W. of Great Britain, being separated from it by the Irish Sea, and surrounded on all other sides by the Atlantic Ocean. It nowhere extends so far as either the N. or S. extremities of Great Britain, but occupies an intermediate space between lat. $51^{\circ} 25'$ and $55^{\circ} 23'$ N., its N. extremity being on the same parallel with the central part of Ayrshire, and the town of Alnwick, in Northumberlandshire; and its S. extremity being opposite the Bristol Channel, nearly in the latitude of London. E. and W. it lies between lon. 6° and 11° W. Its shape is much more regular than that of Great Britain, and bears a considerable resemblance to a rhomboid, two sides of which are nearly due N. and S., while the other two take a slanting direction, between W. S. W. and E. N. E. The greatest diagonal of the rhomboid is between Mizzen Head, in Cork, and Fair Head, in Antrim, about 300 miles; the greatest length, measured on a meridian (nearly that of 8° W.), is 230 miles; and the greatest breadth, measured on a parallel (about $54^{\circ} 25'$ N.), is 180 miles. The breadth across the center is nearly 165 miles. Owing to the compactness of its form, Ireland does not exhibit such variation of breadth as we have seen to exist in Great Britain; but the breadth, from Galway bay to Dublin, is not 110 miles, and the shortest breadth of all, between Ballyshannon and Dundalk, is only 85 miles. One remarkable fact is that notwithstanding the general compactness of Ireland, its opposite coasts and arms of the sea are so conveniently situated in regard to each other, that there is not a spot on its surface which is not, in some direction or other, within 55 miles of the ocean. The area of Ireland is 32,583 square miles.

AREA OF BRITISH ISLES.

NAMES.	Area in sq. m.
England and Wales.....	58,309
Isle of Man.....	227
Channel Islands	75
Scotland	29,785
Ireland	32,583
Total	120,979

Physical Features.—We are so much accustomed to think and speak of the two kingdoms of England and Scotland, that we are apt to imagine, not merely a political, but also some great physical distinction between them. In fact, however, there is no such physical distinction. Their frontiers, in part at least, merge insensibly into each other, and the whole must be

viewed as one island, which, in regard even to physical features, is among the most interesting islands in the world. Though of comparatively limited extent, all varieties of scenery are exhibited in rich profusion on its surface, and all forms of geological structure lie within its bosom. The N. part of Great Britain is, for the most part, rugged, mountainous, and barren. To the N. of a line drawn from the Firth of Clyde on the W., to Stonehaven on the E. coast, the whole country is composed of Primary rocks. This area, usually spoken of as the Highlands, is divided into a N. W. and a S. E. portion by the Great Glen, in which lies the waterway of the Caledonian Canal. Gneiss and mica slate, with numerous outbursts of granite, form lofty mountain masses (they cannot be called chains), whose lower slopes are usually covered with beds of conglomerate and old red sandstone. The series of groups and masses known as the Grampians contain the loftiest mountains in the island, their culminating points, Bennevis and Benmacdhui, being respectively 4,406 and 4,296 feet. These mountains, from the nature of the materials of which they are composed, frequently assume the form of peaks and frowning precipices, which, as they descend, instead of terminating at the general level of the base, are continued downward, and become the romantic barriers of deep extensive lakes, presenting scenes in which sublimity and beauty strangely intermingle. S. of and separated by a valley from the Grampians are the Ochils, which are much less elevated than the Grampians, and exhibit scenery of a much tamer description. They consist chiefly of porphyry and amygdaloid, in which numerous nodules of agate and carnelian are found. Instead of towering up in sterile peaks, they are generally rounded, and clothed to their summits with verdant or heathy pastures. On their S. slopes a new geological formation appears. The carboniferous system, at first with its strata almost turned on edge, and thrown into confusion by contact with masses and veins of trap, soon becomes fully developed, and stretches, with occasional interruptions, from the E. to the W. coast, over the basins both of the Forth and Clyde.

The mineral treasures of this district—the Central Lowlands—make it one of the most important in Great Britain. To the S. of this lies the region of the Southern Uplands, to which belong the Lammermoor hills, the Moorfoot hills, and the Lowthers or Lead hills, so called from the veins of lead by which its strata are intersected. In earlier times their alluvial covering embedded a more precious metal, and the washing of the soil is said to have yielded gold. Still farther to the S. several large masses of granite occur. Toward

the S. E. the most conspicuous feature is formed by the Cheviot hills, a porphyritic range, which once formed part of the boundary between two independent kingdoms, and which sends its ramifications into both. Those which pass into England may be regarded as the commencing links of a long chain of mountains and hills, which extends, with scarcely a single interruption, along the W. side of that division of the island, forming its most important watershed, and throwing out numerous branches, particularly those which penetrate into Cumberland and Wales, and give a somewhat modified but scarcely less attractive repetition of the magnificent scenery to which reference has been made. In the N. part of this chain, or that part to which the name of Cumbrian range is sometimes given, the most striking feature is formed by the series of romantic lakes so well known to tourists from all countries. Here granite and a species of basalt are occasionally seen, but the prevailing rocks are slates and sandstones, belonging to the Silurian series. In other parts of this range trap-porphyry occurs. It forms the very summit of Scawfell, and is seen, in still more interesting circumstances, at Sotaller in Borrowdale where, at its contact with a bed of red unctuous clay and ironstone, occurs the celebrated vein of graphite which long furnished the finest black lead pencils in the world. Another largely developed rock of the same range is the mountain limestone, which, if anywhere, here truly deserves the name; inasmuch as it forms lofty mountain masses — Ingleborough, Wharfedale, Pennigant, and Cross Fell being almost entirely composed of it. This limestone is often intersected by rich veins of lead. In the lengthened chain already referred to, and to the S. and W. of the Cumbrian, is the Cambrian range, spread over the greater part of Wales, and containing, among others, the highest mountain of South Britain — Snowdon, 3,571 feet. The rocks, like those of the Cumbrian range, lie low in the geological series, and consist almost entirely of slate and different varieties of trap and porphyry. The great exception is toward the S. limits of the range, where the Silurian rocks are overlaid by an extensive tract of old red sandstone, overlaid in its turn by the mountain limestone, which, like a girdle, encircles the most extensive, if not the most valuable, of the British coal fields.

To the S. of the Cambrian is the Devonian range, stretching from the Bristol to the British Channel, and though lofty enough, when viewed from the level of the sea, to present a coast of remarkable boldness, is too low to deserve the name of mountainous. Here granite is extensively developed, and, often possessing the proper-

ty of decomposing rapidly, furnishes the white clay called kaolin, of which our finest porcelain is made. The granite underlies the old red sandstone, or rather a slate which is considered to be its equivalent; and prevails to such an extent, particularly in Devonshire, as to have given its name to a geological formation, hence termed the Devonian series or system. Here the mineral treasures are tin and copper, veins of which, generally at a high angle, and in a direction from E. to W., intersect the slate and granite, and vary in width from a few inches to several feet. The different ranges now described as occupying the W. side of England, and stretching from its N. to its S. extremity, are composed entirely of Primary rocks, or at least rocks which, with the exception of the great Welsh coal field, and another of limited dimensions on the N. coast of Cumberland, never stand higher in the geological series than the lowest strata of the carboniferous system. On proceeding E. the case is reversed, and the oldest strata which occur are identical with those which were in the previous case the most recent. Here, accordingly, Secondary formations prevail, beginning with the mountain limestone or coarse quartzose sandstone, known by the name of millstone grit, on which the coal fields are usually based, and ascending by regular gradations up to the more recent Tertiary deposits. The coal fields, notwithstanding their really incalculable economical value, occupy a comparatively limited extent of surface — an extent certainly not underestimated at one-twentieth of the whole. A line drawn from Lyme-Regis to Bath, thence to Gloucester, Warwick, Leicester, Nottingham, and Tadcaster, and from Tadcaster to Stockton-on-Tees, has on its E. side nearly two-thirds of the whole surface of England. In the whole of this space no coal is worked. If the series of strata are regular, there can be no doubt that coal exists; but probably at a depth far beyond the reach of any known means of excavation. The chalks, which occupy the uppermost place in the Secondary formation, though in Scotland confined to a few patches, constitute a marked feature in the geology of England, where they not only compose the prevailing strata of extensive undulating tracts, but form in many places, both on the E. and S. coasts, bold and giddy cliffs, from whose white color the ancient name of Albion is said to be derived. The Tertiary formation, which includes the rocks above the chalk, is of comparatively limited extent, and is succeeded by immense beds of diluvial (or glacial) gravels, sands, and clays, in which are found remains of the larger existing quadrupeds, several of them, like the elephant and rhinoceros, belonging to genera which now exist only in much hot-

ter climates. Above these diluvial beds lie alluvium, and other superficial deposits, the constituents of which, mainly depending on the rocks from which they have been disintegrated, determine the natural properties of the soil, sometimes giving it an almost inexhaustible fertility and sometimes dooming it to comparative barrenness.

Turning from Great Britain to Ireland, one of the most marked features which meet our view is the dreary expanse of bog which stretches over its interior. The surface, as might hence be inferred, is much flatter than that of Great Britain. It is not, however, by any means destitute of mountains. Of these no fewer than 24 exceed 2,000 feet, and four exceed 3,000 feet. Carn Tual, the culminating point of the island, is 3,404 feet. It belongs to a group called the Mountains of Kerry, which in connection with the Lakes of Killarney, placed in the very heart of them, furnish scenes which, for picturesqueness, few countries can surpass. The great mountain groups consist of Primary and Transition rocks, and are generally situated near the coasts, which accordingly become of the boldest description. Inland behind these lofty barriers lies a vast undulating plain, occasionally penetrated and broken up by masses of Primary rocks, but occupied almost throughout its whole extent by Secondary formations. Of these by far the most largely developed is mountain limestone, much of it so fine-grained and compact as to furnish quarries of marble, both black and variegated, but seldom containing the rich veins of lead which usually accompany the same formation in England. The limestone is succeeded in regular gradation by the upper strata of the carboniferous system, and coal has been found to a greater or less extent in no fewer than 17 Irish counties. In general, however, its quality is inferior. Some of it is in the form of anthracite, of which seams of remarkable purity, almost entirely composed of carbon, occur in the vicinity of Kilkenny; but the greater part of the coal mined is mere dross or culm, scarcely fit to be employed for any more important purpose than burning limestone. Still higher in the series above the coal, the upper strata of the Secondary formation are considerably developed in the N., where they are capped by numerous masses of volcanic origin. The most magnificent specimen of these is the range of basaltic columns which forms the celebrated Giant's Causeway.

Rivers and Ports.—The mountain chains which constitute the principal watersheds of Great Britain are generally at no great distance from the W. coast, and hence the rivers which descend from them in that direction have a short course, and are com-

paratively unimportant. The two great exceptions to this rule are the Clyde and the Severn. Both of them have their mouths on the W. coast, but they owe both their volume and the length of their course to a series of longitudinal valleys, which instead of opening directly to the coast take an opposite or parallel direction, and thus, rather skirting the watershed than flowing from it, obtain much larger supplies of water than a direct course could have given them. The former of these rivers, though of vast commercial importance, is indebted for it far less to its natural channel than to the immense sums judiciously expended through a long series of years in improving and almost creating its navigation. Considered merely as a river, it is comparatively insignificant, the whole length of its course to Dumbarton, where the firth properly commences, being not more, including windings, than 73 miles. The Severn is a much longer stream, and carries along with it a much mightier flood, which, commencing in the mountains of North Wales, proceeds S. through long valleys opened into by others which add their tributary streams, till the immense accumulated volume is poured into the Bristol Channel. These two are the only rivers of any considerable volume of which the W. coast can boast, though it also possesses the Mersey, in commercial importance the second river of the empire; but the E. coast, proceeding from N. to S., has the Spey, Don, Dee, Tay, Forth, Tweed, Tyne, Ouse, Trent, and Thames. This list contains the Tay, in volume the first river of Great Britain, and the Thames, not much less in volume, and in navigable importance the greatest river of the world. It is remarkable that no river of importance empties itself either on the N. or S. coast. Owing to the great central flat of Ireland, its rivers usually flow on in a gently winding course, and being little interrupted by natural obstructions they are well fitted for navigation. Those of importance are not very numerous; but one of them, the Shannon, is understood to be the longest river of the British Isles. Within 7 miles of its source it enters Lough Allen, which is itself navigable, and after passing out of the lough pursues a S. W. course of 214 miles, the whole of which is available for transport by smaller vessels, while from its mouth up to Limerick, a distance of 70 miles, it floats vessels of 1,000 tons. In numerous features this noble river bears a remarkable resemblance to the Severn. We have seen that in Great Britain the E. coast regions possess the greater part of the rivers. In Ireland the rule is reversed. The Liffey, more important from having the capital on its banks than from its own magnitude, is the only river on that coast deserving of notice. While both

Great Britain and Ireland are thus provided with numerous streams, which ramify over their various districts, and in many cases are either themselves navigable or furnish the means of continued navigation by acting as the feeders of canals, the coasts are scooped out into various deep and sheltered bays, in some of which whole fleets of the largest ships can float and ride in safety. It is true, however, that the number of ocean harbors, properly so called, is not great, and that the E. coast of Great Britain in particular is so scantily provided as to make the construction of a great harbor of refuge at some central point a work of primary necessity, which must sooner or later be performed. The best of the great natural harbors are situated on the S. coast.

Climate.—The British Isles being nearly in the center of the temperate zone, have, in common with all countries so situated, four different seasons, which merge almost insensibly into each other, but exhibit a wide range of temperature between their opposite extremes. The central latitude of the United Kingdom is nearly 55° N., and the isothermal line which passes through it indicates a mean annual temperature of 50° . If we follow the course of the isothermal line E., we find that on approaching the coast of Holland it is deflected S., and this deflection continues to increase in the same direction till the mean annual temperature of 50° corresponds with lat. 45° on the E. side of the Sea of Azof. From this point we may follow it across the Caspian, and on through Mongolia and Manchuria to the Sea of Japan. If we follow it across the Atlantic we find that it strikes America in about lat. 41° . The fact is thus established that in respect of mean temperature the British Isles have the advantage of all the countries in the same latitude both to the E. and the W. of them. Another feature of the British climate is in regard to range of temperature. A winter of 10° and a summer of 90° give the same mean temperature as a winter of 40° and a summer of 60° , but how unlike the climates! The range of temperature between the coldest and warmest months is at Paris about 30° , at London only about 26° . At Edinburgh the range is about 25° , while at St. Petersburg it is no less than 55° . The chief agents in moderating the climate of the British Isles are the Atlantic Ocean with its warm surface waters drifting from the S. W., and the warm winds which prevail during a large part of the year from the same quarter. While they blow, frost is of rare occurrence, and never of long duration in the British Isles. When the wind blows from the N., after it has passed over immense fields of ice, or from the E., where, from the limited expanse of the German Ocean, its tempera-

ture continues nearly as low as that which it had acquired in passing over the Continent, the atmosphere is rapidly cooled down, and frosts are occasionally severe. These considerations explain the only disadvantages under which the British climate labors. S. W. winds charged with vapor, bring deluges of rain; and N. and E. winds are accompanied with considerable, and too often, sudden accessions of cold. E. winds, in particular, prevail in spring, and not only check vegetation, but tend to produce, or, at all events, greatly aggravate, pulmonary complaints. Still, the advantages far more than counterbalance the disadvantages; and the cloudless skies of South Europe, accompanied as they are with scorching heat which withers up the fields and often makes what should be the finest the least tolerable season of the year, poorly compensate for the magnificent foliage and rich verdure which, at the same season, give a peculiar charm to the British Isles.

Communications.—The prosperity of the country has been greatly furthered by all parts of the United Kingdom having been brought into easy communication with each other by means of roads, rivers, canals, and especially railways. On all of these sums of almost fabulous amount have been expended, and in the case of railways especially, nothing is more remarkable than the number of these which now traverse the United Kingdom in all directions; and which, particularly in the greater part of England and in Central Scotland, cover the whole face of the country, and intersect one another at innumerable points. From 1825 to 1850, a period of a quarter of a century from the opening of the first railway, 6,621 miles of railway were constructed in the United Kingdom, being an average of 265 miles in each year. Between 1850 and 1860, 3,812 additional miles were constructed, giving an average of 381 miles in each year; and between the latter year and the end of 1881, 7,747 miles were constructed, being at the rate of 369 miles every year. The total mileage then amounted to 18,175, which by 1891 had increased to 20,191 miles. On Jan. 1, 1901, there were in all 21,855 miles of railway open in the United Kingdom, of which 15,187 miles belonged to England and Wales, 3,485 to Scotland, and 3,183 miles to Ireland. Of the total paid-up capital of £1,176,001,890, England and Wales absorbed £970,147,581, Scotland, £166,088,736, Ireland, £39,765,573. The net receipts of the railways of the three kingdoms were £89,392,501, £11,603,010, £3,806,347, respectively; total, £104,801,858. When compared with other European countries, the United Kingdom is seen to stand fourth in point of the actual length of railways open, the first being Germany, the second and third France and Russia. When the

number of miles of railway in proportion to the area of the United Kingdom is compared with those of other countries, it occupies the position of second in order, for whereas the United Kingdom has only 17.4 miles of railway to every 100 square miles of surface, Belgium has 31.4 miles of railway to 100 square miles of surface. Belgium's total length of railways, however, is only 3,590 miles. The total length of tramways in the United Kingdom is fully 1,000 miles. The canals have a total length of over 3,800 miles.

Among the means of communication, in a somewhat different sense of the word, may also be mentioned the postal, including the telegraph, system of the United Kingdom. In the year 1901 2,323,600,000 letters were delivered in the United Kingdom, giving an average of about 57 per head of population. Of post-cards 419,000,000, and of book-packets, circulars, and newspapers 981,200,000 were delivered.

Since the transfer of the telegraphs to the State in 1870, the telegraph system has been greatly increased by additional lines and offices, and the business has increased in a still greater proportion. In 1901 the total length of telegraph wires in the United Kingdom was over 347,680 miles with 46,295 miles of line. The number of messages sent in the year was over 89,000,000. Of these some 75,000,000 were forwarded from offices in England and Wales, and over 9,280,000 from offices in Scotland. This department has also telephone exchanges in various towns, besides 60 miles of pneumatic tubing in London.

Agriculture.—Of all branches of industry, this unquestionably demands precedence, more especially because by its very nature it is not merely conducive to the well-being, but essential to the very existence of society. In Great Britain it has been carried to great perfection, and, according to Prof. Thorold Rogers, "it may be confidently averred that owing to improvement in stock and seeds, agriculture in the United Kingdom is at a higher level than in any other country." Thorough and systematic draining, the extensive use of artificial manures, and the employment of the newest implements are among the chief features of modern British agriculture. A peculiar feature of English as distinguished from Scotch husbandry is the large amount of arable land in England forming permanent hayfields. These are kept fertile by heavy doses of farmyard manure. Although much of the land employed is naturally of poor quality, it produces a close sward of the richest green, furnishing admirable food for stock. The great extent of permanent pasture is also a feature of Irish agriculture. In the rearing and fattening of stock there is no country in the world that can be compared

to several districts of Great Britain. Among breeds of horses, the race-horse, the "shire horse," the Suffolk punch, and the Clydesdale may be mentioned; among cattle, the shorthorn, the Hereford, the Aberdeen-Angus, and the Ayrshire; among sheep, the South Downs, Leicesters, Cheviots, and black-faces. The principal cereals grown in England are wheat, barley, and oats, occupying about equal areas; the principal green crops are turnips, potatoes, mangolds, vetches, etc. In Ireland and Scotland oats are the principal grain crop; the chief green crop being in Ireland potatoes, in Scotland turnips. Hops are grown largely in Kent, less extensively in some other parts of Southern England. Of the whole area of Great Britain less than 60 per cent. is under the plow or in pasture, but in England the proportion is about 75 per cent., and in Wales above 60 per cent., while in Scotland it is under 25 per cent. (so much of Scotland being barren). In Ireland the proportion is about 75 per cent. Agriculture is there in a different condition from that of Great Britain, being in a very backward state on the whole, mainly owing to the subdivision of holdings and over-cropping, combined with ignorance and unskillfulness.

The following table gives a general idea of the distribution of crops in the United Kingdom in 1898:

	England and Wales	Scotland.	Ireland.
	Acres.	Acres.	Acres.
Under corn crops	6,128,911	1,271,424	1,105,026
Under green crops	2,513,878	619,592	1,390,941
Grasses under rotation, clover, etc.....	3,303,366	1,607,984	1,252,889
In permanent pasture	15,178,178	1,381,214	11,390,950
Fallow land....	344,815	7,279	16,857

The total in crops, bare fallow, or grass thus amounted altogether to nearly 48,000,000 acres. The mountain and heath land furnishing pasture and not included in these figures is: For England, 2,249,164 acres; Wales, 1,187,404 acres; Scotland, 9,420,370 acres. The total number of agricultural holdings in Great Britain above one acre is about 520,000, in Ireland it is about 514,000.

The following table shows the number of horses used in or connected with agriculture, and of cattle, sheep, and pigs in the United Kingdom in 1898:

	England and Wales.	Scotland.	Ireland.
Horses....	1,315,579	201,581	513,788
Cattle....	5,376,089	1,246,284	4,486,242
Sheep....	19,155,246	7,587,948	4,287,274
Pigs.....	2,317,479	134,116	1,253,682

The totals in 1901 were: Horses, 2,002,811; cattle, 11,435,929; sheep, 30,755,845; and pigs, 3,398,971.

In British farming a period of severe depression has prevailed since about 1875. For many years previous to this agriculture had been in the most flourishing condition, prices being high and large profits being made. Since then the reverse of this has been the case. Prices of almost all kinds of farm produce have fallen enormously, large numbers of farmers have been ruined, and others even at greatly reduced rents can scarcely make headway; while a good deal of land has gone out of cultivation. The main cause of this is the severe competition of foreign countries and British colonies, combined with bad seasons. In 1874 the average prices of wheat, barley, and oats were respectively 55s. 9d., 44s. 11d., and 28s. 10d. The average price of wheat per quarter in 1894 was only 22s. 10d.—the lowest recorded for 124 years. The average price of barley was 24s. 6d., the lowest since 1850, when it was 23s. 5d., while the price of oats was 17s. 1d. Recently there has been some improvement in prices of grain. The prices of beef, mutton, dairy produce, and wool have also undergone a great reduction during the period referred to. The result of the changed conditions has been that, while in 1871–1875 the land under the plow in England and Wales annually averaged 13,696,000 acres, and that under pasture 10,217,000 acres, the figures for 1898 were as given above; the increase in pasture showing that farmers, on the whole, find it pays better to feed stock than to raise grain.

Minerals.—Such is the mineral wealth of the British Isles that, with the exception of quicksilver and gold, which, though found both in Great Britain and Ireland, are so limited in quantity as hardly to repay the labor for searching for them, it is scarcely possible to mention a metal or mineral product of economical value which is not worked to a greater or less extent.

Coal.—Coal claims precedence, not merely because the annual output of it in regard both to quantity and aggregate value exceeds that of any other mineral product, but because without it the other natural resources of the country and the industry of its inhabitants must have for ever remained in a great measure undeveloped. The coal fields are not confined to one particular district, but occupy a series of basins sometimes touching, but more frequently at a considerable distance from each other, and extending in an irregular curve from the S. slopes of the Ochil hills to the Bristol Channel. Beginning with the farthest N. limit, we find a coal field occupying a not inconsiderable part of Fife-shire and almost the whole of Clackmannanshire. The coal of this field is of several kinds; but the most important seams are splint, part of it of a free, open, burning quality, greatly in demand for steam navi-

gation from its not corroding the furnaces and boilers, and part of it admirably adapted for the blast furnace. Part of this field, immediately to the W. of Dunfermline, contains a coal which, in its richness and quality of caking, bears a resemblance to that of Newcastle, and has been worked, as ancient records prove, for at least five centuries. On the opposite side of the Forth, and almost in visible communication with the field already described, another field extends over part of Eastern Stirlingshire and a considerable portion of the Lothians. It furnishes the greater part of the fine fuel which is used in the metropolis of Scotland, and contains excellent seams of parrot coal. To the S. and S. W. are the coal basins of Lanark, Renfrew, and Ayrshire; the first much the largest, and famous throughout the world for the immense industrial establishments which it mainly has called into existence and made prosperous. The second may be regarded as a continuation of the first, and as connected with its industries. The last is the most recently developed of the three. In connection with the coal fields, especially with those of the Lothians, should be mentioned the oil shales, on which an entirely new industry, that of extracting paraffin oil and other products, has been founded. On passing the border the Newcastle coal field lies before us, extending over a great part of the counties of Northumberland and Durham, and centering near Newcastle, which gives it its name. The proximity of this field to the sea, and the excellence of the coal, unrivalled for domestic use, early made it the great theater of mining operations. The association of coals with Newcastle has long been proverbial. It is Durham, however, that now yields most of the coals, a larger quantity being mined here than in any other English county. This field furnishes a large proportion of the coal conveyed by sea both to home and foreign ports. On the opposite coast, nearly in the same latitude, is a small coal field, the workings of which at Whitehaven and Workington, have been carried to a great distance beneath the sea. The next coal field to the S. is in many respects the most important of all. It includes a large central space, not entirely occupied by coal, but interrupted longitudinally by a broad belt which consists of the lower strata of the carboniferous system, and thus forming a kind of twin fields, the one of which extends from Leeds to Nottingham, while the other has its greatest length from S. W. to N. E., and borders both on Manchester and Liverpool. This great coal area can boast, not only of being the seat of what has been termed the world's great workshop, but of furnishing the most essential elements both of its existence and prosperity. The only

other coal field of a magnitude similar to those already mentioned is that of South Wales, which, though it long lay almost unknown or unheeded, has in comparatively recent times become the center of great and varied industries, while Cardiff, as its maritime outlet, has risen to be a large town and the greatest coal-exporting seaport in the world. The field is of an irregularly oval shape and, passing from Monmouth on the E., continues W. without interruption through Glamorgan to Carmarthen bay, across which another field, or continuation of that already mentioned, stretches irregularly to St. Bride's bay. There are several other minor fields, all of them, with exception of that of North Wales, situated near the center of England, and thus, from position as much as from extent, possessed of great value. Their names are: the North Staffordshire, the Shropshire, the South Gloucester and Somersetshire, the Warwickshire, and the South Staffordshire. The most important on the list are the North Staffordshire, the principal seat of the potteries, and the last two, Warwickshire and South Staffordshire. In South Staffordshire occurs the enormous seam known as the Ten-yard Coal of Dudley. It properly consists of several seams separated by very thin beds of clay. The output of coal in Great Britain, which in 1855 was only 61,453,079 tons, has been on the increase ever since. About a sixth part of the total produce is now usually exported to foreign countries or British possessions, and about the same consumed in the manufacture of iron. The following table shows the recent progress of the coal trade:

	Mined	Exported	Retained.
1879	133,808,000	16,442,296	117,365,704
1889	176,916,724	28,956,445	147,960,279
1894	188,277,525	31,756,368	156,521,157
1898	202,054,516	36,562,796	165,491,720
1900	225,181,300	46,098,228	179,083,072

The value of the coal mined in 1900 was £121,652,596.

Iron.—The iron ores smelted in Great Britain are principally carbonates, which are invariably found to a greater or less extent and in a great variety of forms, with very different qualities, in the coal measures. Yet more than two-fifths of the ores now smelted are oxides (principally hæmatite and hydrated oxide). The most important iron districts yielding carbonates are those of Yorkshire, especially the rich Cleveland district in the North Riding, Shropshire, Staffordshire, South Wales, and the coal measures of Scotland. Hæmatite (red) is obtained chiefly in Lancashire and Cumberland; brown hæmatite to a smaller extent in South Wales and Cornwall. Hydrated oxide or brown iron ore is found principally in the counties of Northampton and Lincoln. Hæmatite is by

far the richest of these ores, and hydrated oxide comes next in this respect. The following table shows the quantity and value of the pig-iron produced in the United Kingdom in some recent years:

Years.	Quantities.	Value.
1879	tons 5,995,337	£14,788,342
1889	" 8,322,824	20,390,918
1894	" 7,427,342	17,082,887
1900	" 8,959,691	.....

Other Minerals.—Lead, tin, and zinc are the metals produced next in importance to iron. The value of the lead produced in the United Kingdom in 1900 was £349,094; of the tin, £523,604; of zinc, £97,606. Small quantities of copper and silver are obtained. An important article is salt, chiefly from rock-salt and brine pits, the quantity produced in 1897 being valued at £620,898. Salt is most extensively worked in Cheshire, and the supply is so great as to be inexhaustible. Quarries exist in almost every part of the British Isles. They furnish admirable building stone of various kinds, including in some localities granite, which is employed for ornamental and other purposes. Limestone is plentiful, as are also clays of various kinds; and from Wales and other parts are obtained quantities of the finest roofing slates. The total value of coal and metals mined in 1900 was £135,957,676.

Fisheries.—The fisheries of the United Kingdom have long been of importance, and latterly their importance has considerably increased, larger vessels being now employed, and many of them propelled by steam. One great obstacle to the general consumption of fresh fish, namely, the difficulty of transport, is now much diminished by the facilities offered by the railways; and in some important inland towns, where fresh fish were previously known only as an expensive luxury, they can now be had at a price which places them within the general reach. The principal fresh-water fisheries are those of salmon, carried on chiefly in the rivers and estuaries of Scotland and Ireland. The chief sea-fisheries are those of herrings, haddocks, cod, and the various kinds of flat fish—plaice, soles, turbot, etc. The herring fishery is carried on on almost all the coasts and islands of Scotland, but especially on the E. coast, the great centers of resort for curing being the towns of Wick, Peterhead, Fraserburgh, Aberdeen, etc. Many herrings are also caught on the E. coast of England. The other fishes mentioned are caught all round the coasts, and especially in certain localities in the North Sea, one of the most famous being in the neighborhood of the Dogger Bank. Among minor fisheries may be mentioned those of mackerel, pilchards, oysters, and lobsters. The value of sea-fish caught in 1901 was £9,044,502; including shell-fish, £9,492,379.

Manufactures, Commerce, etc.—History.

—The manufactures and commerce of England began to establish themselves at a period long before those of Scotland came into existence. Tin is said to have been the first article of British commerce. The Phœnicians are generally said to have visited the coasts of England for the purpose of procuring tin. The Romans, while they occupied England, introduced various industries to supply articles for home consumption, and constructed great highways. In their time grain is said to have had some importance as an export. Industry and commerce made some progress among the Anglo-Saxons, but received a check from the invasions of the Danes and Normans. But under William the Conqueror, a body of Flemish weavers settled in the island, and from this period it may be said that the staple of England was coarse woolens. The tyrannic John assumed the sole power of commerce in his kingdom, and erected corporations and monopolies wherever he thought proper, or whenever he was tempted by the offer of a sufficient bribe. Under such restraints, and while subjected to the caprice and oppression of one man, trade must have been greatly hampered. No adventure was made, unless with the prospect of exorbitant profits. The interest of money, therefore, became extremely high; and under Henry III. we find it often to have been no less than 50 per cent. It was, however, during the reign of this latter prince, that regulations were made respecting broadcloths, russets, etc., and fine linens were woven in England at this early period.

During the vigorous, and in some measure prosperous reign of Edward I., commerce met with some encouragement; but the true principles of trade were ill understood. In 1296 the Society of Merchant-Adventurers was instituted for the purpose of improving the woolen manufactures, and encouraging the exportation of that national staple. Edward granted more protection to foreign merchants than they had formerly enjoyed; and though he still left them subject to the iniquitous law of answering for the debts and crimes of any of their countrymen, he allowed them the privilege of trial by jury, and fixed the duties on importation and exportation. The office of aulnager is likewise mentioned as existing in this reign.

Manufactures and commerce, during the weak reign of Edward II., were almost entirely unprotected. The disorders of this reign rendered property insecure, and consequently discouraged honest adventure and the exertion of useful ingenuity. That English manufactures were in a very rude state at this time appears from the fact that the wealthy men of the age often bequeathed their silk or velvet garments

formally by will, as constituting a valuable part of their property. Flanders was then the only country in Europe where commerce was either understood or practised. The first great historical encouragement given to the woolen manufactures of Great Britain was in the reign of Edward III. He protected foreign weavers, and prohibited his subjects from wearing any cloth not of English manufacture. In 1331 John Kemp, with 70 Walloon families, was invited into England, and Kendall became the metropolis of the woolen manufacture. Wool was exported to a considerable amount; but by a very absurd law the exportation of woolen cloth, as well as of wrought iron, was prohibited. The exports at this period consisted entirely of raw materials, such as wool, hides, butter, tin, lead; manufactures were almost unknown. The imports were chiefly linen, fine cloth, and wine. The value of the total exports in 1354 was £294,184 17s. 2d. This sum was in money of that period, and reduced to the present denomination and value would be very large. It is remarkable that the value of the imported cloth, per piece, was at this time three times as great as that of the exported; it may be inferred that the quality was also greatly superior.

The troubles of the reign of Richard II.—the care which Henry IV. was obliged continually to exert for the preservation of that authority to which his title was so lame—the incessant military expeditions of Henry V.—the misfortunes of Henry VI.—and all the miseries brought upon the nation by the bloody contest between the houses of Lancaster and York,—effectually opposed the progress of arts, manufactures, and commerce. Nevertheless, some foreign merchants residing in Great Britain amassed great wealth. The commercial regulations of Henry VII., however well meant, were in reality destructive of national industry. Laws prohibiting the exportation of certain articles were multiplied; the number of corporations and monopolies was increased, and other restraints imposed, which tended powerfully to obstruct the national prosperity. Fine cloths, however, seem to have been much improved about this time; and in 1458 the Company of Staplers paid to the crown £68,000 sterling for the customs of staple wares.

The foreign commerce of England under Henry VIII. was confined to Flanders; and of such importance was this commerce already found, that when war broke out between the English and Flemings, it was agreed that the commercial relations of the two countries should not be interrupted. Foreign artists were now numerous in England; their superior skill and industry excited the envy of the natives, and caused the enactment of many severe and prepos-

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terous laws against aliens. The Flemings, in particular, were so numerous that 15,000 of them were expelled at one time from the city of London. The true method of encouraging commerce still remained ill understood. Monopolies and corporations were multiplied; the prices of labor and provisions were fixed by an absolute authority; sumptuary laws were enacted; and the legal interest of money was in this reign fixed at 10 per cent. The interest really required was probably much higher; but the lending of money on interest was generally esteemed unlawful, and the law by which it was permitted was repealed during the following reign. In 1557 glass was manufactured in England.

The disorders attending the minority of Edward VI., and the religious disturbances under Mary, were opposed to the commercial progress of the nation. Under Mary, however, we find a law which indicates greater liberality of views than might have been expected at this period. A law had been formerly enacted prohibiting anyone from making cloth who had not served an apprenticeship of seven years. This law, during Mary's reign, was repealed; but, little to the honor of Elizabeth's penetration in affairs of trade, it was revived by Mary's successor.

Elizabeth was doubtless desirous of advancing the commerce of England, yet she certainly pursued measures of a directly opposite tendency. In particular, she exerted her prerogative in the creation and encouragement of monopolies of every description. Besides innumerable others of inferior importance, she established the East India Company in 1600—a society politico-commercial of such giant dimensions as no country ever could parallel. She confined the trade with Turkey to a company known by the name of the Turkey Company. She likewise procured from John Basilides, a Russian prince, a law forbidding all nations, except the English, to trade with his subjects; but this law was abrogated by his wiser successor. Several attempts, during her reign, were made to discover a N. W. passage to the East Indies, and several colonies were founded in North America; but in these attempts and undertakings Elizabeth's subjects enjoyed her permission only, not her encouragement or aid. English manufactures were still very imperfect and were surpassed by those of every other nation. Much of the exports consisted in white undressed cloths; and the profits on dyeing and finishing, amounting to £1,000,000 a year, were lost, these operations being generally performed on the Continent. The legal interest of money was fixed at 10 per cent. during this reign, while the legal interest in France was 6½ per cent.—a proof that commerce in France, at that

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time, flourished much more than in England.

The pacific reign of James I. imparted a degree of prosperity to the commerce of England which it had not formerly known. Her manufactures, however, were still inconsiderable, consisting for the most part of articles and utensils for domestic consumption. Wool continued to be a great material of national trade; and during this reign, the exportation of raw wool was forbidden. The greater part of the cloth, however, was still exported without being dressed and dyed—operations which it underwent in Holland. The attempts for the discovery of the N. W. passage led to the discovery of Greenland; and the whale-fishing was soon thereafter carried on with some success. The trade to Spain—originally a monopoly—was now laid open, and soon augmented in an unexampled degree; but the nation, incapable of profiting by such a plain argument, proceeded no further than to compel the monopolizing companies to extend their stock, and to render the admission of new adventurers less difficult than it had formerly been. The chief glory of James' reign in a commercial point of view, however, was the establishment of the American colonies.

In 1618, the exports of England	
“ amounted to	£2,487,435
“ the imports were.....	2,141,151
In 1622, the exports were.....	2,320,436
“ the imports were.....	2,610,315

The number of seamen engaged in the commerce of England during this reign is said to have been 10,000. In 1641 the customs of England are said to have amounted to £500,000.

The disorders which preceded the melancholy end of Charles I. rather promoted than retarded the vigor of commerce. They were the means of carrying abroad, with a fresh ardor, the energy and activity of industrious citizens; and a lucrative acquisition of external commerce became the most fertile source of both public and individual wealth. During the period which elapsed from the death of Charles I. to the abdication of James II., improvements in manufactures and trade advanced with rapidity. The naval war against the Dutch had curtailed the maritime power of that people, and had added to that of England; so that the Revolution found Great Britain a great commercial nation. The shipping was more than double what it had been left by James I.; many new branches of manufacture had been introduced; several new colonies had been established in America, and some were recovered from the power of the Dutch. In Jamaica—an island taken from the Spaniards during the protectorate—the foundations were laid of British West Indian commerce; the destruction of much of the Dutch influence in the East gave new en-

couragement to the exertions of the East India Company; and in 1670 a board of trade was instituted for the purpose of consulting on and protecting the interests of commerce. All these circumstances were greatly favored by the Revolution—an event which strictly defined the rights of the crown, ensured political and religious liberty, and secured to the subjects their property and their personal rights. The progress of arts and commerce, and the accumulation of wealth, have since then gone on constantly, with temporary checks. Some particulars of the various British manufacturing industries are given below; but although the value of goods exported may be stated there is no means of arriving at the values of those consumed in the country.

Cotton Manufacture.—Though of modern origin, this is the most important of British manufactures. It is referred to only once, and that incidentally, in Adam Smith's "Wealth of Nations" (1776), but by the end of the 18th century, owing to the introduction of the machines of Hargreaves, Arkwright, and Crompton, and the extended use of steam power, it had firmly established itself as one of the leading industries. It was in the cotton manufacture that the factory system first ousted the domestic or cottage system of industry, and in consequence those evils that led later to special legislation were first manifested in England. The chief seat of the manufacture is in Lancashire, where Manchester and a number of other large towns, such as Oldham, Bolton, and Preston, are more or less supported, directly or indirectly, by this industry. The cotton manufacture of Scotland is on a comparatively limited scale, and is even of less importance than formerly. It chiefly centres in Glasgow and the surrounding district. Cotton thread is made extensively at Paisley. The importance of the cotton manufacture will be understood from the fact that it gives employment to about 529,000 persons, while the cotton goods exported (not to speak of those consumed in the country) form the largest individual export among the numerous exports sent by Great Britain to foreign countries. During the three years 1889-1891 the annual export of cotton goods had an average value of fully £72,000,000; since that time it has somewhat decreased, the annual value in 1896-1898 being a little over £66,000,000. The raw cotton imported has in recent years had a value of from £30,000,000 to more than £46,000,000 annually. The latter figure represents the value for 1891, while a larger quantity in 1898 was valued at only £34,000,000. The quantity imported, which in 1820 only amounted to 152,000,000 pounds, amounted in 1901 to 1,830,305,904 pounds.

Woolen Manufactures.—This is the most ancient, and was for centuries the great

staple English manufacture. There cannot be a doubt, however, that the first great improvements were not of native invention, but were introduced by foreigners, whom either the wise policy of sovereigns had allured, or the merciless bigotry of their own sovereigns had driven into the kingdom. Though the manufacture cannot boast of an extension like that of cotton, it holds the next place to it among textiles; and, besides working up the greater part of the wool grown within the kingdom, draws largely on other countries for additional supplies, particularly on the Australian colonies. In some branches the British manufacturers have formidable competitors on the Continent, but in others the position of the United Kingdom is at least as high as that of any other country, while in not a few the superiority is decided. The chief centres of the woolen manufacture are in England—the West Riding of Yorkshire (Leeds, Huddersfield, etc.), Lancashire, Gloucestershire, and Wiltshire being the most distinguished for broadcloths; Bradford and Norfolk for worsted stuffs; Leicestershire and Nottinghamshire for woolen hosiery. Blankets and flannels have numerous localities, but for the finer qualities the West of England and several of the Welsh counties are most conspicuous. Carpets of every quality and pattern are extensively made at Kidderminster, Halifax, Worcester, etc.; and Wilton and Axminster have given their names to famous fabrics of this kind. A modern branch of the woolen manufacture is that of shoddy. Its raw material consists of woolen rags, which, being reduced to the state of wool, are then remanufactured. The principal seat of the shoddy trade is the Leeds district.

The woolen manufacture of Ireland is yet on a rather limited scale, but seems to be making some progress. Among the goods made are blankets and flannels, friezes, tweeds, and serges—Irish wool being chiefly used. Scotland has made much more progress, but still bears no proportion to England. The chief seats of the Scotch woolens are Kilmarnock for carpets, bonnets, etc.; Glasgow for carpets, etc.; Stirling and its neighborhood for carpets and tartans; Galashiels, Hawick, Selkirk, and other places in the basin of the Tweed for shawls, plaids, etc., and still more for the kind of cloth known as "tweeds," the manufacture of which originated here, and which are also made at Dumfries and Aberdeen; Hawick for hosiery; Alloa for yarn. The woolen manufacture in all its branches gives employment to about 282,000 persons, while the value of the woolen and worsted manufactures (including yarn) exported from Great Britain has in recent years varied from more than £25,000,000 per annum to less than £20,000,000.

Linen.—In England the spinning of flax into yarn and the weaving of the yarn into cloth is an old industry, and is carried on to a great extent, but is apparently not increasing. The chief seat of the manufacture is the West Riding of Yorkshire, the chief towns engaged in the industry being Leeds and Barnsley. Linen is the great staple of Ireland, where it is carried on chiefly in the province of Ulster (counties of Antrim, Down, Tyrone, etc.); and in Scotland also it was long the staple among textile fabrics. In the former, extraordinary means were employed to foster it. It early fixed its seat in the N., particularly near Belfast, which continues to be its great center.

The forms given to the manufactured flax in Ireland include not only plain linens, but also many of the finer varieties—lawn, cambric, damask, etc. In Scotland the manufacture also assumes great variety, embracing coarse goods such as osnaburgs, sheetings, sailcloth, sacking, etc.—chief seat, Dundee; and diaper and damask—chief seat, Dunfermline. The staples of both towns are by far the most important of their kind in the kingdom; and the Dunfermline table-linens are not surpassed anywhere. Large quantities of jute goods have been manufactured for a considerable number of years, especially at Dundee. The value of the linen and jute manufactures (including yarn) exported in 1883 was £9,267,946, the average for the three years 1896–1898 was rather less than £6,000,000.

Silk.—In the case of silk, as in that of cotton, the raw material is entirely of foreign production. The chief source of supply is China, from which is obtained more than three-fourths of the raw silk consumed in the United Kingdom; and after China the next countries in order of importance in this regard are France, Japan, and British India. The silk manufacture, however, can hardly be regarded as a very important British industry. The silk mills are confined chiefly to England, the chief seats being London, Manchester, Macclesfield, and Coventry. The silk manufactures exported are of trifling value compared with those imported.

Machinery and Metal Goods.—The manufacture of machinery of all kinds is an extremely important branch of the industry of the United Kingdom, embracing steam engines, textile machinery, agricultural machinery, sewing machines, and various other descriptions. In 1898 steam engines of various kinds were exported to the value of £3,600,000; and the total exports of machinery were valued at £18,390,000. Here should also be mentioned plate and sheet iron, tin-plates, rails and railway materials, wire, bars, hoops, tubes, etc.; as well as guns and war material, tools and implements of various kinds, telegraphic and

electric apparatus. For minuter articles of hardware reference may be made to the countless products such as Sheffield and Birmingham produce, not excluding articles in the precious metals—plate, jewelry, and watches, made extensively in various places, but nowhere in the wide world so perfectly as in London. The exports of hardware and cutlery in 1897 amounted to £2,104,009; of steel and iron and other manufactures thereof to £24,641,516.

Miscellaneous Manufactures.—Very extensive are the manufactures of clothing, haberdashery, and millinery, and of vehicles, furniture, cabinet and upholstery wares. So also are the industries connected with earthenware, both in the more ordinary forms of pottery and in that of porcelain, with its classic shapes and gorgeous colors and exquisite designs, the Wedgwood being among the most widely known of such wares. The largest quantity of non-translucent earthenware is manufactured in Staffordshire. Among earthenware, at least as to principal constituents, we may include glass in its various forms, the principal of which are window glass and bottles.

Another notable manufacture is that of paper in all its different varieties. In connection with it are various industries, of which it may be considered as, directly or indirectly, the parent—type-founding, printing, books, newspapers, and with them literature in its various departments, engraving, etc. Besides the various classes of paper and stationery exported there is of course an immense consumption at home. Among other important miscellaneous manufactures are those of chemicals, manures, leather and leather goods (boots and shoes, saddlery), india-rubber goods, floorcloth, etc. Here may also be mentioned preserved provisions in great variety, confectionery, spirits, and ales.

Shipbuilding.—The chief seats of British shipbuilding are Glasgow and other Clyde ports, Newcastle and other Tyne ports, Sunderland, Hartlepool, Belfast, Stockton, Middlesbrough, London, and Barrow-in-Furness. The output for 1898 was 665 sailing vessels, with a net tonnage of 41,839; 705 steam vessels, with a net tonnage of 654,158 (1,079,583 tons gross); or in all, 1,370 vessels, with a total net tonnage of 695,997. Besides these there were built for foreigners 196 sailing and steam vessels, having a total net tonnage of 174,611 tons; the steamers numbering 165, with a net tonnage of 171,560 and a gross tonnage of 278,955.

Exports and Imports.—Of the extent of the commerce carried on by railway, river, canal, and highway there are no means of forming a just estimate, though it must be of enormous extent. The foreign trade, or commerce properly so called, is more easily calculated, at least in all its leading

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branches. The following table will show the progress it has made, and the extent it has attained:

EXPORTS.				
YEARS.	IMPORTS.	British Produce.	Foreign & Colonial Produce.	Total Exports.
	£	£	£	£
1856 . . .	172,544,154	115,826,948	23,393,405	139,220,353
1873 . . .	371,287,372	255,164,603	55,830,162	310,994,765
1880 . . .	411,229,565	223,060,446	63,354,020	286,414,466
1883 . . .	426,891,579	239,799,473	65,637,597	305,437,070
1892 . . .	423,892,178	227,060,224	64,400,420	291,460,644
1897 . . .	451,238,683	234,350,003	59,833,677	294,183,680
1901 . . .	522,238,986	280,498,889	67,846,843	870,584,718

In 1856 the imports per head of the population amounted to £6, 3s. 2d; the exports of British produce, to £4, 2s. 10d. In 1901 the amounts were respectively £12, 11s. and £6, 14s. 10d.

The chief articles and values of the imports and exports in 1901 were:

IMPORTS.		£
Animals, living (for food) . . .		9,400,033
(a) Articles of food and drink duty free . . .		162,949,666
(b) Articles of food and drink dutiable . . .		47,595,501
Tobacco, dutiable . . .		4,819,473
Metals . . .		30,787,452
Chemicals, dyestuffs, and tanning substances . . .		6,129,559
Oils . . .		11,030,606
Raw materials for textile manufactures . . .		70,401,772
Raw materials for sundry industries and manufactures . . .		57,954,510
Manufactured articles . . .		93,609,754
(a) Miscellaneous articles . . .		17,298,198
(b) Parcel post . . .		1,262,462
Total . . .		£522,238,986

EXPORTS.		£
British produce.		
Animals, living . . .		742,499
Articles of food and drink . . .		14,884,915
Raw materials . . .		33,977,644
Articles manufactured and partly manufactured, viz.: . . .		
(a) Yarns and textile fabrics . . .		103,471,561
(b) Metals and articles manufactured therefrom (except machinery) . . .		39,413,762
(c) Machinery and mill work . . .		17,855,335
(d) Ships, new (not registered as British) . . .		9,159,876
(e) Apparel and articles of personal use . . .		10,940,060
(f) Chemicals, and chemical and medicinal preparations . . .		8,942,109
(g) All other articles, either manufactured or partly manufactured . . .		38,068,759
(h) Parcel post . . .		3,642,369
Total British produce . . .		£280,498,889
Foreign and colonial produce . . .		67,846,843
Total . . .		£348,345,732

Shipping.—The registered sailing vessels engaged in the home trade of the United Kingdom were in 1900, 6,203; their tonnage 378,957; their crews numbered 23,734. The steam vessels in the home trade were 3,545, with a tonnage of 508,359, and crews numbering 40,288 men. The vesels en-

British Empire

gaged partly in the home, partly in the foreign trade, numbered 401, their tonnage 217,478, and their crews 5,649. The sailing vessels in the foreign trade were in 1900, 1,143, of 1,594,838 tons, and 25,856 men; steam vessels 3,648, burden 6,695,575 tons, crews 151,921. The total number of vessels employed in the trade of the United Kingdom was thus 14,935, with an aggregate burden of 9,395,207 tons, and crews numbering in all 247,448. The total number of vessels registered as belonging to the kingdom was 19,982 of 9,304,108 tons.

Education.—Since 1870 education has made great advances in all the divisions of the United Kingdom. In that year a comprehensive measure (with compulsory clauses) for the promotion of elementary education in England was passed by the State. Its chief provisions were for the election of school boards in districts in which there was a deficiency of school accommodation, with power to build and maintain schools out of rates levied for the purpose, and for the giving of aid by parliamentary grant to these board schools as well as to previously existing schools. As the result of this act the whole country was mapped out into school districts, school boards were established in London and in all the school districts where there was a deficiency of school accommodation, and these school boards were permitted to make a compulsory by-law for their districts. These provisions were supplemented in 1876 by an act which provided that each school district which had no school board should at least have a school attendance committee. It was found, also, that the discretionary power given to school boards to enforce the attendance of children in their districts did not secure the best results, and so it was enacted in 1880 that every school board, and every school attendance committee was absolutely required to make and enforce by-laws for compulsory attendance. The school attendance age as now enforced by law, is from 5 to 14 years, but whole or partial exemption may be granted to pupils who are not less than 12 years, and who have passed the 5th standard. In 1900 there were in England and Wales 2,545 school boards, embracing in their operations a population of 20,142,943, and 788 school attendance committees, embracing a population of 8,859,532. The proceedings of these bodies and the manner in which they administer the acts are reported by H. M. inspectors to the Education Office. The Scotch Education Act, passed in 1872, was from the first a comprehensive measure which required the election of school boards in every burgh and parish, and made school attendance compulsory throughout the country, the school age being from 5 to 14 years. The child, however, can leave school when he

has passed the 5th standard and is 12 years of age. It was provided by legislation in 1889 that the elementary education of Scotland should be almost entirely free; and in 1891 enactments were passed to make it entirely free, both in England and in Scotland. In 1897 an act was passed providing for money grants to necessitous voluntary schools. In Ireland, which is still far behind England and Scotland, elementary education is under the superintendence of a body of Commissioners of National Education, created in 1845, with powers to erect and maintain such schools as they thought necessary. There is, however, no compulsory school attendance in any part of Ireland. The Education Acts in England and Wales are administered under the general superintendence of the Board of Education, established in 1900, Scotland being under a special department. Of the schools in England and Wales in 1900, 5,758 with 2,201,049 pupils in average attendance were directly under school boards, while 11,777 with 1,885,802 pupils were connected with the National Society. The grants to elementary schools were in 1901: England, £8,390,907; Scotland, £1,196,236; Ireland, £1,321,905. Besides these grants the schools have an income from endowments, school fees, local rates, etc. There are a number of training colleges for teachers, organized mostly in connection with the different religious bodies.

Secondary education in the United Kingdom is not as yet organized by the State. A return issued in 1898 groups the secondary schools of England into five classes, namely, private enterprise, subscribers, companies', endowed, and those under local authority. The total number of schools sending returns was 6,209. The number of pupils was 291,544. The private enterprise schools numbered 5,167; the endowed, 619. Of the latter class many are known as grammar schools. A special class may be said to consist of the great public schools of Eton, Harrow, Rugby, Winchester, etc. In Scotland there are many higher class schools, and also secondary departments in other schools under the school boards. Technical education received a great impetus from the passing of various acts from 1889 onward.

For the higher education there are in England the Universities of Oxford, Cambridge, London, Durham, the Victoria University, the University of Wales, and the Birmingham University. In addition to these there are colleges, some of them called university colleges, at Nottingham, Bristol, and other places (some of them for women), and the colleges belonging to the different religious bodies. Till 1900 London University granted degrees, but did not teach; it is now, however, a teaching university, having in con-

nection with and forming schools of it, University College, King's College, and other institutions. In Scotland there are the four universities of Edinburgh, Glasgow, Aberdeen, and St. Andrews; a university college at Dundee incorporated with St. Andrews University; St. Mungo's College, and Anderson's College Medical School, Glasgow. Ireland has the University of Dublin, the Queen's Colleges of Belfast, Cork, and Galway in connection with the Royal University of Ireland (which is merely an examining and degree-conferring body), the Roman Catholic University in connection with Maynooth and other Roman Catholic colleges. A medical education may be obtained at the various universities and colleges, or in connection with the chief hospitals.

Religion.—Every form of religion enjoys the most complete toleration, but there are two churches, one in England having an Episcopal form of government, and one in Scotland with a Presbyterian organization, established by laws partly supported by State endowments. The Church of England has 2 archbishops, over 30 diocesan bishops, and a number of suffragan bishops, besides colonial and missionary bishops. There are about 14,000 parishes, the income in about half being under £130 per annum; the total number of clergy is about 23,000. The church population is not known with certainty, but estimates make it from 14,000,000 to 16,000,000. The chief religious bodies in England outside of the Established Church are the Methodists in their several branches, the Independents or Congregationalists, and the Baptists. The Established Church of Scotland includes about 1,800 ministers and licentiates engaged in ministerial work, and the number of communicants is said to be over 640,000. The total number of parishes, old and new, together with mission stations, is about 1,760, old parishes numbering about 900. The chief non-established church of Scotland is the United Free Church, formed in 1900 by the union of the Free Church and the United Presbyterian Church. The Episcopal Church in Scotland is also a body of some importance, and so is the Roman Catholic. Both in England and Scotland the great majority of those who do not belong to the Established Church are Protestants. In England, however, dissenters nearly all belong to churches having a different organization from that of the Anglican Church, while in Scotland most of them are Presbyterians, and thus differ little from members of the Established Church as regards creed and organization. In Ireland there has been no State Church since 1871, when the branch of the Anglican Church which had long been there established was disestablished. It still occupies an important position, and is under 2 archbishops

and 11 bishops. The great majority of the people, however, are Roman Catholics. The census takes no account of religious belief, except in Ireland, where the returns of 1891 showed 3,547,307 Roman Catholics, 600,103 Anglicans, and 444,974 Presbyterians. The number of Roman Catholics in the three kingdoms is about 5,500,000. The number of Jews is about 94,000, of whom nearly three-fourths are in London.

People: Social State.—Owing to a great variety of causes, some of them connected with natural resources and geographical position and others with the national character, the people of the United Kingdom enjoy an exceptional degree of prosperity and freedom. But to this general comparative prosperity there is a darker side. The great development of manufactures, itself one of the causes of Great Britain's favorable position among the nations of the world, has, by leading to the overcrowding of large numbers in great towns, produced many gigantic evils. In 1898 there were 34 towns with over 100,000 inhabitants, and more than 70 with over 50,000; and besides London there were four cities—Glasgow, Liverpool, Manchester, and Birmingham—containing over 500,000 inhabitants each. The evils referred to have now for many years received the careful attention of humanitarians and experts, and in consequence much has been done by legislation and other means to diminish them. In particular, the condition of the great cities has been enormously improved in respect of sanitation, though much still remains to be done in this direction. One of the most serious causes of poverty and misery, want of employment, has of late years attracted much attention, particularly at times when various natural causes conspired to aggravate it. The classes most severely affected by this cause are those who, though not paupers, are virtually always on the brink of pauperism; and there is some reason to believe that this class is not diminishing in numbers. The number of persons committed for trial and convicted shows a decided decrease in recent years. In 1897 the number committed at assizes, quarter-sessions, etc., was 15,439, of whom 12,029 were convicted. During the period 1888–1897 the number sentenced to death in England and Wales averaged 24.4 per annum; to penal servitude for life, 2.6; to penal servitude for a term of years by ordinary courts, 840.1; to imprisonment on indictment, 7,709.3; to imprisonment on summary conviction or for want of sureties, 142,017.5. In dealing with the statistics of crime it is important to bear in mind that of recent years several new offenses have been created, and extended powers have been granted in connection with others; and there has probably been increased efficiency in detecting crime. The rate of mortality has been reduced considerably since the be-

ginning of the 19th century, and further improvement in this direction may still be expected. Emigration from the United Kingdom to countries out of Europe has latterly been declining. In 1901 the total number was 172,140, of whom 104,257 went to the United States. With regard to occupations and pursuits the census of 1891 gave the following returns for England and Wales, Scotland, and Ireland: Professional class, 812,242 males, 439,452 females—total, 1,251,694; domestic class, 188,365 males, 2,170,260 females—total 2,358,625; commercial class, 1,616,065 males, 47,795 females—total 1,663,860; agricultural and fishing class, 2,349,652 males, 173,176 females—total 2,522,828; industrial class, 6,641,637 males 2,383,521 females—total 9,025,158; others, 3,245,676 males, 10,716,413 females—total 13,962,089.

Extent of Empire.—The European dominions of the British empire comprise—in addition to Great Britain, Ireland, the Isle of Man, and the Channel Islands—the rocky promontory of Gibraltar, captured from Spain in 1704; and Malta, Gozo, and adjacent islets, ceded to Great Britain in 1800. The most important of the Asiatic possessions of Great Britain is India, acquired gradually since the incorporation of the East India Company in 1600, and especially during the great struggle with France in the 18th century. Great Britain also possesses Ceylon, acquired by conquest from the Dutch and from native rulers in 1796–1815; the Straits Settlements of Singapore (ceded in 1824), Penang (1786), Wellesley Province (1800), and Malacca (1824), on which are dependent various native States of the Malay peninsula; the island of Hong-Kong (taken in 1841) and territory on the adjacent mainland; portions of the islands of Borneo, namely British North Borneo (company chartered in 1881), to which is attached the island of Labuan (ceded 1846), the sultanate of Brunei, and Sarawak (practically British since 1842); Aden (1839), the island of Perim, the Kooria Moorla Islands, and the Bahrein Islands. Cyprus, though belonging to Turkey, has since 1878 been administered by Great Britain. In Africa Great Britain owns Cape Colony, gradually developed since its final acquirement in 1806, and including Walfisch bay; Basutoland (British since 1868); the Bechuanaland Protectorate (acquired in 1884); Natal (proclaimed British in 1843), to which are now annexed Zululand and Tongaland (acquired in 1887); Rhodesia, including Matabeleland, Mashonaland, Barotseland, etc., recently begun to be developed by the British South Africa Company; the Central Africa Protectorate (acquired in 1889–1890, and proclaimed a protectorate in 1891); the West African Colonies; namely, Gambia (recognized as British in 1783), the Gold

Coast (partly acquired in the 17th century), Sierra Leone (ceded 1787), and Lagos, with dependencies (occupied in 1861); Nigeria, including the Niger Coast Protectorate (1884) and the territories formerly administered by the Royal Niger Company (chartered in 1886); the East Africa Protectorate, proclaimed in 1895 over territories previously under the Imperial British East Africa Company (chartered 1888); the Uganda Protectorate, now including also Unyoro, Usoga, etc. (proclaimed in 1894); the Zanzibar Protectorate, consisting of the islands of Zanzibar and Pemba (under the protection of Great Britain since 1890); the Somali Coast Protectorate (acquired in 1884); the islands of Mauritius (taken from France in 1810), with its dependencies the Seychelles, etc.; the island of Socotra (1886); and the Atlantic islands, St. Helena (1651), Ascension (1815), and Tristan d'Acunha (1816). Besides Great Britain virtually rules Egypt and the recently reconquered Egyptian Sudan (1898), though the former is nominally part of the Ottoman empire; and she practically possesses the former territories of the Orange Free State and the Transvaal. Her possessions in the New World comprise the Dominion of Canada, most of which was obtained from France by conquest and treaty between 1713 and 1763; the island of Newfoundland, the oldest English colony (discovered by John Cabot in 1497), with its dependency Labrador; British Honduras (1783); the Bermudas Islands (1609); the West Indian Islands, namely, Jamaica (1655), the Bahamas (1629), several of the Leeward Islands (Antigua, St. Christopher, Dominica, etc.), the Windward Islands (Barbados, St. Lucia, St. Vincent, Grenada, the Grenadines, Tobago, etc.), and Trinidad (1797); British Guiana (1814); and the Falkland Islands (organized 1833) and South Georgia. The British empire in Australasia includes Australia (explored and settled from the latter part of the 18th century onward); Tasmania (settled by Englishmen in 1803); New Zealand (begun to be colonized in 1839); a portion of New Guinea (1884); the Fiji Islands (1874); and many small islands in the Pacific.

British Museum, the great national museum in London, owes its foundation to Sir Hans Sloane, who, in 1753, bequeathed his various collections, including 50,000 books and MSS., to the nation, on the condition of £20,000—less by £30,000 than the original cost—being paid to his heirs. This offer was agreed to by Parliament, which authorized a lottery of £100,000 to implement the bargain, as well as to purchase other collections. Montague House, which was bought for the purpose for £10,250, was appropriated for the museum, which was first opened on Jan. 15, 1759. The original edifice hav-

ing become inadequate, a new building was resolved on in 1823, the architect being Sir R. Smirke, whose building was not completed till 1847. It forms a hollow square, facing the cardinal points of the compass. The S. or Russell street front, is the principal one, having an imposing columnar façade of the Ionic order. This, as well as the other three, looks into the central square court, which measures about 320 feet by 240. There are two stories of galleries and rooms round the greater part of the building. Smirke's designs were no sooner completed than it was found that additional accommodation was needed in various departments, and several new rooms were provided; but the library accommodation being wholly inadequate for the accommodation of the readers, as well as for the reception of new books, a grant was obtained from Parliament for a new library building in 1854, and it was completed and opened in 1857, at a cost of £150,000. It was erected in the interior quadrangle, and contains a circular reading-room 140 feet in diameter, with a dome 106 feet in height. The whole arrangements have been completed with the utmost economy in regard to space, and besides ample accommodation for books, the reading-room now contains accommodation for 300 readers comfortably seated at separate desks, which are provided with all necessary conveniences. The plan was prepared by Mr. Panizzi, the late chief librarian, who superintended its execution. More recently, the accommodation having become again inadequate, it was resolved to separate the objects belonging to the natural history department from the rest, and to lodge them in a building by themselves. Accordingly a large natural history museum has been erected at South Kensington, and the specimens pertaining to natural history (including geology and mineralogy) have been transferred thither, but they still form part of the British Museum. Externally this building is somewhat heavy in character, but the interior has been treated in a most artistic manner. The British Museum is under the management of 48 trustees, among the chief being the Archbishop of Canterbury, the Lord-Chancellor, and the Speaker of the House of Commons. In all the staff of the institution numbers over 320 persons. The museum is open daily, free of charge. Admission to the reading-room as a regular reader is by ticket, procurable on application to the chief librarian, there being certain simple conditions attached. The institution contains something like 2,000,000 volumes in the department of printed books. A copy of every book, pamphlet, newspaper, piece of music, etc., published anywhere in British territory, must be conveyed free of charge to the British Museum. There are various catalogues and handbooks prepared by the offi-

cers of the museum, and containing classified descriptions of the contents of the different departments. Of these there are eight, namely, the department of (1) printed books, maps, charts, plans, etc.; (2) of manuscripts; (3) of natural history; (4) of Oriental antiquities; (5) of Greek and Roman antiquities; (6) of coins and medals; (7) of British and mediæval antiquities and ethnography; (8) of prints and drawings.

British North America, a name under which are included the Dominion of Canada and the colony of Newfoundland, comprising all the mainland N. of the United States (except Alaska) and many islands.

British South Africa Company, a corporation founded in 1889, with a royal charter, by Cecil Rhodes and others, for the purpose of controlling, settling, administering and opening up by railways and telegraphs, etc., certain territories in Central South Africa. Mashonaland was first settled, and, in 1893, Matabeleland was annexed and settled after the defeat of King Lobengula. In 1895, North Zambezia, in British Central Africa, was added, as well as a strip of territory in the Bechuanaland Protectorate. This territory has been called Rhodesia, or British Zambezia; area, about 500,000 square miles. In consequence of the filibustering raid of Dr. Jameson, an officer of the company, near the close of 1895, Rhodes resigned his connection with the company in 1896, and a joint administrator of the territory was appointed by the British crown. See RHODESIA.

Brittany. See BRETAGNE.

Britton, Nathaniel Lord, an American scientist; born on Staten Island, N. Y., Jan. 15, 1858. He was Professor of Botany in Columbia School of Mines in 1888-1896, and later Director of the New York Botanical Garden. He wrote "Geology of Staten Island" (1880); "Catalogue of the Flora of New Jersey" (1882); and collaborated in preparing "An Illustrated Flora of the Northern United States, Canada," etc.

Broach, or **Baroach**, a town in Guzerat (Gujerat), Hindustan, on the Nerbudda. It was taken by the British in 1772 and ceded by treaty in 1803. Pop. 37,281.

Broad Arrow, the mark cut or stamped on all English government property and stores. It was the cognizance of Henry, Viscount Sydney, Earl of Romney, Master-General of the Ordnance, 1693-1702, and was at first placed only on military stores. It is also the mark used in the British Ordnance Survey to denote points from which measurements have been made.

Broad Bill, a species of wild duck, *anas clypeata*: the shoveler; also the spoon bill, *platalea leucorodia*.

Broadhead, Garland Carr, an American geologist; born in Albemarle Co., Va.,

Oct. 30, 1827. He studied at the University of Missouri and was long the State Expert in Geology. From 1887 to 1897 he was Professor of Geology at the University of Missouri.

Broad Mountain, a mountain ridge of Pennsylvania, in Carbon and Schuylkill counties, about 50 miles long.

Broad River, a river of North Carolina, rising in the Blue Ridge mountains, and making a junction with the Saluda at Columbia to form the Congaree; about 200 miles long.

Broads, The Norfolk, a series of English inland lakes, usually said to be formed by the widening or broadening out of the rivers. The broads *par excellence* are those up the Bure or North river (which empties itself into the sea at Yarmouth), and its tributaries, the Ant and the Thurne. The broads have grown greatly in favor with holiday makers in recent years.

Broad Top Mountain, a mountain in Bedford and Huntington counties, Pennsylvania; extensively mined for anthracite coal. Height about 2,500 feet.

Broadway, the great business street of New York. Starting from Bowling Green, at the lower extremity of the island, it runs northward in a somewhat diagonal direction, separating the city into substantially equal eastern and western parts. Its continuous course is interrupted by two public squares; Union Square, at 14th street, and Madison Square, at 23d street. Below Union Square it is devoted mainly to office buildings and wholesale establishments. Above Madison Square (where it intersects Fifth avenue and 23d street) are a number of theaters and the chief hotels. Passing Herald Square (34th street), it becomes Upper Broadway. It joins the Boulevard at 59th street at the S. W. corner of Central Park, and is continued as the Boulevard to 155th street. From this point the same thoroughfare extends to Albany, N. Y., following the course of the old post-road. Its length below 59th street is about 5 miles, and it is traversed throughout by an electric railway. The construction of a Broadway underground road was begun in the spring of 1900, and the first trains were run in the fall of 1904.

Broccoli, a late variety of the cauliflower, hardier and with more color in the lower leaves. The part of the plant used is the succulent flower stalks. Although broccoli is inferior in flavor to cauliflower it serves as a fair substitute.

Broch (bröch), a name for certain prehistoric structures in Scotland, resembling low, circular, roofless towers, with walls of great thickness, built of unhewn stones and without lime or cement, and entered by a narrow passage. There are small cham-

bers in the thickness of the wall, accessible only from the interior. These structures were evidently built for defense. They are most numerous in Orkney, Shetland, and the Northern counties.

Brochantite (from BROCHANT DE VILLIERS, a French mineralogist), an orthorhombic transparent or translucent mineral, with its hardness, 3.5-4; its sp. gr., 3.78-3.90; its luster vitreous, pearly, on one cleavage face. Composition: Sulphuric acid, 15.8-19.71; oxide of copper, 62.626-69.1; oxide of zinc, 0-8.181; oxide of lead, 1.03-1.05. It is found in all portions of the world. It can be produced artificially. Dana makes two varieties—(1) Ordinary brochantite. (2) Warringtonite, with which brongnartine may be classified.

Brock, Sir Isaac, a British military commander, born in Guernsey, Oct. 6, 1769; suppressed a threatened mutiny in Canada in 1802; made Lieutenant-Governor of Upper Canada in 1810; took Detroit from the Americans under General Hull in 1812; and was killed at the battle of Queenstown, Oct. 13, 1812. A monument to his memory stands on the W. bank of the Niagara river.

Brocken, the culminating point of the Hartz Mountains, in North Germany, Kingdom of Saxony, cultivated nearly to its summit, which is 3,740 feet above the level of the sea. The phenomenon called the "Specter of the Brocken" is here occasionally seen at sunset and sunrise. It is caused by the perpendicular rising of the mists from the valley opposite to the sun, at the same time leaving the top of the mountain clear. The effect produced is a wonderful enlargement of every object reflected by this dense mass of vapor ascending from the valley.

Brockhaus, Friedrich Arnold (brok'-hous), a German publisher, born in Dortmund, May 4, 1772. In 1811 he settled at Altenberg, where the first edition of the "Conversations-Lexikon" was completed, 1810-1811. The business rapidly extended, and he removed to Leipsic in 1817. There are now chief branches in Berlin and Vienna, and among the literary undertakings of the house have been several important critical periodicals and some large historical and bibliographical works. He died Aug. 20, 1823.

Brockhaus, Hermann, a German Orientalist, born in Amsterdam in 1806; brother of the preceding; from 1848 till his death, was Professor of Sanskrit at Leipsic, and published many works on Oriental literature. He latterly edited the great "Allgemeine Encyclopädie" of Ersch and Gruber. He died in Leipsic, Jan. 5, 1877.

Brockton, a city in Plymouth co., Mass.; on the New York, New Haven and Hartford railroad; 20 miles S. of Boston. It is one

of the largest boot and shoe manufacturing places in the country, and beside these articles has extensive manufactories of rubber goods, shoe machinery and supplies, tools and bicycles. It contains the villages of Campello, Montello, Marshall's Corner, Brockton Heights, Clifton Heights and Salisbury Square; was settled in 1700; was incorporated as a town in 1821, and chartered as a city in 1881. There are 2 National and 2 savings banks, a public library, with over 26,000 volumes; public school property valued at over \$500,000, and a property valuation exceeding \$26,000,000. Pop. (1900) 40,063; (1910) 56,878.

Brockville, town, port of entry, and county-seat of Leeds co., Ontario, Canada; on the St. Lawrence river, below the Thousand Islands, and the Grand Trunk, the Canadian Pacific, and the Brockville and Sault Ste. Marie railroads; 125 miles S. W. of Montreal. It is a port of call for the St. Lawrence steamers; is lighted by gas and electricity; has excellent water and sewerage systems; and contains several hospitals and asylums; a dozen churches; a number of hotels, well known to travelers; and manufactories of agricultural implements, gloves, cigars, leather, sulphuric acid, and foundry and machine shop products. It is named for Gen. Sir Isaac Brock (1769-1812), an English officer killed in the battle of Queenstown. Pop. (1901) 8,940.

Broderick, David Colbreth, an American legislator, born in Washington, D. C., Feb. 4, 1820; was defeated for Congress in New York in 1846; went to California, and was elected a member of the Constitutional Convention of 1849; served as Speaker of the Senate; and was elected to the United States Senate in 1856, where he actively opposed the admission of Kansas. He was killed in a duel by Judge David S. Terry, Sept. 16, 1859.

Brodhead, John Romeyn, an American historian, born in Philadelphia, Jan. 2, 1814; graduated at Rutgers College in 1831; made a valuable collection of documents in Europe bearing upon American history that was published by the State of New York; author of a "History of the State of New York." He died in New York city, May 6, 1873.

Brodie, Sir Benjamin Collins, an English surgeon, born in Wiltshire, June 9, 1783. He was the leading surgeon of his day, and attended George IV., and was sergeant-surgeon to William IV. and to Queen Victoria. He was made a baronet in 1834; from 1858 to 1861 was President of the Royal Society, and was connected with many other scientific and learned societies. He published a number of works, all connected with his profession. He died Oct. 21, 1862. His eldest son, SIR BENJAMIN

Broglie

COLLINS BRODIE, a celebrated chemist, was born in London in 1817; died in 1880. In 1855 he was appointed Professor of Chemistry at Oxford.

Broglie (brōl-yē' or brō-glē'), a prominent French family, of Piedmontese origin; its most important members have been the four dukes of the name: (1) **FRANÇOIS MARIE**, first Duc de, Marshal of France, born in 1671, took part in every campaign from 1689, and died in 1745. (2) **VICTOR FRANÇOIS**, his son, born in 1718, was the most capable of the French commanders in the Seven Years' War. Made a Marshal in 1759, he entered the Russian service after the Revolution, and died in 1804. (3) **ACHILLE CHARLES LÉONCE VICTOR**, grandson of the last, and son of Prince Claude Victor (born in 1757, guillotined in 1794), born in 1785, was distinguished as a Liberal politician and an earnest advocate for the abolition of slavery. He was Foreign Secretary (1832-1834) and Prime Minister (1835-1836) under Louis Philippe; after 1851 he lived in retirement, and died in Paris, Jan. 25, 1879. He was a member of the Academy, and published "*Ecrits et Discours*" (3 vols., 1863), while the fourth and last volume of his "*Souvenirs*" appeared in 1887. (4) **JACQUES VICTOR ALBERT**, his eldest son, born June 13, 1821, early entered the field of literature, and was elected an Academician in 1862. Returned as a deputy in 1871, he was, till May, 1872, Ambassador at London; he then became leader of the Conservative Right Center, and with a view to force a monarchical government on France, he brought about the resignation of Thiers, and the election of MacMahon, in 1873. He was twice Premier—in 1873-1874 and in 1877—resignation being on both occasions forced on him by Gambetta's exposure of his reactionary tactics. His most important works are his orthodox "*L'Eglise et L'Empire Romain au IV. Siècle*" (6 vols., 1856-1869); "*Le Secret du Roi*" (3d ed., 2 vols., 1879), and two hostile works on Frederick the Great, from family papers (1882 and 1884). He died Jan. 19, 1901.

Brogue, a brogan; a stout, heavy leather shoe, resembling in form the French *sabot*. Applied generally to the pedal coverings of the Scottish Highlanders and the Irish peasantry. It is also applied to a corrupt dialect, or mode of pronunciation; as, spoken with the Irish brogue.

Broiling, the cooking of meat or fish on a gridiron above a fire, or by laying it directly on the coals, a very wholesome method of cookery.

Broke, **Sir Philip Bowes Vere**, a British admiral, born near Ipswich, Sept. 9, 1776; distinguished himself particularly in 1813, as commander of the "*Shannon*,"

Bromelia

in the memorable action which that vessel fought with the United States vessel "*Chesapeake*" off the American coast, and in which the latter was captured. He died in London, Jan. 2, 1841.

Broken Wind, a disease of the organs of respiration in horses, commonly produced by the rupture of the lung cellular tissue.

Broker, an agent employed to make bargains and contracts between other persons, in matters of commerce, for a compensation commonly called brokerage. A broker usually confines his attention to one particular market, as wool, sugar, or iron, and the special knowledge he thus acquires renders his services useful to the general merchant, who has no such intimate acquaintance with the trade. The broker is strictly a middleman, or intermediate negotiator between the parties, finding buyers or sellers as required. He does not act in his own name, nor has he generally the custody of the goods in which he deals, thus differing from a factor, and he cannot sell publicly like an auctioneer. He is treated as the agent of both parties, though primarily he is deemed the agent of the party by whom he is originally employed. Besides ordinary commercial brokers, there are several other sorts, such as stock-brokers, share-brokers, ship-brokers, insurance-brokers, bill-brokers, etc.

Bromberg, a town in the Prussian Province of Posen, on the Brahe, 6 miles from its influx to the Vistula, and 99 miles S. S. W. of Danzig by rail. It has iron foundries, machine shops, and manufactures of cloth and paper, distilleries, breweries and corn mills. There is a considerable provincial trade both by shipping and railway. The Bromberg canal, 17 miles long, by uniting the rivers Netz and Brahe, connects the Oder and Elbe with the Vistula. Pop. (1905) 54,231

Brome, Alexander, an English poet and dramatist, born in 1620. He was the author of many royalist songs and epigrams; published "*The Cunning Lovers*," a comedy (1654); "*Fancy's Festivals*" (1657); "*Songs*," etc. (1660); "*Translation of Horace*" (1666), etc. He died June 3, 1666.

Brome, Richard, an English poet and dramatist; wrote "*The Jovial Crew*," "*The Northern Lass*," and many other plays, 10 of which were edited and published by Alexander Brome soon after his death. He was originally a servant of Ben Jonson's, on whose style he endeavored to mold his own. He died about 1652.

Brome Grass, the English book name for the genus *BROMUS* (q. v.).

Bromelia (named after *BROMELIUS*, who published a Gothic flora), a genus of plants, the typical one of the order *bromeliaceæ*.

Bromeliaceæ

Bromeliaceæ, bromelworts, an order of endogenous plants, placed by Dr. Lindley under his narcessal alliance. The calyx is sometimes herbaceous looking, but sometimes colored. Petals, three, colored; stamina, six or more; ovary, three celled, many-seeded, as is the fruit, which is capsular or succulent. The stem is wanting or, if present, very short. Sometimes it consists of fibrous roots, consolidated round a slender center with rigid channeled leaves spiny at the edge or point. The fruit is sometimes eatable. Lindley estimated the known species at 170, all American. They have been introduced into Africa, the East Indies, and elsewhere. The well known pineapple is the *bromelia ananas*. Ropes are made in Brazil from another species of the same genus. All the species of bromeliaceæ can exist without contact with the earth; they are therefore suspended, in South America, in houses, or hung to the balustrades of balconies, whence they diffuse fragrance abroad.

Bromic Acid (HBrO_3), a monobasic acid, forming salts called bromates. When bromine is dissolved in caustic potash a mixture of bromide and bromate of potassium is obtained, which can be separated by crystallization, $3\text{Br}_2 + 6\text{KHO} = 5\text{KBr} + \text{KBrO}_3 + 3\text{H}_2\text{O}$. Free bromic acid can be prepared by passing chlorine into bromine water, $\text{Br}_2 + \text{Cl}_2 + \text{H}_2\text{O} = 2\text{HBrO}_3 + 10\text{HCl}$. The acid is best obtained by decomposing potassium bromate by argentic nitrate acid acting on the resulting argentic bromate by bromine, $5\text{AgBrO}_3 + 3\text{Br}_2 + 3\text{H}_2\text{O} = 5\text{AgBr} + 6\text{HBrO}_3$. Bromic acid is a strongly acid liquid, reddening and then bleaching litmus paper. On concentration at 100° it decomposes into bromine and oxygen. It is decomposed by sulphur dioxide (SO_2), sulphide of hydrogen (H_2S), and by hydrobromic acid (HBr). Bromates are, with difficulty, soluble in water, and are decomposed on heating into oxygen and bromides.

Bromide, a combination of bromine with a metal or a radical. Bromides are soluble in water, except silver and mercurous bromides; lead bromide is very slightly soluble. They are detected in analysis by the following reactions: Argentic nitrate gives a yellowish precipitate of AgBr , insoluble in dilute nitric acid, and soluble in strong ammonia. Chlorine liberates bromine, and, if the liquid is shaken up with ether, a yellow ethereal solution floats on the liquid. Heated with sulphuric acid and MnO_2 , bromides yield vapors of Br , which turns starch yellow.

Bromine, a non-metallic element. Symbol Br ; atomic weight, 79.4. Bromine was discovered in 1826 by Balard, in the salts obtained by the evaporation of sea water. Bromine is liberated from the sodium and magnesium salts by the action of free chlor-

Bromus

ine, and is separated by ether, which dissolves the bromine. This red colored solution is removed, saturated with potash, evaporated, and heated to redness, and the bromide of potassium is heated with manganese dioxide and sulphuric acid. The bromine is liberated in the form of a deep red vapor, which condenses into a dark, reddish black liquid. Specific gravity, 2.97, it boils at 63° ; its vapor density is 5.54 times that of air. It has an irritating smell, and when inhaled is poisonous. It dissolves in 30 parts of water, and the solution has weak bleaching properties. Bromine and hydrogen do not unite in the sunlight, but do when they are passed through a red hot porcelain tube, forming hydrobromic acid (HBr), which is also obtained by the action of phosphorus and water on bromine. It is a colorless, fuming gas, which liquefies at 73° , very soluble in water. The concentrated solution contains 47.8 per cent. of HBr , it boils at 126° , and has powerful acid properties; it neutralizes bases, forming bromides and water. Hypobromous acid, HBrO , is only known in solutions; it has bleaching properties. Bromine can displace chlorine from its compounds with oxygen, while chlorine can liberate bromine from its compound with hydrogen. Free bromine turns starch yellow.

Bromine has been applied externally as a caustic, but rarely. Its chief officinal preparations are bromide of ammonium, useful in whooping cough, infantile convulsions, and nervous diseases generally; and bromide of potassium, now very extensively used, especially in epilepsy, hysteria, delirium tremens, diseases of the throat and larynx, bronchocele, enlarged spleen, hypertrophy of liver, fibroid tumors, etc. Also, as an antaphrodisiac, for sleeplessness, glandular swellings, and skin diseases. Its alterative powers are similar to but less than those of the iodides. Its preparation is the same as iodide of potassium, substituting an equivalent quantity of bromine for iodine— $6\text{KHO} + \text{Br}_2 = 5\text{KBr} + \text{KBrO}_3 + 3\text{H}_2\text{O}$. It has a pungent saline taste, no odor, and occurs in colorless cubic crystals, closely resembling the iodide. As a hypnotic its usefulness is much increased by combining it with morphia or chloral hydrate.

Bromus (brome grass), a genus of grasses having two unequal glumes and two herbaceous glumelles, the outer one bifid and with an awn from below the extremity. The seeds of *B. mollus*, or soft brome grass, when eaten by man or the larger animals, produce giddiness, and they are said to be fatal to poultry. *B. secalinus*, or smooth rye brome grass, is common in rye and wheat fields. When the seeds are accidentally ground with the flour, they impart a bitter taste to bread, and are narcotic like the seeds of *lolium temulentum*.

Bronchi

Bronchi (-ke), the two branches into which the trachea or windpipe divides in the chest, one going to the right lung, the other to the left, and ramifying into innumerable smaller tubes — the bronchial tubes.

Bronchitis, inflammation of the air tubes leading to the pulmonary vesicles, accompanied by hoarseness, cough, increase of temperature, and soreness of the chest anteriorly. The natural mucous secretion is at first arrested, but increases afterward, and is altered in quality, becoming more corpuscular. Its forms are: (1) Acute bronchitis, (a) of the larger and medium sized tubes; (b) capillary bronchitis, and bronchitis of the tubes generally — the *peripneumonia notha* of the older writers. (2) Chronic bronchitis. (3) Plastic bronchitis. (4) Mechanical bronchitis, such as knife grinder's disease — carbonaceous bronchitis or black phthisis. (5) Bronchitis secondary to general diseases, such as measles or typhoid fever. (6) Bronchitis secondary to blood diseases. (7) Syphilitic bronchitis. All varieties are generally preceded by feverishness, but oftener by "a cold in the chest." The uneasy sensations begin about the region of the frontal sinuses, passing from the nasal mucous passages, trachea, and windpipe to the chest, with hoarseness, cough, and expectoration; but in capillary bronchitis the cough is dry and without expectoration. In acute cases the sputum is first thin, then opaque and tenacious, lastly purulent; the breathing is hurried and laborious, the pulse quickened, and the skin dry. The danger increases in proportion as the finer bronchial tubes become involved, and, instead of the healthy respiratory sound we have sharp, chirping, whistling notes, varying from sonorous to sibilant. The sharp sound is most to be feared, as arising in the smaller tubes; the grave, sonorous notes originate in the larger tubes. Spitting of blood sometimes occurs, and in severe cases persons actually die suffocated from the immense quantity of mucus thrown out, obstructing the tubes and causing collapse of the vesicular structure of the lungs. The ratio of the respiration to the pulse is high, going up to 60 or even 70 in the minute, with a pulse rate of 120 or 130. Chronic bronchitis, or bronchial catarrh, is extensively prevalent, especially among the aged, recurring once or twice a year in spring or autumn, or both, till it becomes more or less constant all the year round. For chronic bronchitis the resinous oils are the best remedies. Five drops of oil of eucalyptus on a cube of sugar three or four times daily will do much to ameliorate the recurrent paroxysms. In acute attacks a physician had best be at once consulted.

Bronchocele, an indolent tumor on the forepart of the neck caused by enlargement

Bronté

of the thyroid gland, and attended by protrusion of the eyeballs, anæmia, and palpitation.

Brongniart, Alexander (bron-nyar), a French geologist and mineralogist, born in Paris, Feb. 5, 1770. He was appointed in 1800 director of the porcelain manufactory at Sèvres. In 1807 appeared his "Traité Élémentaire de Minéralogie," and along with Cuvier he wrote "Description Géologique des Environs de Paris." He also wrote other works on mineralogy and geology, and in 1844 appeared his "Traité des Arts Céramiques." He was a member of the Academy of Sciences, and in 1822 succeeded Haüy as Professor of Mineralogy in the Museum of Natural History. He died in Paris, Oct. 7, 1847. His son, ADOLPHE THEODORE BRONGNIART, born in 1801, died in 1876, became Professor of Botany at the Jardin des Plantes, Paris, 1833, and was the author of several botanical works held in high esteem.

Broni, a town of Northern Italy, with mineral springs, 11 miles S. E. of Pavia. Near by is the castle of Broni, where Prince Eugène obtained a victory over the French in 1703.

Bronn, Heinrich Georg, a German naturalist, born in 1800. He was educated at the University of Heidelberg, where he was nominated professor in 1833, and appointed Lecturer on Zoölogy in succession to Leonhard. Among his various scientific works may be named "A System of Antediluvian Zoöphytes" (1827); "Lethæa Geognostica," an important geological work (1837); "History of Nature" (1841-1849), and "Universal Zoölogy" (1850). He died in 1862.

Bronté (bron'tē), a town of Sicily, at the W. base of Mt. Etna, 33 miles N. W. of Catania. The lava streams of 1651 and 1843 lie on either side, but the district around is fertile, and produces wine. Lord Nelson was created Duke of Bronté by the Neapolitan Government in 1799.

Bronté, Anne, an English novelist and poetess, born in Haworth, Yorkshire, March 24, 1820; sister of CHARLOTTE BRONTE. Under the pen name of ACTON BELL she wrote "Agnes Grey" (1847), and "The Tenant of Wildfell Hall" (1848). She died in Scarborough, May 28, 1849.

Bronté, Charlotte (afterward MRS. NICHOLLS), an English novelist, born in Thornton, Yorkshire, April 21, 1816; was the third daughter of the Rev. Patrick Brontë, rector of Thornton, from which he removed in 1820 on becoming incumbent of Haworth, in the West Riding of Yorkshire, about 4 miles from Keighley. Her mother died soon after this removal, and her father, an able though eccentric man, brought up Charlotte and her sisters in quite a Spartan

Brontë

fashion, inuring them to every kind of industry and fatigue. After an education received partly at home and partly at neighboring schools, Charlotte became a teacher,



CHARLOTTE BRONTË.

and then a governess in a family. In 1842 she went with her sister Emily to Brussels, with the view of acquiring a knowledge of the French and German languages, and she subsequently taught for a year in the school she

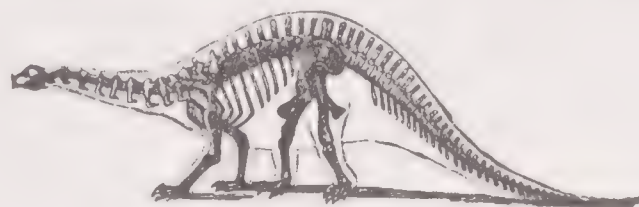
had attended here. In 1844 arrangements were entered into by the three sisters to open a school at Haworth, but from the want of success in obtaining pupils no progress was ever made with their scheme. They resolved now to turn their attention to literary composition; and, in 1846, a volume of poems by the three sisters was published, under the names of CURRER, ELLIS and ACTON BELL. It was issued at their own risk, and attracted little attention, so they quitted poetry for prose fiction, and produced each a novel. Charlotte (CURRER BELL) entitled her production "The Professor," but it was everywhere refused by the publishing trade, and was not given to the world till after her death. EMILY (ELLIS BELL) with her tale of "Wuthering Heights," and ANNE (ACTON BELL) with "Agnes Grey," were more successful. Charlotte's failure, however, did not discourage her, and she composed the novel of "Jane Eyre," which was published in October, 1847. Its success was immediate and decided. Her second novel of "Shirley" appeared in 1849. Previous to this she had lost her two sisters, Emily dying on Dec. 19, 1848, and Anne May 28, 1849 (after publishing a second novel, the "Tenant of Wildfell Hall"). In the autumn of 1852 appeared Charlotte's third novel, "Villette." Shortly after, she married her father's curate, the Rev. Arthur Bell Nicholls, but in nine months died of consumption, March 31, 1855. Her originally rejected tale of "The Professor" was published after her death in 1857, and the same year a biography of her appeared from the pen of Mrs. Gaskell.

Brontë, Emily Jane, an English novelist; sister of CHARLOTTE and ANNE BRONTË, born

Bronx

at Thornton, Yorkshire, Aug. 20, 1813; lived most of her life at Haworth parsonage. Her pen name was ELLIS BELL. "Wuthering Heights" (1847), a powerful but morbid novel, was her chief work. She died in Haworth, Dec. 19, 1848.

Brontosaurus Excelsus, a species of herbivorous dinosaur of the Triassic and Jurassic periods. It is supposed to have been a hippopotamus-like animal, and to have lived on vegetation in the waters. It was about



BRONTOSAURUS EXCELSUS.

60 feet long, and 15 feet high at the middle of the body, and, although its body was of this great size, it had one of the smallest heads known among vertebrates.

Brontotherium, or **Titanotherium**, a genus of the extinct mammals first found in the Bad Lands of South Dakota, and later in Nebraska and Colorado. The formation is Miocene and the genus is but one of an extinct family of herbivorous mammals. It had the following features: The skull was long and depressed, with a large pair of horn cores, placed transversely on the maxillary bones, in front of the orbits; the nasal bones, which were greatly developed and firmly co-ossified, protruded over the nasal orifice; the brain cavity was small and did not extend over the cerebral hemispheres or the cerebellum, and but little over the olfactory lobes; neck was of medium length and stout; axis was large and extended transversely, being massive, with odontoid process stout and conical; lumbar were slender and not as large as the dorsals, and there were four sacral vertebræ; a long and slender tail, indicated by the caudals; limbs somewhat shorter than the elephant's; radius separated from the ulna; carpal bones short and supporting four toes; tibia separated from the fibula; three toes of almost equal size on the hind foot; the bones all solid. The brontotherium was about the size of the elephant. The nose was evidently flexible, but there was no true proboscis.

Bronx, The, a borough of Greater New York, lying N. and E. of the borough of Manhattan, between the Hudson river, East river, and Long Island Sound, including City, Riker's, Hunter's, Twin, Hart, High and several adjacent islands; area, 25,270 acres; pop. (1910) 430,980. It contains an extensive public park, with a botanical garden of 250 acres, and is the site of the newly established New York Zoölogical

Bronze

Gardens. The statistics of this borough are included with those of Manhattan borough. See NEW YORK CITY.

Bronze, an alloy of copper and tin. It was used by the ancient Assyrians and Egyptians. Layard brought many ornaments and other articles of this metal from Assyria. Bronze is more fusible, as well as harder than copper. It is also a fine-grained metal, taking a smooth and polished surface; hence its universal use, both in ancient and modern times, in making casts of all kinds, medals, bas-reliefs, statues, etc. Its color is a reddish-yellow, and is darkened by exposure to the atmosphere. Its composition varies according to the purpose for which it is to be employed, and other constituents besides copper and tin frequently enter into it. Whatever alloy is principally formed of these metals, however, is called bronze. It has been found, on examination, that the bronze weapons of the Greeks and Romans were of the best composition for securing the greatest density in the alloy, and the cutting edges were brought to the highest point of tenacity by hammering. Gun-metal consists of about 90 parts of copper to 9 or 10 of tin. Old cannon are frequently used for casting statues, for which the proportions are similar. Bell-metal consists of 78 of copper and 22 of tin. For edgetools—copper, 100 parts; tin, 14. For medals—copper, 89; tin, 8; zinc, 3, are used. For ornamental articles, zinc and lead are frequently added. These four metals are usually contained in the bronzes of France. There is some difficulty in making bronze, from the liability to the loss of tin, zinc, etc., by oxidization. A greenish color is imparted to ancient bronzes by oxidization, which is imitated in modern bronzes by chemical appliances. An alloy called phosphor-bronze, consisting of about 90 per cent. of copper, 9 of tin, and from .5 to .75 of phosphorus has been found to have peculiar advantages for certain purposes. The addition of phosphorus increases the homogeneousness of the compound, and by varying the proportion of the constituents, the hardness, tenacity, and elasticity of the alloy may be modified at pleasure. Great hardness and tenacity with little elasticity can be conferred on it for the making of ordnance, and hardness and tenacity combined with permanent elasticity can be given to it for the making of parts of machines, etc. In the elastic condition it is peculiarly well adapted for the bearings of machinery, since it produces very little friction. The addition of phosphorus has another important effect. When the proportion exceeds .5 per cent. it gives a warmer color to the bronze, making it resemble gold largely alloyed with copper. This form of the alloy is therefore largely used for works of art. The name of steel-bronze is given to bronze condensed and hardened artificially, as in

Bronze Wing

the making of cannon the bore of which is enlarged by forcing in several strong steel cylinders of different sizes in succession. Aluminum-bronze is a gold-colored alloy of copper and aluminum, manganese-bronze a bronze containing manganese and iron, possessing valuable properties.

Bronzes, in archæology, works of art cast in bronze. Egyptian idols of bronze are contained in the British Museum. The most celebrated antique bronze statues are, the "Sleeping Satyr"; the two youthful athletes; the colossal equestrian statue of Marcus Aurelius, at Rome; the Hercules of the capital; the colossal head of Commodus; the statue of Septimius Severus in the Barberini Palace. Bas-reliefs, vaults, and doors of public edifices were ornamented with decorations of the same metal. Urban VIII. took from the Pantheon alone 450,000 pounds of bronze, which he used for the ornaments of St. Peter's, and for the cannon of the castle of St. Angelo. One of these was composed wholly of bronze nails taken from the portico, and bore the inscription, "*Ex clavis trabalibus porticus Agrippæ.*"

Bronze was considered by men of ancient times as sacred to the gods; and the Roman emperors who struck gold and silver coins could not strike them of bronze without the permission of the senate; hence the inscription S. C. (*Senatus consulto*). The words *moneta sacra* are found only on bronze medals. All the instruments of sacrifice and sacred vessels of the ancients were of bronze. The moderns have also made much use of bronze, particularly for statues exposed to accidents or the influence of the atmosphere, and for casts of celebrated antiques. The molds are made on the pattern, of plaster and brick-dust. The parts are then covered on the inside with a coating of clay as thick as the bronze is intended to be. The mold is now closed and filled on its inside with a nucleus or core of plaster and brick dust, mixed with water. When this is done the mold is opened, and the clay carefully removed. The mold, with its core, is then thoroughly dried, and the core secured in its position by bars of bronze, which pass into it through the external part of the mold. The whole is then bound with iron hoops, and the melted bronze being poured in through an aperture left for the purpose fills the cavity previously occupied by the clay, and forms a metallic covering to the core. It is afterward made smooth by mechanical means.

Bronzed Skin, a peculiar discoloration of the skin frequently associated with Addison's disease, which is a disease of the supra-renal capsules.

Bronze Wing and **Bronze Pigeon**, names given in the Australian colonies to certain kinds of wild pigeon, on account of

Bronzing

the lustrous bronze color with which their wings are variously marked. In other respects also they are beautiful birds.

Bronzing, the process of giving a bronze-like or antique metallic appearance to the surface of metals or plaster casts. The processes vary; they may be classed as coating with a melted alloy; coating with a metal in paste, solution, or vapor; corrosion; coating with a gum, application of bronze powder, and painting.

Brooch, a kind of ornament worn on the dress, to which it is attached by a pin stuck through the fabric. They are usually of gold or silver, often worked in highly artistic patterns and set with precious stones. Brooches are of great antiquity, and were formerly worn by men as well as women, especially among the Celtic races. Among the Highlanders of Scotland there are preserved in several families ancient brooches of rich workmanship and highly ornamented. Some of them seem to have been used as a sort of amulet or talisman.

Brooke, Henry, an Irish novelist and dramatist; born in Rantavan, County Cavan, Ireland, about 1703; was educated at Trinity College, Dublin, and studied law in London, where he became a friend of Pope. His play, "Gustavus Vasa" (1739), was performed in Dublin as "The Patriot." "The Fool of Quality, or the History of Henry, Earl of Moreland" (5 vols. London, 1760) is his best novel. It was republished under the supervision of Charles Kingsley in 1859. Brooke's works were collected in 4 vols. London, 1778. He died in Dublin, Oct. 10, 1783.

Brooke, Sir James, Rajah of Sarawak, was born in Benares, India, April 29, 1803. In 1838, having gone to Borneo, he assisted the Sultan of Brunei (the nominal ruler of the island) in suppressing a revolt. For his services he was made Rajah and Governor of Sarawak, a district on the N. W. coast of the island, and, being established in the Government, he endeavored to induce the Dyak natives to abandon their irregular and piratical mode of life and to turn themselves to agriculture and commerce; and his efforts to introduce civilization were crowned with wonderful success. He was made a K. C. B. in 1847, and was appointed Governor of Labuan. He died in Devonshire, England, June 11, 1868.

Brooke, John Rutter, an American military officer, born in Pottsville, Pa., July 21, 1838. He entered the army as captain in a volunteer regiment on the breaking out of the Civil War in 1861, and resigned in February, 1866, with the rank of Brevet Major-General. In July of the same year he was appointed Lieutenant-Colonel of the 37th United States Infantry. He was pro-

Brook Farm Association

moted to Colonel in March, 1879; Brigadier-General, April 6, 1888, and Major-General, May 22, 1897. After the declaration of war against Spain, he was placed in command of the First Provisional Army Corps, and subsequently distinguished himself in the campaign in Porto Rico, and was made a member of the joint military commission to arrange the cession of the island to the United States. On Dec. 13, 1898, he was appointed Military and Civil Governor of Cuba, a post which he held till April, 1900, when he was succeeded by Gen. Leonard Wood. On May 10, following, he succeeded Major-General Wesley Merritt as commander of the Military Department of the East, with headquarters in New York.

Brooke, Stopford Augustus, an English Unitarian preacher, born in Dublin in 1832. He was educated at Trinity College, Dublin. He has held important curacies in London, and in 1872 was appointed Chaplain in Ordinary to the Queen. He subsequently became a Unitarian. He has published "Life and Letters of Frederick W. Robertson," "Theology in the English Poets," "Primer of English Literature," and "The Early Life of Jesus."

Brook Farm Association, a community which originated in 1841, with William Henry Channing, George Ripley, and Sophia, his wife, with whom were united from time to time George William Curtis, Nathaniel Hawthorne, Theodore Parker, Charles Anderson Dana, John Sullivan Dwight, Margaret Fuller, and other personages of a philosophic turn of mind. It started as an expression of the transcendentalism then attracting philosophical minds in the region of Boston, and as a suggestion from the Fourier communistic movement in Europe, and much shaped by the religious differences which excited New England in 1825-1845. The dominating idea of the Brook Farm experiment was liberty; it was a practical protest against the long dominant Calvinism. An organization was formed, having those named and others as stockholders, and a farm of 200 acres was purchased in West Roxbury, 8 miles from Boston, where the Transcendentalists who adopted its main principle carried it into practice by working the land to the best of their ability and knowledge, which, however, were limited. The actual life of Brook Farm was reverentially planned on the theory that Christ had designed to reorganize society, and that any effort in that direction would be worthy and acceptable to Him. The intellectual plan of the undertaking covered such intellectual objects as would be expected from the brilliant minds included in the community. In this regard it was doubtless successful, so long as it existed. That it ceased to exist, after five or six years, was due to the utterly unpractical

Brookhaven

natures of those engaged in the enterprise, which was finally abandoned after having been a financial failure from the beginning. The scheme of the association contemplated utilizing the labor—physically and intellectually—of each of its members, at a certain fixed rate, the intention being to dispose of the results of such labor to the outside public, and with such profit that all the delights and adornments of life were to be procurable therefrom, and were to be held in common by the members of the association. This part of the plan failed; and the community, having definitely gone over to Fourierism about 1843, and to Swedenborgianism a year later, engaged in a general proselytizing undertaking, a search both for converts and capital, prosecuted by lecturers and writers. But the whole undertaking was brought to a collapse by the destruction of the “Phalanstery” at Brook Farm, by fire, on the night of March 3, 1846.

Brookhaven, city and county-seat of Lincoln co., Miss.; on the Illinois Central railroad; 54 miles S. by W. of Jackson, the State capital. It is the seat of Whitworth Female College, one of the most popular educational institutions in the South, and St. Francis School (Roman Catholic), and is the trade center for a large farming, cotton and yellow pine lumbering region. Pop. (1900) 2,678; (1910) 5,293.

Brookings, city and county-seat of Brookings co., S. D.; on the Chicago and Northwestern railroad; 60 miles N. of Sioux Falls. It is chiefly a dairying place; has electric lights, waterworks, and several mills; and is the seat of the State Agricultural College and of the United States Experiment Station. Pop. (1900) 2,346.

Brooklime, the English name of a veronica or speedwell, *veronica beccabunga*. The leaves and stems are glabrous and succulent; the latter is procumbent at the base, and rooting. The flowers are in opposite racemes. The flowers are generally bright blue, but in one variety they are pink or flesh-colored. The plant is common in ditches and water-courses. It is sometimes used as a spring salad.

Brookline, a town in Norfolk co., Mass.; on the Charles river, and the Boston and Albany railroad; 3 miles W. of Boston, with which it is connected by electric railroad. It contains the villages of Cottage Farm, Longwood, and Reservoir Station; has a granite town house, public library, and manufactories of electric motors and philosophical instruments, and is chiefly a place of suburban residence, being one of the most beautiful and wealthy suburban towns in the country. Pop. (1890) 12,103; (1900) 19,935; (1910) 27,792.

Brooklyn, a former city, and the fourth in population in the United States, accord-

Brooklyn

ing to the Federal census of 1890; since Jan. 1, 1898, one of the five boroughs of the city of Greater New York; situated on the W. extremity of Long Island, on New York Bay and the East river, which separates it from New York and connects Long Island Sound with New York Bay. Brooklyn is connected with New York by the East River bridge and numerous ferries, and comprises Brooklyn proper, Williamsburg, Gravesend, Flatbush, Flat Lands, New Lots, New Utrecht and several smaller suburban towns that were united with it prior to its consolidation with New York. It now extends from the Atlantic Ocean at Coney Island to the East river and New York harbor, and occupies the whole of Kings county; area 66.39 square miles; pop. (1900) 1,166,582; (1910) 1,634,351.

Topography.—The surface of the borough is generally elevated, sloping from the bay and river to a ridge which extends through the island. Its highest point is Mt. Pleasant, 194 feet above tidewater. Its water front extends from Newtown creek, emptying into the East river, to beyond Sheepshead Bay, a distance of about 33 miles. The shore opposite Lower New York is an irregular bluff, with an elevation of about 90 feet, and is known as Brooklyn Heights, while South Brooklyn is low. Brooklyn, being an aggregation of separate towns and villages, presents a very irregular street system and lacks unity of design. The main business street is Fulton street, from Fulton Ferry to East New York, and contains some of the largest retail establishments in the United States. Clinton avenue is the handsomest street in the city, and is lined with fine residences surrounded by ornamental grounds and shade trees. The favorite drive is through Prospect Park and along the Ocean Parkway, a boulevard 210 feet wide, with bicycle paths on both sides, extending from the S. W. corner of the Park to the seashore at Coney Island.

Municipal Improvements.—Brooklyn has a waterworks system which cost \$24,300,000. The water is pumped into a reservoir at Ridgewood and thence distributed through 720 miles of main. The reservoirs have a daily capacity of 159,000,000 gallons and an average daily consumption of about 103,000,000. There are in all 691 miles of streets, of which 543 are paved. The sewerage system has upward of 629 miles of pipe. The city is lighted by both gas and electricity at a cost of over \$870,000 per annum. The average annual cost of the police department is \$2,830,000 and that of the fire department \$1,797,670. The annual death rate averages 18.00 per 1,000. Various electric street railroads and steam and electric elevated roads connect Brooklyn with its suburbs, and by means of the bridge with New York city.

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Public Parks.—There are 16 parks in Brooklyn, with an area of 754 acres. Prospect Park is the largest, with 516 acres, including 77 acres of lakes and waterways, 70 acres of meadows, 110 acres of woodland, and 259 of plantations. It is situated on an elevated ridge and commands a magnificent view of the ocean, the Sound, Long Island, New Jersey, and New York city. It has been left to a great extent in its original wooded condition, making it one of the most picturesque parks in the United States. There are 8 miles of drives, 11 miles of walks, and 4 of bridle paths. The Flatbush avenue entrance, or the Plaza, is paved with stone and surrounded by grass. There is a Soldiers and Sailors' Memorial Arch and a statue of President Lincoln at this entrance. Of the other parks, Washington Park, the site of extensive Revolutionary fortifications, of which Fort Green is the principal one, is the largest. Among the smaller parks are the City Park, Carrol Park, and Tompkins Park.

Notable Buildings.—The principal public buildings of Brooklyn are grouped together about the City Hall. This building is of white marble in the Ionic style. The Kings County Court-house stands just E. of the City Hall, and has a marble front with a Corinthian portico and an iron dome over 100 feet high. Near the Court-house are the Municipal Building and the Hall of Records, both of marble. The Federal Building is the finest structure in the borough; built of granite at a cost of \$5,000,000. It is in the Romanesque style, with numerous turrets and a tall tower. It was opened in 1892 and is occupied by the post-office and the United States courts. Other notable buildings are the Academy of Music, the Brooklyn Bank, Pratt Institute, the Brooklyn Library, the Art Association Building, and the Brooklyn Polytechnic Institute. The most notable and important navy yard in the United States is located here, and is always a place of large patriotic interest, because of its buildings, its relics, and the old and new types of warships that are generally to be seen here.

Manufactures.—The Federal census of 1890 reported 10,583 manufacturing establishments, employing \$193,607,920 capital and 109,292 persons; paying \$151,060,710 for stock used and \$65,247,119 for wages; and yielding products of an aggregate value of \$269,244,147. The principal industries, according to the value of products, were sugar refining (\$16,629,982); the manufacture of foundry and machine shop products (\$15,627,536); coffee and spice (\$12,247,162); malt liquors (\$12,004,529); bread and other bakery products (\$9,331,523); chemicals (\$9,091,609); and carpentering (\$8,239,652). Other important manufac-

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tures included cordage and twine, men's clothing, paints, lumber, flour, and grist.

Banks.—On Sept. 7, 1899, there were reported 5 National banks in operation, having a combined capital of \$1,352,000; circulation, \$577,800; individual deposits, \$16,285,355; resources, \$21,373,160; reserve, \$4,369,298, and surplus, \$1,900,000. There were also 18 savings banks.

Education.—On Oct. 31, 1899, there were 150,194 registered pupils in the public schools; 126 school buildings, with 41,104 sittings, and 3,675 teachers and assistants. There were 1,002 children registered in kindergartens, with 882 sittings and 41 teachers and assistants. The value of school property amounted to \$11,882,583, and the appropriation for school purposes in 1899 was \$4,090,619. The public school system includes a Training-school for Teachers, Girls' High School, Boys' High School, Manual High School, and Truant School. For higher education are the Polytechnic Institute for boys; the Packer Institute for girls; Pratt Institute (co-educational); the Brooklyn College of Pharmacy, and the Brooklyn Institute.

Churches.—Brooklyn has been widely known as the City of Churches. There are now nearly 470 of such edifices and chapels. The Roman Catholic, with 83 churches, is the strongest denomination. Then follow the Methodist Episcopal (60); Protestant Episcopal (54); Baptist (47); Lutheran (40); Presbyterian (37); Congregational (33); Reformed (34); synagogues (18), and others of various denominations (about 70). In 1900 there were 130,311 church members; 138,136 Sunday School scholars, and, in the previous year, the churches expended for current expenses, debt, extensions, and missions, \$2,119,485.

Charitable Institutions.—The most important hospitals in Brooklyn are the Long Island College, Brooklyn, Brooklyn Homœopathic, General, St. Mary's Methodist, St. John's, and St. Peter's. The city has 24 dispensaries, 5 training-schools for nurses, 25 orphan asylums and industrial schools, 11 homes for the aged, and 6 nurseries. The public institutions are mostly at Flatbush, and consist of the Insane Asylum, Hospital, and Almshouse. There is an Inebriates' Home in Bay Ridge.

Finances.—On Jan. 1, 1900, the total debt of the borough was \$77,680,225, of which \$18,112,567 was payable from sinking funds, \$14,132,750 from water revenue, \$6,422,343 from assessments, and \$39,012,566 from taxation. The sinking funds, in investments and cash, amounted to \$6,797,317, making the net debt \$70,882,908. This included the debt of the annexed towns and of King's county as constituted prior to the consolidation. The assessed valuations in 1900 were, real estate, \$651,398,500; personal

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property, \$43,937,440; total, \$695,335,940. The tax rate in 1900 was \$23.21 per \$1,000.

History.—Brooklyn was settled by the Dutch in 1636 at New Utrecht. In 1646 five small towns consolidated under the name of Breuckelen, from the Dutch town whence most of the settlers came. In 1666 the first Dutch church was built in Breuckelen. About this time the English came into possession of New York and Long Island, and Breuckelen became a part of West Riding. On Aug. 27, 1776, the battle of Long Island was fought in Brooklyn, and the village was held by the British till 1783. Brooklyn was incorporated as a village in 1816; slavery was abolished there in 1825, and in 1834 it became a city. Several adjoining towns were annexed from time to time, and in 1896 Brooklyn comprised all of Kings county. On Jan. 1, 1898, Brooklyn was consolidated with Greater New York, under the name of the Borough of Brooklyn.

Brooklyn, The, a twin-screw, steel armored cruiser of the United States navy; displacement, 9,215 tons; length, 400 feet 6 inches; breadth, 64 feet; mean draft, 24 feet; horse power, 18,770; armor, 3 inches on the sides, 5½ inches on the turrets, 3 to 6 inches on the deck, and 8 inches on the barbettes; main battery, eight 8-inch breech-loading rifles and twelve 5-inch rapid-fire guns; secondary battery, twelve 6-pounders, four 1-pounders, four Colts, and two field guns, four torpedo tubes. The "Brooklyn" was the flagship of Rear-Admiral Schley, and bore the brunt of the running fire in the battle of July 3, 1898, off the harbor of Santiago. After the war the cruiser was sent to Manila, and in June, 1900, she joined the international squadron at Taku, China.

Brooks, Charles William Shirley, editor of "Punch," was born in London April 29, 1816. From clerk he became a reporter, and settling in London, wrote dramas, contributed to some of the leading periodicals and journals, and for five sessions wrote the "Parliamentary Summary" for the "Morning Chronicle." By its proprietors he was sent, in 1853, on a mission to report on the condition of labor and the poor in Russia, Syria, and Egypt, and a result of his observations appeared in "The Russians of the South" (1856). He wrote political articles, attracted attention by several dramas and burlesques, and in 1854 joined the staff of the London "Punch." In 1870 he succeeded Mark Lemon as its editor. His novels, which include "Aspen Court" (1855); "The Gordian Knot" (1860); "The Silver Cord" (1861); "Sooner or Later," with illustrations by Du Maurier (3 vols., 1866-1868); "The Naggeltons" (1875), show keen observation. He also wrote "Amusing

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"Poetry" (1857). He died in London, Feb. 23, 1874. His son, REGINALD SHIRLEY, collected Brook's "Wit and Humor from Punch" (1875).

Brooks, Eldridge Streeter, an American author, born in Lowell, Mass., in 1846. He was the author of popular juvenile books, including "Historic Boys"; "Chivalric Days"; "The Story of the American Indian"; "The Story of New York"; etc. He died in Somerville, Mass., Jan. 7, 1902.

Brooks, Maria Gowan, an American poet, pseudonym MARIA DEL OCCIDENTE, born in Medford, Mass., about 1795; spent her youth in Charlestown, Mass., and the rest of her life in London, New York and Cuba. Her chief poem is "Zophiel, or the Bride of Seven," the first canto of which appeared in Boston in 1825, and the rest was finished under Southey's influence in 1833. "Idomen, or the Vale of Yumuri," is an autobiography (1843). She died in Matanzas, Cuba, Nov. 11, 1845.

Brooks, Noah, an American journalist and author, born in Castine, Me., Oct. 30, 1830. After 1850 he was connected with newspapers in Massachusetts, California, Washington, New York, and elsewhere. He wrote many popular books, of fiction and of history, including two on Abraham Lincoln of whom he was a personal friend, "How the Republic Is Governed," etc., and edited and enlarged Bryant and Gay's History of the United States. He died Aug. 16, 1903.

Brooks, Phillips, an American clergyman of the Episcopal Church, born in Boston, Dec. 13, 1835. He was rector of Protestant Episcopal churches successively in Philadelphia and in Boston, and was made Bishop of Massachusetts in 1891. He was an impressive pulpit orator, had great spiritual force, and published many volumes



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of sermons and lectures, notably "Letters of Travel;" "Lectures on Preaching" (1887), and "Essays and Addresses" (1894). He died in Boston, Jan. 23, 1893.

Brooks, Preston Smith, an American legislator, born in Edgefield, S. C., Aug. 14, 1819. He served in the Mexican War; was elected to Congress in 1853, and on May 22, 1856, he assaulted Senator Charles Sumner in the Senate Chamber, beating him

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into insensibility with a cane. He afterward resigned, but was immediately returned to the House by his District. He died in Washington, D. C., Jan. 27, 1857.

Broom, the English name of the common shrub, *sarothamnus*, formerly *cytiscus scoparius*, and of the genus to which it belongs. It has large beautiful yellow flowers. Butchers' broom is the English name for the liliaceous genus *ruscus*, and especially for the *ruscus aculeatus*. Irish broom is the *sarothamnus patens*, a native of Spain and Portugal. The word is also applied to a besom for sweeping, so called because it is occasionally made of broom, though other material is often employed.

Broom Corn, a name for two plants of the order *graminaceæ* (grasses): (1) *Sorghum vulgare*. Its panicles are made into brooms for sweeping and into clothes brushes. (2) *Sorghum saccharatum*, of which a species of molasses or syrup is made.

Broom Rape, the English name of *orobanche*, a genus of plants constituting the typical one of the order *orobanchaceæ* (broom rapes). All are parasitic on other plants. They grow upon furze, broom, a galium, on thymus, a centaurea, a picris, on clover, milfoil, on hemp roots, etc. Some broom rapes confine themselves to a single genus or even species of plants, while others range over a considerable variety. The greater broom rape, one of the 11 which grows on leguminous plants, especially on furze, broom, and clover, is so destructive to the last named genus of plants in Flanders that it prevents many farmers from attempting their cultivation. The tall broom rape (*orobanche elatior*), though preferring *centaurea scabiosa*, also attacks clover, as does the lesser broom rape (*orobanche minor*).

Broom Tops, the fresh and dried tops of *cytiscus scoparius* (common broom). There are two officinal preparations; the decoction (*decoctum scoparii*), consisting of a pint of distilled water to an ounce of the dried tops, and the juice (*succus scoparii*), made of three ounces of the fresh expressed juice to a pint of rectified spirits. They are valuable diuretics, especially in cardiac dropsies. Scoparine and sparteia are the two active principles; the action of sparteia is analogous to that of conia.

Brose (Gaelic *brothas*), a dish sometimes used in Scotland, made by pouring boiling water, milk, or the liquor in which meat has been boiled, on oatmeal, and mixing the ingredients by immediate stirring. Butter may be added, and sweet milk when the brose is made with water. It is kail brose, water brose, or beef brose, according

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to the liquid used. Athole brose, a famous Highland cordial, is a compound of honey and whiskey.

Brosses, Charles de (brōs), a French historian, born in Dijon, Feb. 17, 1709. Among his works were "Letters sur Herkulaneum" (1750); "Histoire des Navigations aux Terres Australes" (1756), in which he introduced the names Australia and Polynesia; "Du Culte des Dieux Fétiches" (1760), the word *fétich* being first used by him in the sense now usual; the ingenious "Traité de la Formation Mécanique des Langues" (1765), and "Histoire de la République Romaine" (1777). His "Lettres écrites d'Italie en 1739-1740" was edited by Colomb in 1885. He died in Paris, May 7, 1777. See Marnet's "Le Président de Brosses" (1875). He died in Paris, May 17, 1777.

Brother Jonathan, a phrase applied to the people of the United States, as "John Bull" is to the people of England. Washington, on assuming command of the New England Revolutionary forces, was in great straits for arms and war material. The governor of Connecticut, Jonathan Trumbull, was a man of excellent judgment and an esteemed friend of Washington. In the emergency Washington said, "We must consult Brother Jonathan." This expression was repeated on other difficult occasions, and became a convenient name for the whole people.

Brotherhoods, Religious, were societies instituted for pious and benevolent purposes, and were numerous in the Middle Ages. Where the rules of monastic life appeared too narrow and severe, the Roman Church favored a freer form of consecrated life without vows other than that of devotion to good works or penitential exercises, but in many other respects, as in living together and the like, resembling the spiritual orders. Such brotherhoods or confraternities, were, in earlier times, those of Mary, of the Scapular, and of the Rosary; in later times, that of the Sacred and Immaculate Heart of Mary, for the conversion of sinners, that of Francis Xavier, or the Mission Brotherhood, and that of Christian Learning (*Frères Ignorantins*) for the education of the people. The bridge-building brotherhood (*Fratres Pontifices*) originated in Southern France toward the end of the 12th century, and was recognized by Pope Clement in 1189. Their occupation was to keep up hospices at the most frequented fords of great rivers, maintain ferries and build bridges. Other brotherhoods were the Familiars and Crossbearers of the Inquisition in Spain, and the *Fratres Calendarii* in North Germany and the Netherlands. The great Brotherhood of Common Life was founded about 1376 by Geert Groote (born 1340; died 1384) and Florentius Radewin

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(born 1350; died 1400) at Deventer. Its members were sometimes styled Brethren of Good Will, also Hieronymites and Gregorians, from Hieronymus and Gregory the Great, whom they claimed as patrons. Community of goods, ascetic habits, industry, and the use of the vernacular language in divine service, were some of the chief points insisted on by the brethren, who were not fettered by monastic or any other vows. Their principal occupations were the copying of the Bible and other books for the common purse, prayer, and the instruction of the young, and their services in the last direction can hardly be over estimated. Their most famous houses were those of Windesheim, near Deventer, and Agnetenberg, near Zwolle. They became numerous in the Netherlands and North Germany, but also spread themselves in Italy, Sicily, and Portugal, so that in 1430 they reckoned more than 130 societies. The last was founded in Cambrai in 1505. The most important and distinguished members of the society were Gerhard Zerbold of Zutphen, the famous Thomas à Kempis, and the learned Cardinal Nicholas Cusa. Female societies of a similar character sprung up at the same time with those of the Brothers of Common Life. At the head of each was a superior or directress, who was styled the Martha. The brotherhoods were usually founded at first without ecclesiastical authorization, on account of which several of the confraternities that either did not seek or did not obtain the recognition of the Church assumed the character of sects, and were suspected of heresy. To this class, among others, belonged the Beghards and Beguines, the Brothers and Sisters of the Free Spirit, the Apostolic Brethren, the Flagellants, who, tolerated by the Church for a while, at last incurred its displeasure and were severely persecuted. Even within the Protestant Churches, single brotherhoods have been formed, as the Rauhes Haus, founded by Wichern at Hamburg in 1833; those formed by Father Ignatius and the Cowley Fathers at Oxford are Anglican brotherhoods. Several similar institutions for women exist within the Church of England. See SISTERHOODS.

Brothers, a name given to three isolated mountains near the coast of New South Wales, between Harrington Inlet to the S. and Port Macquarie to the N. They are valuable as landmarks. The name is also common to several groups of small islands.

Brothers, a term applied to the members of monastic and military orders, as being united in one family. Lay brothers were an inferior class of monks employed in monasteries as servants. Though not in holy orders, they were bound by monastic rules.

Brougham

Brothers of the Christian Schools, a Roman Catholic Order formed by the Abbé La Salle at Rheims, and confirmed by Benedict XIII. in 1725. Its members are not allowed to enter the priesthood, but devote themselves to teaching the poor. There are branches of the Order in the United States as well as in most European countries.

Brothers, Richard, an English fanatic, born in Newfoundland, Dec. 25, 1757. He served as a lieutenant in the army, which he quitted in 1789, refusing, from conscientious scruples, to take the oath necessary to entitle him to his half pay. He announced himself in 1793 as the apostle of a new religion, dating his call from 1790. He styled himself the "Nephew of the Almighty, and Prince of the Hebrews, appointed to lead them to the land of Canaan." He published in 1794 "A Revealed Knowledge of the Prophecies and Times," in two books. He was committed to Newgate for prophesying the death of the King, and subsequently to Bedlam as a dangerous lunatic, but was released in 1806. He died in London, Jan. 25, 1824.

Brougham, named after Lord Brougham, a four-wheeled closed carriage with a single inside seat for two persons, or a similar carriage with two seats, each accommodating two persons. The seat for the driver is elevated.

Brougham, Henry Peter (brö'am or bröm), **Lord Brougham and Vaux**, a British statesman, orator, and author, born in Edinburgh, Sept. 19, 1778; entered the University of Edinburgh in 1792. In 1802 he helped to found the "Edinburgh Review," contributing to the first four numbers 21 articles, and to the first 20 numbers 80 articles. The article on Byron's "Hours of Idleness" provoked the poet to write his "English Bards and Scotch Reviewers." In 1810 Brough-



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am entered Parliament, where his remarkable eloquence gave him at once a commanding place. He was counsel for Queen Caroline in George IV.'s suit against her (1820), winning a decisive victory, which raised him to the height of fame and popularity. He became Lord Chancellor in 1830, and was at the same time created a

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baron; he resigned on the defeat of the Whigs in 1834, and never again held public office, though still taking effective part in the business and debates of the House of Lords. His later years were passed partly in England, and partly in the beautiful retreat he had fitted up at Cannes. He was the steadfast and powerful champion of revision and reform of the laws, popular education, the abolition of slavery, and the maintenance of peace. The famous Reform Bill of 1832 was carried during his chancellorship, and largely by his agency. His miscellaneous writings in their collected edition (11 vols., 1855-1861) cover a vast number and variety of subjects. His best works are his "Sketches of the Statesmen of the Time of George III." and "Lives of Men of Letters and Science." An edition of his "Speeches," corrected by himself, was published in four volumes in 1838. His "Autobiography" was written in extreme old age, and is unreliable. He died in Cannes, France, May 7, 1868.

Brougham, John, an American actor and playwright, born in Dublin, Ireland, May 9, 1810; made his debut as an actor in England in 1830. He came to the United States in 1842, and, with the exception of a short return trip to England in 1860, remained here until his death. He was the author of over 100 comedies, farces, and burlesques. Among his most successful plays were "Vanity Fair," "The Irish Emigrant," "The Game of Love," and "London Assurance," written in collaboration with Dion Boucicault. He was also author of sketches entitled "Basket of Chips" (1855) and "Bunsby Papers." He died in New York, June 7, 1880.

Broughton, Rhoda, an English novelist, born in Segrwyd Hall, Denbighshire, Wales, Nov. 29, 1840. She is the daughter of a clergyman, and resides at Broughton Hall, Cheshire. Her novels are very popular, and include "Cometh Up as a Flower" (1867); "Not Wisely but Too Well" (1867); "Red as a Rose Is She" (1870); "Good-bye, Sweetheart" (1872); "Nancy" (1873); "Belinda" (1883); "Doctor Cupid" (1886); "Alas" (1890); "A Beginner" (1894); "Scylla and Charybdis" (1895), etc.

Broussa (brö'sa), **Brusa**, or **Boursa**, the ancient Prusa, where the Kings of Bithynia usually resided, situated in Asiatic Turkey, at the foot of Mount Olympus, in Asia Minor, 13 miles S. of the Sea of Marmora. Broussa is pleasantly situated, facing a beautiful and luxuriant plain. The water supply is good, and water flows down the center of some of the streets, which are clean, but for most part narrow and dark, and the bazaars very good. It contains about 200 mosques, some of which are very fine buildings, also three Greek churches, an Armenian and several synagogues. The

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population of Broussa in 1900 was 76,303; of whom over 5,000 were Greeks.

Broussais, François Joseph Victor (brö-sä'), a French physician, born in St. Malo, Dec. 17, 1772. Professor at the Military Hospital of Val de Grâce in 1820, he became Professor of General Pathology in the Faculty of Medicine, in Paris, 1832, and afterward was made a member of the Institute. The influence of Broussais in his generation was unbounded, and his so-called "Physiological Doctrine" rapidly acquired a great sway, the traces of which are visible even now, though a more exact knowledge of physiology has demonstrated that the views of Broussais were one-sided and exaggerated. The basis of Broussais' doctrine was the assumption that the animal tissues are endowed with a property called irritability, a property which is called into play by the action of stimuli of various kinds, and by the operations of which all vital phenomena are produced. He died in Paris, Nov. 17, 1838.

Broussoneta (named after P. N. V. BROUSSENET, a naturalist who traveled in Barbary, and published a work on fishes in 1782), a genus of plants belonging to the order *urticaceæ* (nettles). *B. papyrifera* is the paper mulberry. It has 3-5 lobed leaves. There is another species of the genus, *B. spatulata*, or entire leaved broussoneta.

Brown, the color produced when certain substances—wood or paper, for example—are scorched or partially burned. Brown is not one of the primary colors in a spectrum. It is composed of red and yellow, with black, the negation of color. It is also the name of a genus of colors, of which the typical species is ordinary brown, tinged with grayish or blackish. The other species are chestnut brown, deep brown, bright brown, rusty, cinnamon, red brown, rufous, glandaceous, liver colored, sooty, and lurid.

Brown, Benjamin Gratz, an American politician, born in Lexington, Ky., May 28, 1826; graduated at Yale in 1847. He practiced law in Missouri, and was a member of the State Legislature in 1852-1858. In the Civil War he served in the Union army, recruiting a regiment, and becoming a Brigadier-General of volunteers. In 1863-1867 he was United States Senator from Missouri, and in 1871 was elected governor of his State. He was the candidate for the Vice-Presidency of the United States on the ticket with Horace Greeley in 1872. He died in St. Louis, Dec. 13, 1885.

Brown, Charles Brockden, an American novelist, born in Philadelphia, Jan. 17, 1771, was of a highly respectable family, of Quaker descent. He studied law, but took a disgust to the practice of the pro-

fession, and abandoned it for literature. His first publication was "Alcuin, a Dialogue on the Rights of Women," which appeared in 1797; followed in 1798 by "Wieland; or, the Transformation," a novel; and in 1799 by "Ormond; or, the Secret Witness." In 1798 he established himself in New York, and when the yellow fever broke out there he refused to forsake his friends and neighbors; and, after performing the last offices of affection for one of them, a young physician, was himself attacked by the pestilence. His conception of the dis-



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ease he embodied in his next work, "Arthur Mervyn; or, Memoirs of the Year 1793." The publication of "Arthur Mervyn" was quickly succeeded by that of "Edgar Huntly; or, the Adventures of a Sleep-Walker." The second part of "Arthur Mervyn" appeared in 1800; and "Clara Howard" in 1801; and in 1804 the series of his romances was closed with "Jane Talbot," first printed in England. In 1801 he returned to Philadelphia, and soon undertook the management of the "Literary Magazine and American Register." He projected the plan of an "Annual Register," the first work of the kind in the United States, and edited the first volume of it in 1806. Between 1803 and 1809 he published three political pamphlets, which excited general attention. He died Feb. 22, 1810.

Brown, Charles Rufus, an American clergyman and Hebrew scholar, born in East Kingston, N. H., Feb. 22, 1849. He was graduated at the United States Naval Academy in 1869, at Harvard in 1877, and at Union Theological Seminary in 1879. He was ordained a Baptist minister in 1881 and held pastorates at Salem and Worcester, Mass. He has been Professor of Hebrew at Newton Theological Institution since 1886, and has written important text books in the Oriental languages.

Brown, Emma Elizabeth ("B. E. E."), an American author and artist, born in Concord, N. H., Oct. 18, 1847. She was educated in the Concord common schools. She has written lives of Washington, Grant, Garfield, Holmes, and Lowell; "From Night to Light," "Child Toilers," and much verse, besides contributing illustrated papers to leading magazines.

Brown, Ford Madox, an English artist, born in Calais, France, in 1821. In 1835 was placed in the Academy at Bruges, studied also at Ghent and Antwerp, and later in Paris. Settled in London in 1845-1846. He was associated with Rossetti, Millais, and the rest of the pre-Raphaelite brotherhood. Among his best pictures are "Lear and His Daughters," "Farewell to England," and "Work," an aggregation of pictures illustrating labor. He died in London, Oct. 6, 1893.

Brown, George, a Canadian statesman, born in Edinburgh, Scotland, Nov. 19, 1818; educated at the high school there. He emigrated to the United States with his father, and assisted in the management of a newspaper at New York; but in 1843 removed to Toronto, Canada, where he founded a newspaper, "The Globe," which was very successful. In 1852 he was returned to Parliament, and rapidly rose to the first rank as a debater and advocate of reforms. In 1858 he was called to the office of Premier, and formed an administration, which, however, owing to an adverse vote of the Assembly, lasted only three days. In 1864 he joined the coalition government as leader of the reform section, and took an active part in the conferences held at Charlottetown and Quebec on the subject of the federation of the North American colonies; but resigned his office as Minister in December, 1865. He was called to the Senate in 1873, and the year after went to Washington along with Sir Edward Thornton to negotiate a commercial treaty with the United States. He died on May 9, 1880, of a gunshot wound inflicted by a discharged employé.

Brown, Sir George, an English military officer, born near Elgin in 1790; served in the Peninsular War, and in the American campaign of 1814. He became lieutenant-general in 1851; and distinguished himself in the Crimean War, at Alma, Inkermann, and Sebastopol. He was made K. C. B. in 1855, and died in 1865.

Brown, Gould, an American grammarian, born in Providence, R. I., March 7, 1791. He is known as the author of "Brown's Grammar," a school text book widely used for some generations, and still in circulation. He published "First Lines of English Grammar" (1823); "Grammar of English Grammars" (1850-1851), etc. He taught an academy in New York city for 20 years. He died in Lynn, Mass., March 31, 1857.

Brown, Harvey, an American army officer, born in Rahway, N. J., in 1795; graduated at West Point in 1818. He was in constant service for more than 45 years. In the Black Hawk expedition, the Seminole Indian campaigns, in the Army of Occupation in Mexico, and to the time of

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the Civil War, he did gallant duty, for which he received several brevets. In 1862 he was brevetted a Brigadier-General in the Regular army and promoted Colonel, and in 1863 was promoted to Major-General, U. S. A., and retired. He died in Clifton, Staten Island, N. Y., March 31, 1874.

Brown, Henry Kirke, an American sculptor, born in Leyden, Mass., Feb. 24, 1814. He made the equestrian statue of Washington in Union Square, New York, the altar piece for the Church of the Annunciation in the same city, portrait busts of William Cullen Bryant, Dr. Willard Parker, Erastus Corning and other New York men, and the statue of De Witt Clinton in Greenwood cemetery. The last named was the first bronze statue cast in the United States. Mr. Brown brought skilled workmen from Europe and did the first work in bronze casting attempted in this country. Some of his other well known works are a statue of Lincoln in Prospect Park, Brooklyn, and equestrian statues of Gen. Scott and Nathanael Greene for the National Government, etc. He died in Newburg, N. Y., July 10, 1886.

Brown, Jacob, an American army officer, born in Bucks county, Pa., May 9, 1775. He was a commander on the Canadian frontier in the War of 1812. In the engagements at Fort Erie he so distinguished himself as to receive the thanks of Congress, Nov. 13, 1814. The city of New York also voted him its freedom. At the close of the war he was in command of the Northern Division of the army, and, in March, 1821, became general-in-chief of the United States army. He died in Washington, D. C., Feb. 24, 1828.

Brown, John, a Scotch covenanting martyr, born about 1627. He is said to have fought against the government at Bothwell Bridge in 1679, and to have been on intimate terms with the leaders of the persecuted party. He was shot by Claverhouse and a party of his dragoons at Priestfield, or Priesthill, in the upland parish of Buirkirk, Ayrshire, where he cultivated a small piece of ground and acted as a carrier, in 1685.

Brown, John, a Scotch clergyman, minister in the Burgher dissenting body at Haddington, born in Carpaw, Perthshire, in 1772. By intense application to study he became acquainted with the French, Italian, German, Arabic, Persian, Syriac, and Ethiopic languages, as well as the Greek and Hebrew. His most important works are "The Self-Interpreting Bible," "Dictionary of the Bible," "Explication of the Assembly's Catechism," "The Christian Journal," "Explication of Scripture Metaphors," "System of Divinity," "General History of the Church," "Particular History of the

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Churches of England, Scotland, and Ireland," and "Harmony of Scripture Prophecies." He died in Haddington, June 19, 1787.

Brown, John, author of the Brunonian system in medicine, born in Berwickshire, Scotland, in 1735. After studying medicine at the Edinburgh University he took the degree of Doctor in Medicine at St. Andrew's, and, after practicing and teaching in Edinburgh, he published his "Elements of Medicine" (in Latin). He maintained that the majority of diseases were proofs of weakness and not of excessive strength or excitement, and, therefore, contended that indiscriminate lowering of the system, as by bleeding, was erroneous, and that supporting treatment was required. His system gave rise to much opposition, but his opinions materially influenced the practice of his professional successors. Having fallen into difficulties, he removed to London in 1786, and died there, Oct. 17, 1788.

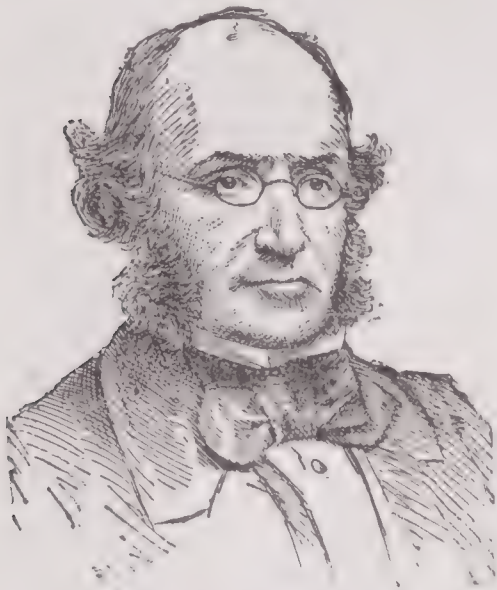
Brown, John, a Scotch clergyman; grandson of the Rev. John Brown, of Haddington, born in 1784. He was ordained pastor of the Burgher congregation at Biggar in 1806. In 1821 he removed to Edinburgh, and in 1834 became Professor of Theology in connection with the body to which he belonged, afterward merged in the United Presbyterian Church. He was author of numerous works, chiefly in Biblical criticism, some of which were very popular. He died in 1858.

Brown, John, an American opponent of slavery, born in Torrington, Conn., May 9, 1800. He early conceived a hatred for slavery, and, having removed to Osawatimie, Kan., in 1855, he took an active part against the pro-slavery party, the slavery question there giving rise already almost to a civil war. In the summer of 1859 he rented a farmhouse about 6 miles from Harper's Ferry, and organized a plot to liberate the slaves of Virginia. On Oct. 16, he, with the aid of about 20 friends, surprised and captured the arsenal at Harper's Ferry, but was wounded and taken prisoner by the Virginia militia next day; and was tried and executed at Charlestown, Dec. 2, 1859.



JOHN BROWN.

Brown, John, a Scotch physician and essayist, son of John Brown, D. D., born in Biggar in 1810. He graduated in 1833 and began practice as a physician. His leisure hours were devoted to literature, many of his contributions appearing in the "North British Review," "Good Words," and other



JOHN BROWN.

periodicals. His collected writings were published under the title of "Horæ Subsecivæ" (leisure hours), and embrace papers bearing on medicine, art, poetry, and human life generally. Several of his sketches

(such as "Rab and His Friends," "Our Dogs," "Pet Marjory," "Jeems the Doorkeeper") on which his fame chiefly rests, have been published separately. Humor, tenderness, and pathos are his chief characteristics. He died in Edinburg, in 1882.

Brown, John George, an Anglo-American painter, born in Durham, England, Nov. 11, 1831; was educated in the common schools in Newcastle-on-Tyne, and came to the United States in 1853. He studied in the schools of the National Academy of Design; was elected an Academician in 1863; received honorable mention at the Paris Exposition in 1899; and in 1900 was president of the American Water Color Society. He is best known for his pictures of bootblacks and street urchins. Among his famous pictures are "A Merry Air with a Sad Heart," "The Stump Speech," "The Passing Show," "Be Mine," and "Training the Dogs."

Brown, John Hamilton, an American inventor, born in Liberty, Me., July 28, 1837. At the age of 18 he was apprenticed to a gunsmith and in 1857 he entered business in Haverhill, Mass. He served in the Civil War as a sharpshooter, and in 1882 was a member of the American Rifle Team at Wimbledon. He began in 1883 to perfect the invention of a weapon for military use later known as the Brown segmental wirewound gun, which, after numerous Government tests, was pronounced a success.

Brown, John Howard, an American editor, born in Rhinebeck, N. Y., Nov. 8, 1840; attended Rhinebeck Academy and Fort Edward Institute; and was graduated at Eastman College, Poughkeepsie, in 1859, remaining there as tutor two years. After

studying law in New York city and engaging in journalism in Washington, D. C., and Augusta, Ga., he became a publisher in New York city. He subsequently originated, planned, and edited six volumes of "The National Cyclopædia of American Biographies" (1890-1895), and in 1896 removed to Boston to become editor-in-chief of "Lamb's Biographical Dictionary of the United States" (8 vols., 1897, *et seq.*). He is the author of "American Naval Heroes" (1898), and of numerous contributions to periodical literature. He is a member of the American Academy of Political and Social Science; the Society of American Authors, and the American Social Science Association.

Brown, Joseph Emerson, an American statesman, born in Pickens county, S. C., April 15, 1821; educated at Calhoun Academy, and graduated at Yale in 1846. He settled in Canton, Ga.; served in the State Legislature, and was elected governor in 1857; serving three terms. As war governor he opposed Jefferson Davis in the matter of the conscription laws and raised 10,000 recruits to oppose Sherman's march to the sea; but would not allow them to leave the State. After the war he gave hearty support to the reconstruction measures, and supported Gen. Grant for the Presidency. He was Chief-Justice of Georgia in 1868, and United States Senator in 1880-1891. He died in Atlanta, Ga., Nov. 30, 1894.

Brown, Nicholas, an American merchant, born in Providence, R. I., April 4, 1769; best known as the chief patron of Brown University. In honor of his gifts, which exceeded \$100,000, the name of the institution was changed, in 1804, from Rhode Island College to Brown University. He gave also magnificent sums to other public institutions of Providence. He died Oct. 27, 1841.

Brown (or Browne), Robert, founder of an English religious sect first called Brownists, and afterward Independents, was born about 1540, and studied at Cambridge, where, in 1580, he began openly to attack the government and liturgy of the Church of England as anti-Christian. After attacking the Established Church for years he was excommunicated, but was reinstated, and held a church living for over 40 years, dying in 1633. The sect of Brownists, far from expiring with their founder, soon spread, and a bill was brought into Parliament which inflicted on them very severe pains and penalties. In process of time, however, the name of Brownists was merged in that of Congregationalists or Independents.

Brown, Robert, a Scotch botanist, born in Montrose, Dec. 21, 1773; received his education at Marischal College, Aberdeen,

and afterward studied medicine at Edinburgh. In 1800 he was appointed naturalist to Flinders' surveying expedition to Australia. He returned with nearly 4,000 species of plants, and was shortly after appointed librarian to the Linnæan Society. In 1810 he published the first volume of his great work, "*Prodromus Floræ Novæ Hollandiæ et Insulæ Van Diemen.*" No second volume of it ever appeared. He was the first English writer on botany who adopted the natural system of classification, which has since entirely superseded that of Linnæus. In 1814 he published a botanical appendix to Flinders' account of his voyage, and in 1828 "*A Brief Account of Microscopical Observations on the Particles Contained in the Pollen of Plants, and on the General Existence of Active Molecules in Organic and Inorganic Bodies.*" He also wrote botanical appendices for the voyages of Ross and Parry, the African exploration of Denham and Clapperton and others, and described, with Dr. Bennet, the plants collected by Dr. Horsfield in Java. In 1810 he received the charge of the collections and library of Sir Joseph Banks. He transferred them in 1827 to the British Museum, and was appointed keeper of botany in that institution. He became a Fellow of the Royal Society in 1811, D. C. L., Oxford, in 1832, a Foreign Associate of the French Academy of Sciences in 1833. He had the Copley Medal in 1839, and was appointed president of the Linnæan Society in 1849. He died in London, June 10, 1858. As a naturalist Brown occupied the very highest rank among men of science. A collection of his miscellaneous writings was published by the Ray Society (1866-1867).

Brown, Thomas, an English poet and miscellaneous writer, described by Addison as "of facetious memory," born at Shifnal, Shropshire, in 1663; was the author of numerous dialogues, letters, poems, etc., witty, coarse, and indelicate, first collected in 1707. He died in London in 1704.

Brown, Thomas, a Scotch metaphysician, born in Kirkmabreck, Kirkeudbright, Jan. 9, 1778; was educated at the high school, and subsequently at the University of Edinburgh, where he obtained the professorship of moral philosophy. He distinguished himself, at a very early age, by an acute review of the medical and physiological theories of Dr. Darwin, in a work entitled "*Observations on Darwin's Zoonomia.*" He published some indifferent poems which were collected in 1820. But he chiefly deserves notice on account of his metaphysical speculations, his chief work being "*Lectures on the Philosophy of the Human Mind*" (1822). His system reduces the intellectual faculties to three great classes—perception, simple suggestion, and relative suggestion, employing the term suggestion as nearly synonymous with association. He

held original views in regard to the part played by touch and the muscular sense in relation to belief in an external world. His development of the theory of cause and effect was first suggested by Hume. He died in London, April 2, 1820.

Browne, Charles Farrar, an American humorist, best known as ARTEMUS WARD, born at Waterford, Me., April 26, 1834. Originally a printer, he became editor of papers in Ohio, where his humorous letters became very popular. He subsequently lectured on California and Utah, and in England, where he contributed to "*Punch.*" His writings consist of letters and papers by "*Artemus Ward,*" a pretended exhibitor of wax figures and wild beasts, and are full of drollery and eccentricity. The chief of these are: "*Artemus Ward, His Book*" (1862) "*Artemus Ward in England*" (1867); and "*A. W. among the Mormons*" (1866). He died in Southampton, England, March 6, 1867.

Browne, Sir Thomas, an English physician and antiquary; son of a merchant of London, where he was born in 1605. He lost his father early, and was defrauded by one of his guardians; but his mother, who married Sir Thomas Dutton, had him educated at Winchester school, whence he was at a proper time removed to Oxford, where he took the degree of M. A. He practised as a physician for some time in Oxfordshire. He subsequently accompanied his father-in-law to Ireland, and afterward visiting the Continent, received the degree of M. D. at Leyden. On his return to England he settled as a physician at Norwich, where he married and acquired extensive practice and reputation. In 1642 he published his famous work entitled "*Religio Medici,*" which excited the attention of the learned not only in England, but throughout Europe, and was translated into various languages. In 1646 his literary character was still further exalted by the appearance of his "*Pseudodoxia Epidemica, or Treatise on Vulgar Errors,*" a work of extraordinary learning, and accounted the most solid and useful of his literary labors. Owing probably to his extent of practice, it was not until 1658 that his "*Hydriotaphia, or Treatise on Urn-Burial,*" appeared, conjointly with his "*Garden of Cyrus.*" These works ranked him very high as an antiquary; and he maintained a wide correspondence with the learned both at home and abroad. In 1665 he was constituted an honorary member of the College of Physicians, and in 1671 King Charles II., visiting Norwich, conferred on him the honor of knighthood with marks of esteem. He died in 1682.

The literary character of Sir Thomas Browne, as exhibited by his productions, was very remarkable. His "*Religio Medici*" is in no way professional, but may

be described as the beliefs of an individual, upon morals, religion, and metaphysics. It is a curious production, and its extreme orthodoxy and submission to authority might in later days, at least in expression, be held ironical. He deems it "no vulgar part of faith to believe a thing, not only above but contrary to reason, even against the arguments of our proper senses." Fancy and feeling in fact predominated in him over judgment; he believed in the existence of guardian angels, in the reality of witchcraft, and the appearance of specters. He was, however, extremely benevolent, opposed to persecution, and in the moral part of his work he frequently expatiates with a noble glow of language on subjects of charity and philanthropy. This work was much attacked, both at home and abroad, especially by the German divines, who *more theologico*, treated the writer as an atheist and an infidel, although his piety and reverence for authority were displayed in every page.

The "Treatise on Vulgar Errors" discusses the varying causes of error, which he examines with great strength of reasoning and liberality of sentiment. His appropriation of one grand source of error to the machinations of Satan, however, may not appear very philosophical at present; and of course his own science being only that of the day, he is often astray in the department of natural knowledge. Still he displays a large and penetrating understanding on many points, and this work still retains considerable celebrity. His treatise on "Urn-Burial," composed on occasion of the discovery of some funeral urns in Norfolk, discovers some curious erudition on the subject of ancient and modern burial; and the tract called "The Garden of Cyrus" is still more curiously learned and fantastical. Sir Thomas Browne left some posthumous papers relative to antiquities, which appear in the folio edition of his works, published in 1686. Dr. Johnson, who wrote his life, and who is thought in some degree to have founded his own style upon that of Sir Thomas Browne's, gave a masterly description of his genius and tone of composition; in which he speaks highly of the exuberance of his knowledge and plentitude of his ideas; and in reference to his heterogeneous mixture of languages, observes that he who has uncommon sentiments to deliver, may be allowed great liberty in his manner of expressing them. Coleridge has characterized Browne as "rich in various knowledge, exuberant in conceptions and conceits, contemplative, imaginative; often truly great and magnificent in his style and diction, though doubtless too often big, stiff, and hyperlatinistic." His works have been republished in 3 vols. in Bohn's "Antiquarian Library."

Browne, Thomas Alexander. See BOLDREWOOD.

Browne, Ulysses Maximilian, Count, an Austrian military officer, born in Basel, Oct. 23, 1705, of an Irish Jacobite family; entered the Austrian service at the age of 12, and became one of the foremost field marshals in the army of Maria Theresa. As Governor of Silesia (1739-1742), he had to face the first of Frederick the Great's attacks, and in the Seven Years' War he commanded the Austrians at Lobositz (1756). He was mortally wounded at the battle of Prague, and died June 26, 1757.

Browne, William, an English poet, born in Tavistock, Devonshire, in 1591; was educated at Oxford, and spent a quiet, tranquil life. His poetry is graceful and fanciful, and abounds in beautiful pictures of English scenery. Browne has always been much admired by the poets. His chief work is "Britannia's Pastorals" (1613-1616). "The Shepherd's Pipe" (1614) is a collection of eclogues, and "The Inner Temple Masque" (1614-1615) tells the story of Ulysses and Circe. His minor poems are very fine. The best modern editions are by Hazlitt for the Roxburghe Club, and by Gordon Goodwin, "The Muse's Library." He died in Ottery St. Mary about 1643.

Brownell, Franklin P., a Canadian artist, born in New Bedford, Mass. His specialties are portrait and figure painting. He has for some years been principal of the Ottawa Art School. His canvas, "The Photographer," is in the National Gallery at Ottawa.

Brownell, Henry Howard, an American poet and historian, born in Providence, R. I., Feb. 6, 1820. His first poetic venture was a spirited versification of Farragut's "General Orders" to the fleet below New Orleans. Afterward he was appointed to an honorary place on the "Hartford," flagship, and had opportunity to observe actual naval warfare. In "The Bay Fight" he describes, with truth and force, the battle of Mobile Bay. He collected and published his many occasional verses in "Lyrics of a Day; or, Newspaper Poetry by a Volunteer in the United States Service" (1864). He died at East Hartford, Conn., Oct. 31, 1872.

Brownell, William Crary, an American essayist and critic, born in New York city, Aug. 30, 1851. He graduated from Amherst, and devoted himself to critical and editorial work in New York. He became editor of "Scribner's Magazine," and wrote "French Traits: an Essay on Comparative Criticism" (1889); "French Art" (1892); and "Newport" (1896), etc.

Brownie, in Shetland, an imaginary being, to whom evil properties were attributed; in other parts of Scotland, a domestic spirit or goblin, meager, shaggy, and wild,

till lately supposed to haunt many old houses, especially those attached to farms. He was the Robin Goodfellow of Scotland. In the night he helped the family, and particularly the servants, by doing many pieces of drudgery. If offered food or any other recompense for his services, he decamped and was seen no more. The diffusion of knowledge has been more potent in its operation, and the Brownie may now be reckoned almost an extinct species.

Browning, Elizabeth Barrett, a distinguished English poet, regarded by some as the greatest which England has ever produced; born in London, March 6, 1809. Her father, Mr. Barrett, was a country gentleman who resided at the foot of the Malvern Hills, and in this beautiful retreat his daughter's girlhood was passed. She early began to commit her thoughts to writing, and in 1826 a volume, entitled "An Essay on Mind, with other Poems," appeared of her authorship. Viewed as the production of a young lady of 16, this volume is indeed a remarkable one; but in after years its authoress was so dissatisfied with it that she omitted it in the collected editions of her poems. In 1833 appeared a translation by her of the "Prometheus Vincetus" of Æschylus, and in 1836 the "Romaunt of Margaret," which was published anonymously in the "New Monthly Magazine," and created by its originality a considerable sensation. A collection, entitled "The Seraphim, and other Poems," was produced in 1838, the principal piece being a lyric drama shadowing forth the feelings and emotions which may be supposed to have been excited in an angelic being by the spectacle of the crucifixion. Both in this and in a subsequent work, "The Drama of Exile" (1840), she chose for her theme the fall and redemption of man, subjects on which Milton had already employed his genius, and in the treatment of which, though exhibiting much grandeur and sublimity, Mrs. Browning can scarcely be said to have approached the great English poet. Always feeble in health, she was now nearly brought to the verge of the grave by the rupture of a blood-vessel, and having been taken to Devonshire to promote her recovery, received there a severe shock by the death by drowning of a favorite brother. For several years she was confined to a darkened chamber, and saw only a few of her most intimate friends, but nevertheless continued to busy herself with study and composition. Her health was at length partially restored, and in 1846 she was married to Robert Browning, a gentleman well known in the literary world as a poet and dramatist. After their union they went abroad to Italy, and continued subsequently to reside for the most part in the city of Florence. In 1850 a collected edition of Mrs. Browning's works appeared in

two volumes, including several new poems, and among others "Lady Geraldine's Courtship," one of the finest of her productions, and remarkable, it is said, as having been composed in the incredibly short space of 12 hours. "Casa Guidi Windows," a poem on the struggle of the Italians for liberty in 1848-1849, appeared in 1851. The longest and most finished of all her works, "Aurora Leigh," a narrative and didactic poem in nine books, was published in 1856. Her last volume, "Poems before Congress," appeared in 1860, and cannot be said to have added greatly to her reputation. Several detached pieces from her pen appeared from time to time in the "Cornhill Magazine" up to the period of her death, in Florence, June 29, 1861. The poetry of Mrs. Browning is characterized by much pathos and depth of feeling, combined with great vividness and powers of description. It partakes eminently of the modern English school, as represented by Tennyson and others, at times obscure and transcendental, but animated throughout by the most noble and exalted sentiments, and illuminated from time to time by flashes, which, in their bearings on the unseen world of mind and spirit, seem almost supernatural.

Browning, Robert, one of the greatest of the Victorian poets; born in Camberwell, England, May 7, 1812. His father, who was a clerk in a bank, had the boy educated in a school at Peckham, after which he attended lectures at University College. At the age of 20 he traveled on the Continent and resided for some time in Italy, where he made diligent study of its mediæval history. About this time (1833) he published his first poem of "Pauline"; spent some months in Russia in 1834; and in the following year issued "Paracelsus," a dramatic poem in five parts. In 1837, at the suggestion of Macready, he wrote the "Tragedy of Strafford," which was produced at Covent Garden in May of the same year with no marked success. His next poem, "Sordello," was printed in 1840, and the obscurity of its introspective subtleties injured the poet's reputation with the critics. This notwithstanding, he published (1841-1846) the "Bell and Pomegranates" series, in which were included the three plays, "Pippa Passes," "King Victor and King Charles," and "Colombe's Birthday"; the four tragedies, "The Return of the Druses," "A Blot on the Scutcheon" (produced by Macready at Drury Lane in 1843), "Luria," and "A Soul's Tragedy"; while among the lyrics were the "Pied Piper of Hamelin," "How They Brought the Good News from Ghent to Aix," and "The Lost Leader."

In 1846 he married Elizabeth Barrett, and settled with her in Florence, where they remained for nearly 15 years. During his residence there he published "Christmas

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Eve and Easter Day (1850), and *Men and Women* (1855), the latter containing such characteristic poems as "Andrea del Sarto," "Fra Lippo," "Childe Roland," "Evelyn Hope," "One Word More," and "Up at a Villa." When the poet's wife died in 1861 he returned to London, and entered upon his richest literary period by publishing *Dramatis Personæ* (1864). These dramatic monologues of which there were 17, include "Rabbi ben Ezra," "Abt Vogler," "Prospice," "Caliban upon Setebos," and "A Death in the Desert." Recognition of his literary fame, which came slowly, was made in 1867, when he was elected an honorary fellow of Baliol, an M. A. of Oxford, and later an LL. D. of Cambridge. It was not, however, until 1869, that "The Ring and the Book" was published, and this poem, which accentuates every characteristic of the poet, still remains his central achievement. The poem, which is epical in length if not in method, is the story of a murder told 10 times over in wide variety of intention by various persons connected with the tragedy. His next publication was the short poem of "Hervé Riel," the proceeds from which were devoted to the relief of Paris after the siege in 1871. Following this came "Balaustion's Adventure" (1871), including a translation of Euripides' "Alcestris"; "Prince Hohenstiel-Schwangau, Savior of Society" (1871), an imaginary conception of how Louis Napoleon might justify his policy; "Fifine at the Fair" (1872), in which the relations of the sexes are discussed; "Red-Cotton Night-Cap Country" (1873), a story of love, penitence and suicide, the scene of which is laid in Normandy; "Aristophanes' Apology" (1875); "The Inn Album" (1875), a story of a woman's wrongs; "Pacchiarotto, and how he Worked in Distemper" (1876), in which the author deals incidentally with his own method in the poetic art; "The Agamemnon of Æschylus" (1877); and "La Saisiaz" (1878), in which immortality is discussed. As a kind of new departure he published a first set of "Dramatic Idylls" (1879), and a second series (1880), of which the more important are "Martin Relph," "Pheidippides," "Ivan Ivanovitch" and "Echetlos." The volumes which followed are: "Jocoseria" (1883); "Fetrishtah's Fancies" (1884); "Parleyings with Certain People of Importance in Their Day" (1887), and "Asolando" (1889).

The latter volume was published when the author was on his death bed, and an account of its favorable reception was almost the last information he received. He died in Venice, Dec. 12, 1889. His body was taken from Venice to England, where, in national recognition of his genius, it was buried in Westminster Abbey between Cowley and Chaucer.

Brownsville

Brownists. See BROWN, ROBERT.

Brownlow, William Gannaway ("PARSON BROWNLOW"), an American politician, journalist, and author, born in Wythe county, Va., Aug. 29, 1805. During his early career he was an itinerant preacher, editor, and lecturer. He was a Union champion during the Civil War, and was banished from the Confederate lines on that ground. In 1865 he was elected Governor of Tennessee, and was re-elected in 1867. He was United States Senator from 1869 to 1875. Among his works are "The Great Iron Wheel Examined" (1858); "Sketches of the Rise, Progress, and Decline of Secession" (1862). He died in Knoxville, Tenn., April 29, 1877.

Brown-Sequard (-sā-kär'), **Edouard**, a Franco-American physiologist and physician, was born in Mauritius in 1818, his father being a sea captain from Philadelphia, who married on the island a lady named Séquard. The son studied in Paris, and graduated M. D. in 1846. He devoted himself mainly to physiological research, and received numerous prizes, French and British, for the results of valuable experiments on blood, muscular irritability, animal heat, the spinal cord, and the nervous system. In 1864 he became Professor of Physiology at Harvard, but in 1869 returned to Paris as Professor of Pathology in the School of Medicine. In 1873 he became a medical practitioner in New York, treating especially diseases of the nervous system; and in 1878 he succeeded Claude Bernard as Professor of Experimental Medicine at the Collège de France. He repeatedly lectured in England. His publications include lectures on "Physiology and Pathology of the Nervous System" (Philadelphia, 1860); on "Paralysis of the Lower Extremities" (1860), and on "Nervous Affections" (1873). He died in Paris, April 1, 1894.

Brownson, Orestes Augustus, an American author; born in Stockbridge, Vt., Sept. 16, 1803. His early education was slight. Was an ardent champion of popular rights, and advocated a mild form of socialism. His greatest work was the establishment and editorship of the Boston "Quarterly Review" (1838-1843) and "Brownson's Review" (1844-1864 and 1873-1875). Of his extensive works, the best known are: "The Convert, or Leaves from my Experience" (1857), and "The American Republic, its Constitution, Tendencies, and Destiny" (1865). He died in Detroit, Mich., April 17, 1876.

Brownsville, city, port of entry, and county-seat of Cameron Co., Tex.; on the Rio Grande and the Rio Grande railroad, opposite Matamoras, Mexico. It contains the Cathedral of the Immaculate Conception, the Convent and Academy of the Incarnate Word, a United States govern-

ment building, and a National bank; and has a large trade with Mexico. In the suburbs is Fort Brown, a garrisoned United States post. In May, 1846, Brownsville was occupied and fortified by a small body of United States troops, who maintained their position in the face of a heavy bombardment that lasted for 160 hours; and in November, 1863, it was taken from the Confederates by a Federal army under General Banks. Pop. (1910), 10,517.

Brown University, a co-educational institution in Providence, R. I.; organized in Warren in 1764 as Rhode Island College; removed to Providence in 1770, and renamed in honor of Nicholas Brown in 1804. It has always been affiliated with the Baptist Church, but its management is non-sectarian. It has grounds and buildings valued at over \$1,800,000; endowment exceeding \$3,500,000; scientific apparatus, \$165,000; volumes in the library, over 185,000 (valued at over \$1,315,000); ordinary income, about \$460,000; professors and instructors, about 95; students, 1,000; graduates since organization, over 6,500.

Brozik, Vacslav (brot'sik), a Bohemian artist, born in Pilsen in 1852. His picture, "Columbus at the Court of Isabella," was presented to the city of New York by Morris K. Jesup, and is in the Metropolitan Museum. He is a pupil of Pilaty and Munkacsy, and is considered the foremost historical painter living.

Bruce, a family name distinguished in the history of Scotland.

Bruce, Catherine Wolfe, an American patron of science, born in New York city. She was a cousin of Catherine Lorillard Wolfe, from whom she inherited a fortune, which she used in furthering astronomical study at Harvard. She gave \$50,000 to the Harvard Observatory in 1888. The Bruce Memorial Telescope at Arequipa, Peru, was her gift. In 1897 she established a gold medal fund for the Astronomical Society of the Pacific. She died in New York, March 13, 1900.

Bruce, Edward, a brother of Robert I., who, after distinguishing himself in the War of Independence, crossed in 1315 to Ireland to aid the native septs against the English. After many successes he was crowned King of Ireland at Carrickfergus, but fell in battle near Dundalk in 1318.

Bruce, James, an African traveler, born in Stirling, Dec. 14, 1730. He received his education at Harrow and at the University of Edinburgh, and entered the wine trade, but having inherited his father's estate in 1758, he soon gave up business. From 1763 to 1765 he held the consulship of Algiers, and in 1765 he visited successively Tunis, Tripoli, Rhodes, Cyprus,

Syria, and several parts of Asia Minor, where he made drawings of the ruins of Palmyra, Baalbec, etc. In 1768 he set out for Cairo, navigated the Nile to Syene, crossed the desert to the Red Sea, passed some months in Arabia Felix, and reached Gondar, the capital of Abyssinia, in 1770. In that country he ingratiated himself with the sovereign and other influential persons, and in the same year succeeded in reaching the sources of the Abai, then considered the main stream of the Nile. On his return to Gondar he found the country engaged in a civil war, and more than three years elapsed before he was able to return to Cairo. After visiting France and Italy, he returned to Scotland in 1774. His long-expected "Travels" did not appear until 1790, and were received with some incredulity, though succeeding travelers have proved them in large part accurate. Bruce lost his life by an accident, April 27, 1794.

Bruce, Michael, a Scottish poet, born in Kinnesswood, Kinrossshire, March 27, 1746. At first a herd-boy, he succeeded in attending Edinburgh University, occupying himself in the intervals as a village schoolmaster. His poems, of which the best known is the "Elegy" on his own approaching death, were published by the Rev. John Logan in 1770. This volume contained a well-known ode to the cuckoo, which Logan afterward claimed as his own, though he really seems only to have somewhat improved Bruce's poem. He died July 5, 1767.

Bruce, Robert (ROBERT DE BRUS), fifth Lord of Annandale, born in 1210. He was possessed of extensive estates in Cumberland, of which he was made sheriff in 1255. He was one of the 15 regents of Scotland during the minority of Alexander III., and was one of the competitors for the Scottish crown on the death of Margaret, the Maiden of Norway, in 1290, Bruce being the grandson of David, Earl of Huntingdon, by his second daughter Isobel, while Baliol claimed as the great-grandson of the eldest daughter Margaret. On the decision of Edward being given in 1292 in favor of Baliol, Bruce resigned the estate of Annandale to his eldest son to avoid doing homage to his rival. He died in Lochmaben Castle in 1295.

Bruce, Robert, Earl of Carrick, eldest son of the preceding, accompanied Edward I. to Palestine in 1269; married, in 1271, Martha Margaret, Countess of Carrick. Like his father, he resigned the Lordship of Annandale to his eldest son to avoid acknowledging the supremacy of Baliol. On the revolt of the latter Bruce fought on the English side, and after the battle of Dunbar made an unsuccessful application to Edward for the crown. He died in 1304.

Bruce

Bruce, Robert, the greatest of the Kings of Scotland, born in 1274. He was the son of the preceding. In 1296, as Earl of Carrick, he swore fealty to Edward I., and in 1297 fought on the English side against Wallace. He then joined the Scottish army, but in the same year returned to his allegiance to Edward until 1298, when he again joined the National party, and became in 1299 one of the four regents of the kingdom. In the three final campaigns, however, he resumed fidelity to Edward, and resided for some time at his court; but, learning that the King meditated putting him to death on information given by the traitor Comyn, he fled, in February, 1306, to Scotland, stabbed Comyn in a quarrel at Dumfries, assembled his vassals at Lochmaben Castle, and claimed the crown, which he received at Scone, March 27. Being twice defeated, he dismissed his troops, retired to Rathlin Island, and was supposed to be dead, when, in the spring of 1307, he landed on the Carrick coast, defeated the Earl of Pembroke at Loudon Hill, and in two years had wrested nearly the whole country from the English. He then in successive years advanced into England, laying waste the country, and on June 24, 1314, defeated at Bannockburn the English forces advancing under Edward II. to the relief of the garrison at Stirling. In 1316 he went to Ireland to the aid of his brother Edward, and, on his return in 1318, in retaliation for inroads made during his absence, he took Berwick and harried Northumberland and Yorkshire. Hostilities continued until the defeat of Edward near Byland Abbey in 1323, and though in that year a truce was concluded for 13 years, it was speedily broken. Not until March 4, 1328, was the treaty concluded by which the independence of Scotland was fully recognized. Bruce did not long survive the completion of his work, dying at Cardross Castle on June 7, 1329. He was twice married; first to a daughter of the Earl of Mar, Isabella, by whom he had a daughter, Marjory, mother of Robert II., and then to a daughter of Aymer de Burgh, Earl of Ulster, Elizabeth, by whom he had a son, David, who succeeded him.

Bruce, Thomas, Earl of Elgin and Kincardine, an English diplomatist and antiquary, born July 27, 1766. He was successively Envoy at Brussels, Berlin and Constantinople, and made a valuable collection of ancient sculptures at Athens, which was purchased by Parliament for the British Museum in 1816, and is known as the Elgin Marbles. He died in Paris, Nov. 14, 1841.

Bruce, Wallace, an American poet, born in Hillsdale, N. Y., Nov. 10, 1844; graduated at Yale College in 1867; and was United States Consul at Edinburgh, Scot-

Brucker

land, in 1889-1893. He became a lecturer on literary topics, and published "Way-side Poems," "Old Homestead Poems," "The Hudson," "The Yosemite," "Parson Allen's Ride," "The Land of Burns," etc.

Bruce-Joy, Albert, an English sculptor, born in Dublin in 1842. He was a pupil of John Foley. His first exhibit was in the Royal Academy in 1866. A colossal statue of John Laird, by him, made him celebrated. He executed the Harvey tercentenary statue and a colossal statue of John Bright. His bronze statue of Gladstone was unveiled in Chicago in 1900.

Brucea, a genus of plants belonging to the order *xanthoxylaceæ* (xanthoxyls). The green parts of *B. sumatrana* are intensely bitter. *B. antidysenterica* contains a poisonous principle called brucia. The bark of another species is bitter, and has qualities like those of *quassia simaruba*. *B. ferruginea* is from Abyssinia.

Bruchesi, Napoleon Paul, a Canadian prelate of the Roman Catholic Church, born in Montreal, Oct. 20, 1855. He pursued his theological studies at Paris and Rome, being ordained priest in 1878. In 1887 he was made a canon at the cathedral in Montreal. He was successively Vicar at St. Bridget's and St. Joseph's Churches in Montreal, and in 1897 was appointed Archbishop of Montreal to succeed the late Monsignor Fabre.

Bruchsal (bröch'sal), a town of Baden, 25 miles S. of Heidelberg. It was the residence of the prince-bishops of Spire from the 11th century, but lost its importance until it became a considerable railway center. The Grand Duke of Baden has a fine palace here. Pop. (1905) 14,931.

Bruchus, a genus of beetles belonging to the section tetramera, and the family *rhyncophora* or *curculionidæ*. The antennæ are 14-jointed, and are filiform, serrate, or pectinated, not geniculated as in the more normal *curculionidæ*. It contains small beetles which deposit their larvæ in the germs of leguminous plants, and, when hatched, devour their seed. *B. pisi* is destructive to the garden pea.

Brucine, or **Brucia** (named from the plant *B. antidysenterica*, from which it is derived), an alkaloid found along with strychnine in *nux vomica*; also in false Angostura bark. Brucine is a tertiary base; it is more soluble in alcohol and water than strychnine, and is less bitter and poisonous. It forms crystalline salts, and turns a bright red color when moistened with nitric acid. Symbol, $C_{22}H_{26}N_2O_4$.

Brucker, Jakob, a German historian, born in Augsburg, Bavaria, Jan. 22, 1696. He was educated at Jena, and in 1744 became pastor at Augsburg. His most important work is a "Critical History of

Bruges

Philosophy" (1741-1744), in Latin, which was the first complete history of the different philosophical schools. It contains biographical matter of great value. He died in Augsburg, Nov. 26, 1770.

Bruges, a city of Belgium, capital of West Flanders, at the junction of the canals from Ghent, Ostend, and L'Ecluse, 7 miles from the North Sea, and 60 miles N. W. of Brussels; lat. $51^{\circ} 12' 30''$ N., long. $3^{\circ} 13' 44''$ E. The city has a circumference of nearly $4\frac{1}{2}$ miles, and is entered by six gates. Many large and noble ancient mansions and spacious public edifices present their pointed gables to the streets, and afford interesting specimens of the ornamental Gothic architecture of the Middle Ages.



BELFRY AND CLOCK TOWER, BRUGES.

Among the most remarkable public edifices are the Cathedral of Notre Dame (Onser Vrouw), the old Gothic Hospital of St. John, and the elegant church of St. Saviour. In the great square is a lofty Gothic tower or belfry, the most beautiful in Europe, and its chimes are harmonious. In this tower there are 48 bells, some weighing six tons; they are played upon every quarter of an hour by means of an immense copper cylin-

Brugg

der communicating with the clock, and weighing about nine tons. Its surface is pierced by 30,500 square holes, so that an infinite variety of airs may be set upon it, by merely shifting the iron pegs that lift the hammers. The Ostend canal presents an expanse of surface that resembles a stately river, and is sufficiently wide to admit the passage of ships of 500 tons from the sea. There are 54 bridges across the numerous canals by which the streets are intersected; hence, the Flemish name of the place — Brügge, that is, bridges; in French, *Bruges*. The chief manufactures are woollens, linens, cottons, lace, dye works, sugar refineries and ship building yards. The lace manufacture is the most important. From

the 7th century Bruges was rapidly acquiring importance. During the government of the rich and powerful Counts of Flanders, who resided there from the 9th to the 15th centuries, its woollen manufactures grew and flourished to an amazing extent. The wealth of the citizens was enormous; a single merchant gave security for the ransom of Jean sans Peur, the last Count of Flanders, to the amount of 400,000 crowns of gold. Under the Austrian dynasty, at the close of the 15th century, the rebellious conduct of the inhabitants of Bruges called upon it such destructive vengeance that henceforth its greatness died away, its trade was transferred to Antwerp, and the religious persecution and ferocity of the Spanish under Philip II. and the Duke of Alva completed the process of its ruin. On Feb. 25, 1900, a new canal was inaugurated, extending from Zeebrugge, a port on the North Sea, 14.29 miles N. of Ostend, to the city, a distance of 7.49 miles. This will add greatly to the commercial importance of the city, as

the old Ostend canal accommodates only vessels of very light draft, and the new one will enable vessels of 25 feet draft to pass to the city wharves. Pop. (1906) 53,690.

Brugg, a town in the Swiss canton of Aargau, on the right bank of the Aar, and near the mouth of the Reuss, 36 miles E. S. E. of Basel by rail. Near it is the site of Vindonissa, the chief Roman station in Helvetia; and it was also the cradle of the

Brugsch

house of Hapsburg, whose ruined castle, founded in 1020, crowns a wooded height 2 miles from the village. Nearer is the abbey of Königsfelden (1310; converted in 1872 into an asylum), in the vaults beneath which are interred many of the members of the Austrian royal family.

Brugsch, Heinrich Karl (brögsh), a German Egyptologist, born in Berlin Feb. 18, 1827. He early devoted himself to the study of Egyptian antiquities, and resided a number of years in Egypt, being for some time in the employment of the Egyptian Government, by which he was created a Bey, and latterly a Pasha. He also traveled in various parts of the East. His works are very numerous. His "History of Egypt from the Monuments" has been translated into English. He died in Berlin, Sept. 11, 1894.

Brühl (brül), **Heinrich, Count von**, a minister and favorite of Augustus III., King of Poland, born in Weissenfels, Aug. 13, 1700. In 1747 he became the Prime Minister of Augustus, to gratify whose wishes he exhausted the State, plunged the country into debt, and greatly reduced the army. He acquired great wealth and lived in greater state than the King himself. His profusion was often beneficial to the arts and sciences, and his library of 62,000 volumes forms a chief part of the Royal Library at Dresden. He died in Dresden, Oct. 28, 1763.

Bruhns, Carl Christian (bröns), a remarkable self-taught astronomer, born in Plön, Holstein, Nov. 22, 1830, the son of a locksmith; went in 1851 as locksmith and mechanic to Borsig, and then to Berlin with Siemens and Halske; attracted the attention of Encke by his remarkable powers as a computer, and was appointed in 1852 as assistant, and in 1854 as observer, in the Berlin Observatory, and in 1859 as instructor in the university. In 1860 he was called to Leipsic as Professor of Astronomy and director of the new observatory to be constructed there, which, under his skillful direction, grew into one of the finest structures of its kind in Europe. He is known as the discoverer of five comets, an able computer of cometary and planetary orbits, and for his important work in geodesy in connection with the European triangulation. He died in Leipsic, July 25, 1881.

Bruise, or Contusion, signifies an injury inflicted by a blow or sudden pressure, in which the skin is not wounded, and no bone is broken or dislocated. Both terms, and especially the latter, are employed in surgery to include all such injuries in their widest range, from a black eye to a thoroughly crushed mass of muscle. In the slighter forms of this injury, as in ordinary simple bruises, there is no tearing, but only a concussion of the textures, the utmost damage done being the rupture of a few

Brummel

small blood vessels, which occasions the discoloration that is always observed in these cases. In more severe contusions, the subjacent structures—muscles, connective tissue, vessels, etc.—are more or less ruptured, and in extreme cases are thoroughly crushed and usually become gangrenous. The quantity of blood that is extravasated mainly depends upon the size and number of the ruptured blood vessels, but partly also on the nature of the textures of the injured part. Thus, a lax tissue, as that of the eyelids, favors the escape of blood into the surrounding parts.

With regard to treatment, simple and not very severe bruises require little treatment, but the rest necessary for the avoidance of pain; but the removal of the swelling and discoloration may be hastened by the application of various local stimulants, which seem to act by accelerating the circulation through the bruised part, and promoting the absorption of the effused fluid. Friar's balsam, compound soap liniment, or poultices made with the roots of black bryony beaten to a pulp, are popular remedies of this class. Tincture of arnica has a great reputation; but experiments have made it very doubtful whether it is any more efficacious than simple spirit of the same strength. A solution of sulphurous acid, and hazeline and other preparations of the American witch-hazel are of more value. They should be kept constantly applied to the bruised part on lint or cotton wool. Pugilists, who are probably better acquainted with ordinary bruises than any other class of men, are in the habit of removing the swelling of the eyelids that often naturally occurs during a prize fight to such an extent as to close the eyes, by at once puncturing the eyelids at several points with a lancet; and their favorite remedy for a black eye or other bruise on the face is a fresh beefsteak applied locally as a poultice. Bruises of a more severe nature, as when there is much breaking or crushing of the tissues, must, of course, at once be placed in the hands of a surgeon.

Brumaire (brü-mār'), the second month of the year in the French Revolutionary calendar. It commenced on the 23d of October, and ended on the 21st of November, thus comprising 30 days. It received its name from the fogs that usually prevail about this time. The 18th of Brumaire, VIII. year (Nov. 9, 1799), is celebrated for the overthrow of the Directory and the establishment of the sway of Napoleon.

Brummel, George Bryan (the sometime famous BEAU BRUMMEL), born in London, June 7, 1778. He was educated at Eton, and there formed intimacies with the younger nobility of the day. On his father's death, inheriting a fortune of about \$150,000, he began his career as a man of fash-

Brunaï

ion, and became the intimate associate of the Prince of Wales (afterward George IV.). He it was who inaugurated the reign of dandyism, and for a period of 20 years exercised almost despotic sway over English society in the matter of dress. His fortune being soon swallowed up, he maintained his position in society by his success at play, and the indescribable charm of his manner and conversation. After a rupture with the Prince, his influence gradually declined; and oppressed by debt, and the falling off of former friends, he retired to Calais, and afterward to Caen, where he was appointed British consul, and where he died, March 30, 1840.

Brūnaï (brōnī), or **Brunei**, a British Protectorate in the N. W. of Borneo, till 1888 nominally an independent Mohammedan territory, whose sultan was formerly overlord of the whole island. Area, about 18,000 square miles; pop. est. at 125,000, divided into trade castes. The capital, Brunaï, on a river of the same name, is a miserable, dirty town, built on piles, with some 30,000 inhabitants, who trade with Singapore.

Brunanburgh, the scene of a battle in which Athelstan and the Anglo-Saxons defeated a force of Scots, Danes, etc., in 937; locality very doubtful.

Brundusium, or **Brundisium**, a city of Calabria, now Brindisi, on the shores of the Adriatic. It was taken by the Romans, B. C. 267, and became a colony of the Republic, B. C. 244. During the Illyrian War, B. C. 229, it was the naval and military station for the Roman fleet and army, and its fine harbor rendered it on many subsequent occasions the center of warlike operations. Vergil died here, B. C. 19.

Brune, Guillaume Marie Anne (brün), a Marshal of France, born in Brive-la-Gaillarde, March 13, 1763. In 1793 he joined the army, and afterward distinguished himself at Arcola and Verona as general of brigade in the Italian army. In 1799 he compelled the British and Russians to evacuate the North of Holland. In 1800 he pacified La Vendée, and, replacing Masséna as commander of the Italian army, led his troops over the Mincio, conquered the Austrians, passed the Adige, took possession of Vicenza and Roveredo, and hastened the conclusion of peace. In 1802-1804 he was ambassador at Constantinople, and the latter year was made a marshal. Losing the favor of Napoleon, he remained without employment for some years, but, on the return of Napoleon from Elba, he received an important command in the South of France, which he was soon after compelled to surrender at the second Restoration. He then set out for Paris, but was attacked and brutally killed by the populace at Avignon, Aug. 2, 1815.

Brunelleschi

Brunel, Isambard Kingdom, son of Sir Marc, born in Portsmouth, England, April 9, 1806; was educated at the College of Henri IV., at Caen, France, and began the study of civil engineering under his father. He was the resident engineer of the Thames tunnel, and the designer and civil engineer of the "Great Western," the first steamship built to cross the Atlantic. He was also the constructor of the magnificent iron steamship, the "Great Eastern," which was built at Millwall. In 1833 he was appointed engineer to the Great Western Railway, and all the tunnels and works connected with that line and its branches were constructed under his direction. He also superintended the erection of many bridges; among them the Hungerford suspension bridge across the Thames, since removed to give place to a railway bridge, and the bridge of the Cornwall Railway, crossing the Tamar at Saltash. He died in Westminster, Sept. 15, 1859.

Brunel, Sir Marc Isambard, a French civil engineer, born in Hacqueville, near Rouen, April 25, 1769. He entered the mercantile marine, made several voyages to the West Indies, and, when the French Revolution of 1793 drove him from his country, he went to New York, with the resolution of endeavoring to turn his engineering skill to some account. Accordingly, he, conjointly with another, surveyed the ground for the canal which now connects the Hudson river at Albany with Lake Champlain. Desirous, however, of returning to Europe, he went to England, where he produced several inventions, and submitted to the Government a plan for making block pulleys for ships by machinery. This was carried into execution in the dockyard at Portsmouth, and proved a wonderful success. Brunel was now a made man; he continued to exercise his talents in constructive works, and in 1825 began excavating for the Thames tunnel. This extraordinary work was opened to the public in 1834; but previously, in 1841, the honor of knighthood had been conferred upon him. He died in London, Dec. 12, 1849.

Brunelleschi, Filippo, an Italian architect; born in Florence, in 1377; devoted himself to the study of the works of Dante, to natural philosophy and perspective, the rules of which were then scarcely known. He invented various ingenious machines and mechanical contrivances. He applied himself particularly, however, to architecture; and learned the art of drawing to make his architectural plans; statuary, to adorn them; and mechanics, that he might be able to raise the materials. He was also profoundly versed in mathematics and geometry. He is said to have drawn views of the finest monuments in Florence in per-

spective—an art which then excited much astonishment. This varied knowledge prepared him for bold and difficult undertakings, and he gained the name of the restorer of architecture. As a statuary he was much indebted to his intimate connection with Donatello, who was then very young but very able. Both went to Rome. Here Brunelleschi conceived the idea of restoring architecture to the principles of the Greeks and Romans in the hope of making the revived classic forms supersede the Gothic then in vogue. When the architects assembled in 1407 at Florence to consult on the building of the dome of the Cathedral of Santa Maria, the plan which Brunelleschi proposed received but little attention, and he went back to Rome.

It was necessary, however, to have recourse to him, as the undertaking far surpassed the powers of the other architects. He engaged to erect a dome which, by its own weight and by the strong connection of its parts, should hang suspended. This proposal seemed so wonderful that the author was regarded as insane. As all other plans, however, failed to answer the expectations of the magistrates, Brunelleschi was again recalled, and ordered to explain the mode in which he intended to execute his plan. This he refused to do, but built two small chapels according to his new system. On this the charge of erecting the dome was committed to him. Aided only by his own genius he accomplished the work, which remains one of the boldest creations of the human mind. But the ingenious lantern, which formed the upper part of the dome, was not finished when he died in 1444. It was completed, however, according to his first design. Few monuments of architecture are so noble as this wonderful building. Only the dome of St. Peter's in Rome, which was built since, excels it in height, but is inferior to it in lightness and grandeur of style. Michael Angelo said it was difficult to imitate Brunelleschi, and impossible to excel him. Brunelleschi was the author of a great number of other masterpieces of architecture.

Brunetière, Ferdinand (brün-tyär'), a French critic; born in Toulon, July 19, 1849. He is the editor of the "Revue des Deux Mondes" and became a member of the French Academy in 1893. In criticism he inclines to the idealist as opposed to the naturalist school, and is a severe critic of literary fads. His principal works are: "History and Literature" (1884, 3 vols.); "The Naturalist Romance" (1883); "Essays on Contemporary Literature" (1892); "Epochs of the French Theater" (1892). In 1897 he delivered a series of lectures in Harvard, Johns Hopkins and Columbia Universities. He died Dec. 9, 1906.

Brunhilda (1) in the "Nibelungenlied," the young and stalwart Queen of Iceland, wife of Gunther, the Burgundian king. She hated passionately Kriemhild and her husband, Siegfried, who had once been her own lover; and she caused his murder by the hands of Hagen. Originally she was identical with the Norse Walkyrie Brynhildr, who, for a fault, was stripped of her divinity by Odin and sunk into a charmed sleep from which she was awakened by Sigurd (Siegfried). (2) The daughter of the Visigothic King Athanagild, married King Sigbert of Austrasia, in 567, and afterward, as regent of her two grandsons, Theodebert II., King of Austrasia, and Theodoric II., King of Burgundy, divided the government of the whole Frankish world with her rival Fredegond, who governed Neustria for the youthful Clotaire II. On the death of Fredegond, in 598, she seized on Neustria, and, for a while, united under her rule the whole Merovingian dominions, but was overthrown, in 613, by a combination in their own interests of the Austrasian nobles under the nominal leadership of Clotaire II., and put to death by being dragged at the heels of a wild horse.

Bruni (brö'nē), **Island**, an island off the S. part of the E. coast of Tasmania, from which it is separated by D'Entrecasteaux Channel. It has a length of 32 miles, a varying breadth of 1 to 11 miles, and an area of 160 square miles. Coal is mined.

Brunn, Heinrich, a German archæologist; born in Wörlitz, Anhalt, Jan. 23, 1822; became Professor of Archæology at Munich; and published several works of high repute among scholars. He died in Munich, July 23, 1894.

Brunn (brön), an Austrian city, capital of Moravia, on the railway from Vienna to Prague, nearly encircled by the rivers Schwarza and Zvittawa. It contains a cathedral and other handsome churches; a *landhaus*, where the Provincial Assembly meets; and several palaces; and has extensive manufactures of woollens, which have procured for it the name of the Austrian Leeds. It is the center of Moravian commerce, a great part of which is carried on by fairs. Near it is the fortress of Spielberg, in which Trenck and Silvio Pellico were confined. Pop. (1900) 109,346.

Brunne (brön), **Robert of**, the name by which ROBERT MANNING, a monk of the order founded by St. Gilbert of Sempringham, is usually designated. His monastery was in South Lincolnshire, near the modern town of Bourn, and he lived in the reigns of Edward II. and Edward III. His chief work is his "Handlyng Synne," a free and amplified translation into English verse of William of Waddington's "Manuel des Pechiez," with such judicious omissions and excellent additions as made his version

much more entertaining than the original. The purpose of the book was to convey religious instruction to the people in the agreeable form of moral anecdotes. It is of great importance from the linguistic point of view as one of our best landmarks in the transition from the early to the later Middle English. He also made a new version in octosyllabic rhyme of Wace's "Brut d'Angleterre," and added to it a popular translation of the French rhyming chronicle of Peter Langtoft of Bridlington. Robert deliberately wrote in English instead of French, in order to reach the common people, to give them the means "for to haf solace and gamen, in felauschip when tha sit samen (together)."

Brunnow, Philipp (brö'nof), **Count von**, a Russian diplomatist, was born in Dresden, Aug. 31, 1797, and entered the Russian service in 1818. He was present in a civil capacity in the campaigns of 1828 and 1829 against the Turks, and in 1839 he was sent on a special mission to London, where, in the following spring, he was accredited as permanent ambassador. In this capacity he soon acquired distinction as a diplomatist. After retiring from London on the outbreak of the war, in 1854, he represented Russia in Frankfort, and, along with Count Orloff, was sent to the Conference of Paris in 1856. He was afterward appointed to the court of Prussia; but in 1858 he returned to his old place in London, where he represented Russia at the conferences in 1864 and 1871. He was raised to the rank of Count in 1871, and in 1874 retired to Darmstadt, where he died, April 12, 1875.

Bruno, Giordano, an Italian philosopher, one of the boldest and most original thinkers of his age, born in Nola, about 1550. He became a Dominican monk, but his religious doubts, and his censures of the monastic orders, compelled him to quit his monastery and Italy. He embraced the doctrines of Calvin at Geneva, but doubt and free discussion not being in favor there, he went, after two years' stay, to Paris. He gave lectures on philosophy there, and, by his avowed opposition to the scholastic system, made himself many bitter enemies. He next spent two years in England, and became the friend of Sir Philip Sidney. In 1585 he went again to Paris and renewed his public lectures. After visiting and teaching in various towns in Germany, he returned, in 1592, to Padua, and went afterward to Venice, where he was, in 1598, arrested by the Inquisition and sent to Rome. He lay in prison two years, and on Feb. 17, 1600, was burned as a heretic. Bruno was a man of powerful understanding, vigorous and fertile imagination, and rich and diversified learning. His theory of the world was pantheistic. He was well versed in astronomy, and adopted the views of Copernicus. But he was also a believer in as-

trology. His works in Latin and Italian are numerous, and abound in bold and noble thought and rich eloquence. Spinoza was indebted to Bruno for some of his theories. Among the works of Bruno are the following: "Della Causa," "Principio ed Uno," "Dell 'Infinitio Universo e Mondi," "La Cena delle Ceneri," "Specchia della Bestia Trionfante," etc.

Bruno, or Bruni (BRUNUS), **Leonardo**, an Italian scholar, born in Arezzo in 1370, whence his name Aretino. He was secretary to the papal chancery under Innocent VII., Gregory XII., Alexander V., and John XXIII. On the deposition of the latter he escaped to Florence, where he wrote his history of Florence, received in consequence the rights of citizenship, and afterward, by the favor of the Medici, was secretary to the republic till his death in 1444. He did much to advance the study of Greek literature by his literal Latin translations from Aristotle, Demosthenes, Plutarch, etc., and was the author of biographies of Dante and Petrarch.

Bruno, St., the Apostle of the Prussians, born in Querfurt, in 970. He was of a noble Saxon family, converted the Emperor Henry II., and was assassinated by the pagans of Lithuania in 1008.

Bruno, St., the founder of the Carthusian order of monks, born in Cologne about 1040; died in Calabria in 1101.

Bruno the Great, one of the most eminent men of his time, born about 925, the third son of Henry the Fowler. He became archbishop of Cologne, and chancellor of the Empire under his brother, Otto I., and afterward, as a reward for his services, Duke of Lorraine. Distinguished alike for piety and learning, he strove to reform the monasteries and advance the love of learning among the clergy. He died in Rheims, Oct. 11, 965.

Brunonian Theory, a theory, or, rather, hypothesis, according to which the living system was regarded as an organized machine endowed with excitability, kept up by a variety of external or internal stimuli, that excitability constituting life. Diseases were divided into sthenic or asthenic, the former from accumulated and the latter from exhausted excitability. Darwin, author of the *Zoonomia*, adopted the theory with enthusiasm, and Rasori introduced it into Italy, where it flourished for a time, and then had to be abandoned, as it ultimately was everywhere.

Brunswick, Duchy of, in Germany, consists of five detached portions of territory on the rivers Weser, Seine, Ocker and Aller. It occupies part of the vast plain which stretches from the foot of the Hartz Mountains and their continuations (the Solling) to the German Ocean and the Baltic, with

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a portion of the rise of those chains on the N. side. The largest portion contains the districts of Wolfenbüttel and Schöningen, in which the cities of Brunswick and Wolfenbüttel, and the towns of Königsbutter and Helmstadt, are situated. Two small detached portions of territory, viz., the circles of Thedinghausen on the Weser, and that of Badenburg, are inclosed by the Hanoverian territory, and form part, the former of the Weser district, the latter of the Seine district. Finally, the detached circle of Kalvorde, inclosed within the Prussian Province of Saxony, belongs to the district of Schöningen. The duchy has an area of 1,526 square miles. The inhabitants are mostly engaged in agricultural and mining pursuits. Iron is the chief produce of the mines worked in the three districts of the Hartz, Weser and Blankenburg. Nearly the whole of the inhabitants are members of the Lutheran Church. Pop. (1905) 485,958.

BRUNSWICK, the capital, is on the Ocker, in a level and fertile district, 143 miles W. S. W. of Berlin. It is supposed to have been founded in 861 by Bruno, Duke of Ostfalen; but Henry the Lion, in the 12th century, so greatly strengthened and beautified the city that he may be almost said to be its founder. In the 13th century Brunswick became a member of the Hanseatic League, and soon attained considerable commercial prosperity, but its importance declined with the decay of the League. The town is most irregularly built, with narrow and crooked streets, but possesses the advantage of an abundant supply of water. The cathedral (1173-1469), and the churches of St. Martin, St. Catharine, and St. Andrew, with its steeple 341 feet high, are among the principal buildings; the old Rath-haus is a fine specimen of Gothic, and a number of the older houses are interesting for their quaintly carved wooden fronts. In the museum are some notable antiquities and works of art, by Jan Steen, Albert Dürer, Holbein, Rembrandt, Raphael, Guido Reni, Ruysdael, Michael Angelo and Benvenuto Cellini. The industry of the town consists chiefly in manufactures of jute, woolen and linen, leather, sewing machines, chicory, beet sugar, tobacco, papier mâché, and laquered wares, and in publishing. The old fortifications have been demolished, and their site converted into pleasant promenades. A fine avenue of linden trees leads to the ducal palace, which, destroyed by fire in 1830 and 1865, was rebuilt in 1869. Pop. (1905) 136,397.

Brunswick, city and county-seat of Glynn co., Ga.; on St. Simon's Sound, 8 miles from the Atlantic Ocean; on the Plant System and the Southern railroads; 80 miles S. by S. W. of Savannah. Its settlement dates back more than 100 years, and its importance as a commercial port has been de-

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veloped since the close of the Civil War. It has an admirable and spacious harbor, provided with a brick lighthouse; is connected with New York, Fernandina, and Savannah by regular steamship lines; and exports large quantities of cotton, phosphates, tar, turpentine and pine lumber. The city is the seat of a United States Marine Hospital; and is a popular summer and winter resort, with fine hotels. Pop. (1910) 20,554.

Brunswick, a town in Cumberland co., Me.; at the head of navigation on the Androscoggin river, and on the Maine Central railroad, 26 miles N. E. of Portland, and 8 miles W. of Bath. It is principally engaged in lumbering, milling and manufacturing; and is widely known as the seat of Bowdoin College and the Maine State Medical School. Pop. (1910) 6,621.

Brunswick, Family of, a distinguished family founded by ALBERT AZO II., Marquis of Reggio and Modena, a descendant, by the female line, of Charlemagne. In 1047 he married Cunigunda, heiress of the Counts of Altorf, thus uniting the two houses of Este and Guelph. From his son, GUELPH, who was created Duke of Bavaria in 1071, and married Judith of Flanders, a descendant of Alfred of England, descended Henry the Proud, who succeeded in 1125, and by marriage acquired Brunswick and Saxony. OTHO, the great-grandson of Henry by a younger branch of his family, was the first who bore the title of Duke of Brunswick (1235). By the two sons of ERNEST of Zell, who became Duke in 1532, the family was divided into the two branches of Brunswick-Wolfenbüttel (II.) and Brunswick-Hanover, from the latter of which comes the present royal family of Great Britain. The former was the German family in possession of the duchy of Brunswick until the death of the last Duke in 1884. GEORGE LOUIS, son of Ernest Augustus and Sophia, granddaughter of James I. of England, succeeded his father as Elector of Hanover in 1698, and was called to the throne of Great Britain in 1714 as GEORGE I.

Brunswick, Ferdinand, Duke of, fourth son of Duke Ferdinand Albert, born in Brunswick in 1721. In 1739 he entered the Prussian service, was engaged in the Silesian wars, and in the Seven Years' War commanded the allied army in Westphalia. He drove the French from Lower Saxony, Hesse and Westphalia, and was victorious at Crefeld and Minden. After the peace he retired to Brunswick, and died in 1792.

Brunswick, Friedrich Wilhelm, Duke of, fourth and youngest son of Duke Karl Wilhelm Ferdinand of Brunswick, born in 1771. During the war against France in 1792 and subsequently, he fought in the Prussian armies, was twice wounded, and once made prisoner with Blücher at Lubeck.

For the campaign of 1809 he raised a free corps in Bohemia, but was compelled to embark his troops for England, where he was received with enthusiasm. His corps immediately entered the British service, and was afterward employed in Portugal and Spain, the Parliament granting him a pension of £6,000, until he returned to his hereditary dominions, 1813. The events of 1815 called him again to arms, and he fell at Quatre Bras, 1815. Caroline, wife of George IV., was a sister of this prince.

Brunswick-Lüneburg, Karl Wilhelm Ferdinand, Duke of; born in 1735. He was the eldest son of the reigning Duke Charles of Brunswick and of a sister of Frederick the Great. The Seven Years' War afforded him the first opportunity of cultivating his military talents. He commanded the Brunswick troops in the allied army, and in the fatal battle at Hastenbeck, July 28, 1757, in which he recaptured a battery that had been taken by the French in the center of the allied army. On June 23, 1758, he decided the victory of Crefeld. He took the most active part in all the enterprises of his uncle Ferdinand; and Frederick's esteem for him continued to increase. In 1764 he married the Princess Augusta of England.

Having early become acquainted with the real situation of his native country, and drawn salutary instruction from the constant embarrassments of his father before he entered on the government, he practised the greatest economy, living mostly retired from public business, and devoted to the arts and sciences. In 1773 he entered the Prussian service and became general of infantry, but had no opportunity of cultivating his military talents. After the death of his father (in 1780) he entered on the government with zeal and activity. Anxious above all for the improvement of the finances, he diminished his household, discharged the debts of the State, encouraged agriculture, extended the liberty of commerce, undertook or assisted in the erection of considerable buildings, and by causing Italian operas, masquerades, etc., to be exhibited gratis, provided also for the amusement of the public. Yet, with the best intentions, he was often unsuccessful. This was the case with his plans for the improvement of public education. He invited men of learning into the country at great expense, but the projected reformation having met with innumerable obstacles, they became a burden to the State. In 1787 he was obliged to place himself at the head of a Prussian army for the support of the stadtholder of Holland. The facility with which this campaign was terminated procured the duke more reputation than he perhaps deserved.

High expectations were entertained of him when the wars of the French Revolution

broke out. The duke received the chief command of the Austrian and Prussian army, and issued at Coblenz, July 15, 1792, the famous manifesto, drawn up in a very harsh and haughty style by a Frenchman, De Limon. It certainly did more injury to the allied forces than a hostile army could have done. It inflamed the French nation to almost a fury against the insolent conquerors, who intended "to make every city that dared resist level with the ground and to cut their way to Paris." The Emperor Francis approved it, and so did the King of Prussia; but the duke considered the expressions too strong. The severest passages were expunged; but its tone was still very insolent. The duke designed to press forward from Lorraine to Paris to cut off its supplies, and thus to force it to surrender by famine. On Aug. 23, 1792, Longwy was taken, and Sept. 2, Verdun. But in Champagne, a country of itself unproductive, the transport of provisions for the army from the frontiers was rendered difficult by mountains and forests. Dumouriez was encamped in the vicinity of St. Menchould, and skirmishes took place daily; but the skillful disposition of Dumouriez culminated in the defeat of the Germans by Kellermann at Valmy, on Sept. 20, 1792, and Brunswick-Lüneburg was obliged to conclude an armistice and to evacuate Champagne. Custines took Worms and Spire during this retreat, and Oct. 21 captured the fortress of Mentz, and soon afterward Frankfort, which latter city, however, was retaken by the Prussians and Hessians Dec. 2. The endeavors of the Germans, therefore, were principally directed to the recapture of those places. To this end the duke, in conjunction with the Austrians, opened the campaign on the Upper Rhine in 1793, took the fortress of Königstein March 7, conquered Mentz July 22, and prepared to attack the strong fortress of Landau, then in the power of the French. The French, on the other hand, Sept. 14, made a general attack on the duke and Wurmser, from Strasburg to Saarbruck. On that day the duke had a sanguinary engagement with Moreau, in the vicinity of Pirmasens, a town belonging to the landgraviate of Hesse-Darmstadt. The French were driven from their camp near the village of Hornbach, as far as to the Saar. A month later the duke, having formed a union with Wurmser, succeeded, Oct. 13, in his attack on the lines of Weissenburg and his attempt to draw nearer to Landau. In order to gain another strong point of support he ventured, on the night of Nov. 16, to make an assault upon the mountain fortress of Bitche, which is the key of the Vosges, as the roads from Landau, Pirmasens, Weissenburg, and Strasburg unite at that place. This attempt miscarried.

Brunswick Black

Between Nov. 28 and 30, however, he defeated a division of the army of the Moselle at Lautern, which was pressing through the mountains, under the command of Hoche, with the intention of relieving Landau. But the daily attacks of Hoche and Pichegru, without regard to the sacrifice of men and the successful attempt of the latter to break the Austrian lines near Fraschweiler, Dec. 22, forced the Austrians to retreat beyond the Rhine, and occasioned the retreat of the duke also. As some difficulties had already risen between Austria and Prussia, he laid down the chief command of the army in the beginning of the year 1794. The duke continued to labor for the welfare of his country till the fatal year 1806. Although he was now of such an age that he might have retired without reproach from public life, yet he assumed burdens beyond his powers. At the beginning of that year, commissioned by the King of Prussia, he made a journey to St. Petersburg relative to the war that soon broke out with France. He was then placed at the head of the Prussian army. But his physical strength was not equal to his moral energy. He was mortally wounded at the battle of Auerstädt, and closed his life in Ottensen, near Altona, Nov. 10, 1806.

Brunswick Black, a composition of lamp black and turpentine, used for imparting a jet black appearance to iron articles.

Brunswick Green (in German, *Braunschweiger grün*, so called because it was first made in Brunswick by Gravenhorst), a green pigment, prepared by exposing copper turnings to the action of hydrochloric acid in the open air. It is a pale bluish green, insoluble, cupric oxychloride, $\text{CuCl}_2 \cdot 3\text{CuO} \cdot \text{H}_2\text{O}$.

Brush, an instrument used for painting, or for removing dirt by light rubbing, from floors, furniture, etc. They are generally made of hair, bristles, or whalebone, and are divided into two classes—simple and compound. Simple brushes are composed of a single tuft, and compound brushes consist of several tufts inserted in a handle. Painters' brushes are examples of the former, and ordinary hair brushes of the latter.

Brush, Charles Francis, an American scientist; born in Euclid, O., March 17, 1849. He was graduated at the University of Michigan, in 1869. He invented the modern arc system of electric lighting and founded the Brush Electric Company. He was decorated by the French government in 1881 for his achievements in electrical science. In 1891 he won a long contest in the Federal courts over the rights to the manufacture and sale of storage batteries; and in 1900 he was awarded the Rumford medal by the American Academy of Arts and Sciences.

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Brush, George Jarvis, an American mineralogist; born in Brooklyn, N. Y., Dec. 15, 1831. He received a public school education and studied science at New Haven. He has been Professor of Mineralogy and a leading official of the Sheffield Scientific School since 1864. His writings on mineralogy are authoritative.

Brush Turkey, a large gregarious species of bird, *tallegalla lathamii*. It is an inhabitant of Australia. It makes its nest in large mounds of brushwood, which it collects, and from which it takes its name.

Brussels (French *Bruxelles*), the capital of Belgium; on the river Senne, communicates with Antwerp and the Baltic Sea by means of the Scheldt canal, and railroads connect it with Germany, France, and Holland, as well as with all the principal towns of Belgium. The city is built partly on the side of a hill and partly on a fertile plain. French is spoken in the upper part of Brussels; in the lower Flemish is prevalent, and in one quarter the Walloon dialect is spoken. The English language, owing to the number of English who reside in the city, for economy, is also very common. Besides the fine park in the Upper Town, covering an area of some acres, ornamented with fountains and statues, and surrounded by the king's palace, the palace of the Prince of Orange, the Chamber of Representatives, and other buildings, Brussels has several other squares or places, among which the most noteworthy are: the Place Royale, with the colossal monument of Godfrey of Bouillon; the Grand Place, in which is situated the Hôtel de Ville, a splendid Gothic structure, erected in the beginning of the 15th century, with a pyramidal tower 364 feet high, surmounted by a statue of St. Michael, the patron saint of Brussels, and where, in 1568, the patriot Counts Egmont and Horn were beheaded by order of the Duke of Alva; and the Place des Martyrs, where a memorial has been erected to those who fell here in the Revolution of 1830. Among the churches of Brussels the largest and finest is the Cathedral of St. Gudule, which dates from the 12th century. In the Palais des Beaux Arts is the picture gallery, containing the finest specimens of the Flemish school; the public library, with its 234,000 volumes and its 20,000 MSS. The observatory is one of the finest in Europe. The educational establishments of Brussels are numerous, the principal being the free university, founded in 1834, with four faculties. It has also numerous charitable and benevolent institutions, and is the seat of the provincial government of South Brabant, as well as of the general government of the kingdom. Brussels is one of the chief centers of the industry of the country. Its lace is particularly famous. Of carpets which pass under the

Brussels Sprouts

name of Brussels carpets only a few are manufactured here, most of those of Belgic make being produced at Tournai. Pop. (1906) with suburbs, 612,401.

Brussels Sprouts, the small sprouts or heads, each a perfect cabbage in miniature, springing from the stalks of a species of cabbage. They were originally brought from Belgium.

Brut, or **Brutus**, the eponymous Trojan hero who gave his name to the island of Britain, according to Geoffrey of Monmouth, Wace, Layamon, and all the earlier historians in verse or prose. The great-grandson of Æneas, he was banished from Italy, and after many adventures, found his way to Albion, then the abode of giants, who were not destroyed without desperate fighting.

Brutus, Decimus Junius, a Roman soldier, served under Julius Cæsar in Gaul, and was afterward commander of his fleet, but, like his relative, Marcus Junius Brutus, joined in the assassination of Cæsar. He was afterward, for a short time, successful in opposing Antony, but was deserted by his soldiers in Gaul and betrayed into the hands of his opponent, who put him to death in B. C. 43.

Brutus, Lucius Junius, a Roman hero; son of Marcus Junius and the daughter of the elder Tarquin; saved his life from the persecutions of Tarquin the Proud by feigning himself insane, on which account he received the surname **BRUTUS** (stupid). During a plague that broke out at Rome he accompanied the son of Tarquin to the oracle in Delphi. When Lucretia, the wife of Collatinus, plunged a dagger into her bosom that she might not outlive the insult which she had suffered from Sextus, the son of Tarquin, Brutus, being present, threw off his mask. He drew the dagger, all bloody, from the wound, and swore vengeance against the Tarquins, explaining to the astonished spectators the reason of his pretended imbecility, and persuading all who were present to take the same oath. The people submitted to his guidance, and he caused the gates to be shut, the inhabitants to be assembled, and the body to be publicly exposed. He then urged the banishment of the Tarquins. After this had been resolved on, Brutus proposed to abolish the regal dignity, and introduce a free government. It was then determined that two consuls should exercise supreme power for a year, and Junius Brutus and Tarquinius Collatinus were chosen for the first term. Tarquin, who had seen the gates shut against him, and found himself deserted by his army, sent ambassadors to Rome to demand a restoration of his private property, and, at the same time, to promise that he would make no attempt against the republic. His

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request was granted. The ambassadors, however, set on foot a conspiracy, and drew into it many young men, among whom were the two sons of Brutus and the nephews of Collatinus. But a slave named Vindex discovered the plot. The criminals were imprisoned, and the consuls caused the people the next morning to be called to a meeting. All were deeply shocked to see the sons of Brutus among the prisoners, and their father on the judgment seat to condemn them. Collatinus wept, and even the stern Valerius sat silent. But Brutus arose firmly, and, after the crime had been proved beyond a doubt, ordered the lictors to execute the law. Neither the entreaties of the people nor of his sons could alter his resolution. He witnessed the horrible spectacle without emotion, and did not leave the assembly till after the execution. He was called back, however, when Collatinus wished to save his guilty nephews. The people condemned them all, and chose Valerius consul in place of Collatinus. In the meantime, Tarquin, supported by Porsenna, collected an army and marched against Rome. The consuls advanced to meet him. Brutus led the cavalry; Aruns, son of Tarquin, commanded the body opposed to him. They pierced each other with their spears at the same moment, and both fell 509 B. C. The Romans came off conquerors, and Brutus was buried with great splendor. The women lamented him a whole year, as the avenger of the honor of their sex. The details of the story of Brutus, which may be regarded as a poetical legend, have been shown by Niebühr to be irreconcilable with history.

Brutus, Marcus Junius, one of the most distinguished Romans at the close of the republican period; born of a plebeian family 85 B. C. He was at first an enemy of Pompey, who had slain his father in Galatia, but forgot his private enmity, and was reconciled to him when he undertook the defense of freedom. He did not, however, assume any public station, and, after the unfortunate battle of Pharsalia, surrendered himself to Cæsar, who received him generously, allowed him to withdraw from the war, made him in the following year governor of Cisalpine Gaul, and afterward conferred on him the government of Macedonia. Notwithstanding these benefits, Brutus allowed himself to be drawn into, and made the head of the conspiracy against Cæsar. He was led into the conspiracy by Cassius, who, impelled by hatred against Cæsar, sought, at first by writing, and then by means of his wife, Junia, sister of Brutus, to gain his favor; and when he thought him prepared for the proposal, disclosed to him verbally the plan of a conspiracy against Cæsar, who had now made himself master of the supreme power in the State. Brutus was induced to agree

Brutus

to the design, and his influence led many of the most distinguished Romans to embrace it also. Cæsar was assassinated in the senate house. In public speeches Brutus explained the reasons of this deed, but he could not appease the dissatisfaction of the people, and retired with his party to the capital. He soon after took courage, when the consul, P. Cornelius Dolabella, and the prætor, L. Cornelius Cinna, Cæsar's brother-in-law, declared themselves in his favor. But Antony, whom Brutus had generously spared, was reconciled to him only in appearance, and obtained his leave to read Cæsar's will to the people. By means of this instrument Antony succeeded in exciting the popular indignation against the murderers of Cæsar, and they were compelled to flee from Rome. Brutus went to Athens and endeavored to form a party there among the Roman nobility; he gained over, also, the troops in Macedonia. He then began to levy soldiers openly, which was the easier for him, as the remainder of Pompey's troops since the defeat of their general, had been roving about in Thessaly. Hortensius, the governor of Macedonia, aided him; and thus Brutus, master of all Greece and Macedonia, in a short time stood at the head of a powerful army. He went now to Asia and joined Cassius, whose efforts had been equally successful. In Rome, on the contrary, the triumvirs prevailed. All the conspirators had been condemned and the people had taken up arms against them.

Brutus and Cassius having finally with difficulty subdued the Lycians and Rhodians, returned to Europe to oppose the triumviri. The army passed over the Hellespont, and 19 legions and 20,000 cavalry were assembled on the plains of Philippi, in Macedonia, whither also the triumvirs, Antony and Octavianus (afterward the Emperor Augustus), marched with their legions. Although Roman historians do not agree in their accounts of the battle of Philippi, this much at least seems certain, that Cassius was beaten by Antony; that Brutus fought with greater success against the division of the army commanded by Octavianus; that 20 days after he was induced, by the ardor of his soldiers, to renew the contest; and that he was this time totally defeated. He escaped with only a few friends, passed the night in a cave, and as he saw his cause irretrievably ruined, ordered Strato, one of his confidants, to kill him. Strato refused a long time to perform the command; but, seeing Brutus resolved, he turned away his face, and held his sword, while Brutus fell upon it, and died in 42 B. C.

Bruyère. See LA BRUYÈRE.

Bryan, William Jennings, an American orator, editor, and political leader; born

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in Salem, Ill., March 19, 1860. He was graduated at Illinois College in 1881, with the highest honors, and at the Union College of Law, Chicago, in 1883. From that year till 1887 he practiced law in Jacksonville, Ill., and then removed to Lincoln, Nebr., where he soon became prominent in his profession and in politics. In 1890 and again in 1892 he was elected to Congress by the Democrats, and during his two terms of service he made several speeches on the tariff, silver, and income tax questions that showed his strength of conviction and his skill in oratory and debate. In 1893 and 1894 he received Democratic support as candidate for United States senator, but failed of election. As editor of the Omaha "World-Herald" (1894-96) and by speeches delivered in various places he made himself widely known as an advocate of free silver, and at the Democratic National Convention of 1896, in Chicago, he led the free silver delegates, wrote the "silver plank" of the platform, made a speech against the gold standard that aroused intense enthusiasm, and was nominated for the presidency. He was also nominated by the National Silver party and by the People's party. He canvassed the country, traveling more than 18,000 miles in twenty-seven States and making about 600 speeches, but was defeated by William McKinley, who received 271 electoral votes against 176 for his opponent, the popular vote being 7,111,607 for McKinley and 6,509,052 for Bryan. In 1898 he served as colonel of the 3d Nebraska volunteers in the Spanish-American War, and afterward he wrote and spoke for free silver and in opposition to imperialism and trusts. In 1900 he was again nominated for president by the Democratic and People's parties and also by the Silver Republicans, and was again defeated by McKinley, receiving 155 electoral votes, while McKinley received 292. After the election he established at Lincoln, Nebr., "The Commoner," a weekly political journal, which he has since edited. In 1908 he was again defeated for the Presidency, by William H. Taft, Republican, and in 1910 lost his 20-year party leadership in his own State in convention and primaries.

Bryant, William Cullen, an American poet; born Nov. 3, 1794, in Cummington, Mass. His father, a man of great literary culture, practised as a physician. He prepared, when he was but 14, a collection of poems, which were published in Boston in 1809. In that volume appeared "The Embargo," the only poem dealing with the politics of the day he ever wrote. In the following year Bryant entered Williams College as a student of law, but left without taking a degree in 1815, when he was admitted to the bar. In that year he became a contributor to the "North American Review," in which appeared the following year his "Thanatopsis," a poem in

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blank verse, which received much laudatory criticism. Six years later he published a second collection of poems which brought him into real fame. The principal item in this collection, "The Ages," is a didactic poem, in which he sketches the past progress of the world, concluding with a glowing picture of America, and its occupation by the new race. He definitely abandoned law for literature in 1825, and went to New York, where he founded the "New York Review," and a year after became the editor of the "Evening Post," an old established paper with which he was connected till his death. In 1832 he issued another collection of poems, which was republished in Great Britain with a preface by Washington Irving. In the summer of 1834, accompanied by his family, he went to Europe, and traveled through England, France, Germany, and Italy, remaining in the latter country for a considerable time. In 1845 he again visited Europe, repeating his excursion in 1849, when he extended his journey to Egypt and the Holy Land. The incidents of these and subsequent journeys both in Europe and America were described in letters written to the "Evening Post," which were reprinted in separate volumes entitled, "Letters of a Traveler," and "Letters from Spain and other Countries." A complete edition of his poems up to 1855 was published in that year, and in 1863 appeared a small volume entitled "Thirty Poems." His last works of importance are his translations of the "Iliad" (1870) and the "Odyssey" (1872), translations which many American critics rank above any that had hitherto appeared in the English language. Early in 1878 appeared "The Flood of Years," his last poem of any great length, in which the poet, in strains that remind the reader of "Thanatopsis," reviews the life of man as the ridge of a wave ever hurrying on to oblivion the forms that appear on its surface but for a moment, concluding, however, with the expression of a confident hope in the future of mankind, even though the present is most dark and drear. On the occasion of uncovering a statue to Mazzini (May 30, 1878) he had to stand uncovered for about an hour under a burning sun. On his way home he met with an accident which was followed by concussion of the brain, and on June 12 he expired. At the time of his death he was engaged, in conjunction with Sydney Howard Gay, on a popular history of the United States, the first volume of which appeared in 1876.

Bryce, George, a Canadian educator and clergyman; born in Mount Pleasant, Ontario, April 22, 1844. He was graduated at the University of Toronto in 1867, and was ordained to the Presbyterian ministry

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in 1871. His great work was the foundation of Manitoba College and in assisting the foundation of Manitoba University. He has written "Manitoba," and "A Short History of the Canadian People."

Bryce, James, a British diplomat, born in Belfast, May 10, 1838. After graduating at Oxford in 1862, he studied at Heidelberg, and subsequently practiced law in London. From 1870 till 1893 he was Regius Professor of Civil Law in Oxford. He had a distinguished political career; supported Home Rule and international copyright; became chief



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secretary for Ireland in 1905, and ambassador to the United States in 1907. His chief works are "The Holy Roman Empire" and "The American Commonwealth."

Bryce, Lloyd, an American editor and novelist, born in Long Island, N. Y., in 1852. He was editor of the "North American Review" from 1889 to 1896. His works are "Paradise," "A Dream of Conquest," "The Romance of An Alter Ego," "Friends in Exile."

Bryn Mawr College, an educational institution for women, at Bryn Mawr, Pa.; founded in 1880 by Joseph Taylor. Its standard of admission is very high; its system of undergraduate studies combines required courses and varied elective groups. It has grounds and buildings valued at over \$2,000,000; endowment funds, \$1,250,000; volumes in the library, over 58,000; scholarships about 80; faculty about 60; students, 420; graduates, over 1,000.

Bryology, the department of botany which treats of the *bryaceæ* (urn mosses).

Bryony, or **Bryonia**, a plant, *bryonia dioica*. It has a large root, white and branched. Its stem is long and weak, with tendrils which enable it readily to cling to bushes in the hedges and thickets where it grows. The inflorescence consists of short axillary racemes of whitish diœcious flowers with green veins. The berries are red. The plant abounds in a fetid and acrid juice. Also a genus of plants belonging to the order *cucurbitaceæ* (cucurbits). *B. alba*, or blackberried bryony, which grows on the continent of Europe, is by some believed to

Bryophyllum

be only a variety of the *dioica*. Several other species are found in the East Indies.

Bryophyllum, a genus of plants belonging to the order *crassulaceæ* (houseleeks). There are eight stamina and four ovaries. *B. calycinum*, the large cupped bryophyllum, has succulent, oval, crenate leaves and long, pendulous, cylindrical flowers. Its native country is the East Indies, whence it has been carried to other places. In Bermuda, where it is naturalized and grows abundantly, it is called life plant.

Bryozoa, the name given by Ehrenberg to a class of mollusoid animals, the peculiarities of which had been previously observed by J. V. Thompson, who had called them polyzoa.

Bryum, a genus of mosses, the typical one of the family BRYACEÆ (q. v.).

Bubalis, a genus in the antelope division of hollow horned, even toed ruminants, not to be confused with the genus bubalus—the BUFFALO (q. v.). The species of bubalis are among the more oxlike antelopes, and one of them is supposed to be the bubalus of the ancients. In this genus the head is elongated, the snout broad, the horns twisted and present in both sexes, the tear pits small, the back sloping off behind, the teats two in number. The bubaline of the North African deserts (*B. mauretanica* = *antelope bubalis*) is a handsome animal of a reddish brown color, standing about 5 feet high at the shoulder, living in herds, and readily tamed. It is figured on Egyptian monuments. The hartebeest (*B. caama*) is found in the S., is perhaps slightly larger, has a general gray brown color (black on the outside of the legs and on middle of forehead, with large white spots on haunches), and is at home on the mountains. The sassaby (*B. lunata*), the bastard hartebeest of the Cape Colonists, is slightly smaller, and is differently colored. The bontebok (*B. pygarga*) is a smaller and more beautifully colored form of the S. interior, where another species, the violet colored blesbok, is also abundant.

Bubastis, an ancient Egyptian town, so named from the goddess Bast, supposed to answer to the Greek Artemis or Diana. The cat was sacred to her, and the bubasteia or festivals of the goddess were the largest and most important of the Egyptian festivals.

Bubo, hardening and enlargement of lymphatic glands, generally the inguinal, as in the Oriental or Levantine plague, syphiloid gonorrhœa, etc., always, unless dissipated by medical interference, followed by suppuration. In cases of true infecting syphilis a suppurating bubo is a rare complication, although induration of the glands in the later forms of the disease is almost invariably present.

Bubonic Plague

Bubo, a genus of birds belonging to the family *strigidæ*, or owls. They have a small ear aperture, two large feathered tufts like horns on the sides of the head, and the legs feathered to the toes. *B. maximus* is the eagle owl, or great owl. It is a native of Europe. The corresponding American species is *B. virginianus*.

Bubonic Plague, a disease supposed to be identical with the plague known as the Black Death, which had its origin in China, and made its first appearance in Europe 543 A. D., at Constantinople. It derives its modern name from the fact that it attacks the lymphatic glands in the neck, armpits, groins and other parts of the body. The swollen parts are extremely sensitive to the touch, the patient suffers from headache, vertigo, high fever, vomiting and great prostration. Another feature is the appearance of purple spots and a mottling of the skin. In severe cases death generally ensues in 48 hours, and, at best, recovery is slow. It is now generally agreed that this plague is a germ disease. The bacillus has been identified by Indian bacteriologists as well as by European and American investigators. It is found without trouble in the blood of the patient, and cultures are made in beef tea or glycerine preparations. The bacilli resemble those of chicken pox, and are said not to survive more than four days of dessications. At the Hoagland laboratory in Brooklyn, N. Y., extensive experiments have been made, both in the culture of the germs and in an anti-toxin, by means of which immunity from this scourge may be obtained. The disease has been called "the poor's plague," from the fact that it first attacked the half starved masses who congregate in the slums of the cities. This was the case in Bombay, where so fatal were its ravages that a panic ensued and more than 450,000 people, one-half the population, left the city. Pure air, wholesome food, the free external use of cold water, and proper sanitary regulations modify to some extent the attacks of the plague, and, more than anything else, have been the cause of the comparative exemption of Europeans from it. It has, however, visited some of the cities of Europe.

History.—The first authentic description of the bubonic plague is contained in the writings of Rufus of Ephesus, who described the disease as having existed in Northern Africa during the 3d or 4th century B. C. He presented the testimony of physicians of that period to corroborate his arguments. Since that time the disease has been variously described by writers under the name of Levantine, Oriental and Bubonic Plague and the black plague, or black death. These designations are more or less open to criticism and lack scientific foundation. In the reign of Justinian, 542 A. D., the disease

appeared in Egypt, and within a year extended to Constantinople, where it is said to have caused the death of 10,000 persons in one day. In 1352 the plague spread through the whole of Europe and nearly one-fourth of the population died. It is estimated by Hecker that during this reign of terror, out of 2,000,000 inhabitants of Norway, but 300,000 survived. It was estimated by Pope Clement VI. that the mortality from black death for the entire world was 40,000,000. This outbreak lasted about 20 years. During the great plague of London, in 1665, there were 63,596 deaths out of a population of 460,000. It was believed the infection was introduced by bales of merchandise from the Levant. The sanitary condition of London, at the time, was notoriously bad. It is a significant fact that those who lived out of town and on barges and ships on the Thames did not contract the disease.

Characteristics.—The bacillus of the bubonic plague was discovered and studied by Kitasato and Yersin, working independently, and at about the same time, in 1894, during the epidemic of the plague at Hong Kong. It is found in large numbers in the pus, in the lymphatic glands, and occasionally in the internal organs. It is apparently present in the blood only in the acute hemorrhagic types of the disease, and shortly before death. An anti-plague serum injected into a young Chinaman at the Catholic mission at Canton in June, 1896, who was attacked with a severe type of the disease, was effective. It is believed the plague is transmitted solely through infection from previous cases. What part, if any, the soil plays in propagating the disease has not been settled. The natives of Eastern countries are strongly impressed with the belief that the germ is contained in the ground. Exactly what influence the climate and temperature have in the propagation of the plague is not known. It is apparent, however, that hot, dry air is fatal to the disease, and that moist warm air is favorable to it. It even may be very active in cold weather. This was shown by the outbreak that occurred on the Volga river, in Russia, in the severe winter of 1878. Like typhus fever, the plague is unknown in the tropics, and, like typhus, again, it usually selects its victims from the lowest class, and thrives on filth and famine. The usual period of incubation is from three to six days. In the usual or severe forms, the earlier symptoms are similar to those that usher in typhus fever. The invasion is abrupt, associated with chills, great depression, blunted condition of the intellect, pains in the bones and high fever. Death frequently occurs within 48 hours, and even earlier. When life is prolonged for five or six days the prognosis is more favorable. The germ can be carried in rags, general

merchandise and clothing. Rigid quarantine with disinfection of all articles should be strictly enforced when it appears in any country.

Remedies.—The chief causes of the plague are given as famine and filth. The various serums seem to be unavailable against these obstacles and even the use of antipyretics or stimulants. As a preventive serum, that of Professor Haffkins has proven the most effectual. The compulsory evacuation of infected cities and districts has accomplished much. Indeed, this was the most available remedy during the epidemic in the Punjab District in 1896–1897, and is the first preventive of a spread in case of an outbreak. The cities of India lie close to the river, the same being sacred, and the population multiplying upon their banks. As the river bottoms prevent proper drainage this militates largely in favor of the disease. The miserable “chawli,” or huts, of the natives, squat low on the alluvial soil, which absorbs all drainage and gives out pestilential gases. The Hindu has little or no vitality to battle with the disease. His state of demoralization makes a livelihood impossible, and famine fosters the plague. The Mohammedans, unlike the Hindus, do not burn their dead bodies; nor like the Parsees, place them in the Towers of Silence, on Malabar Hill, to be eaten by the vultures. By burying in shallow graves they aid the spread of the disease, contaminating all underground supplies of water.

Animals also have a tendency to spread the plague. Mice, rats, cats and monkeys have been known to infect a ship and bring the scourge from a foreign port. Excessive precautions are taken at all ports leading from Asia, that of the Suez canal being the most dangerous and carefully guarded highway into Europe. Every ship and, indeed, every passenger and piece of baggage is scrutinized, with a view to discovering the first symptoms of the plague in the victim or suspicious article of merchandise that may lead to infection.

Precautions, however, are quite impossible in the incipient stages of the disease, as the evidences may not appear in the victim till he or she is already marked for death. Fever, swelling of the lymphatic glands and utter prostration are soon superseded by the appearance of the bubos in groin, neck and face, when death occurs in 90 cases out of a possible 100, within a period varying from five hours to as many weeks, depending upon the constitution of the victim.

The white races are more immune than any other. The mode of life in civilized countries is conducive to successful battle with the plague. As it is rather sporadic than epidemic, even in the East, there should be little fear of its securing a foothold on Western soil. Two cases of the disease were brought into New York harbor,

Nov. 18, 1899, from Santos, Brazil, on the British steamship "J. W. Taylor." The infected vessel was refused a landing, but was placed in quarantine and steps instantly taken to make sure and complete the isolation of the disease. Health Officer Doty, of New York city, announced that the chances of the bubonic plague reaching this country through the ports of New York were extremely remote. Active measures were also taken in the summer of 1900 to disinfect the Chinese quarter of San Francisco in which the plague had appeared. In Honolulu heroic measures were adopted to stamp out the infection.

A. H. DOTY.

Bucareli y Urzua, Antonio Maria, a Spanish soldier and administrator; born in Seville, Jan. 24, 1717; was governor of Cuba in 1760-1771, and viceroy of New Spain (Mexico) from 1771 till his death in Mexico City, April 9, 1779.

Buccaneer, an order of men, not quite pirates, yet with decidedly piratical tendencies, who for nearly 200 years infested the Spanish main and the adjacent regions. A bull of Pope Alexander VI., issued in 1493, having granted to Spain all lands which might be discovered W. of the Azores, the Spaniards thought that they possessed a monopoly of all countries in the New World, and that they had a right to seize, and even put to death, all interlopers into their wide domain. Enterprising mariners belonging to other nations, and especially those of England and France, naturally looked at the case from quite an opposite point of view, and considered themselves at liberty to push their fortunes within the prohibited regions. Being cruelly treated, when taken, by the Spaniards, their comrades made reprisals, and a state of war was established between the Spanish governments in the New World and the adventurers from the Old, which continued even when the nations from which they were drawn were at peace in Europe. The association of buccaneers began about 1524, and continued till after the English revolution of 1688, when the French attacked the English in the West Indies, and the buccaneers of the two countries, who had hitherto been friends, took different sides, and were separated forever. Thus weakened, they began to be suppressed between 1697 and 1701, and soon afterward ceased to exist, pirates of the normal type, to a certain extent, taking their place. The buccaneers were also called "filibustiers," or "filibusters"—a term which was revived some years ago in connection with the adventures of "General" Walker in Spanish America.

Buccinator, the trumpeter's muscle, one of the maxillary group of muscles of the cheek. They are the active agents in mastication, and are beautifully adapted for

it. The buccinator circumscribes the cavity of the mouth and, aided by the tongue, keeps the food under the pressure of the teeth; it also helps to shorten the pharynx from before backward, and thus assists in deglutition.

Buccinidæ, a family of mollusks belonging to the order *prosobranchiata*, and the section *siphonostomata*. They constitute part of Cuvier's *buccinoida*. They have the shell notched in front, or with the canal abruptly reflected so as to produce a varix on the front of the shell. The leading genera are *buccinum terebra*, *eburna*, *nassa*, *purpura*, *cassis*, *dolium*, *harpa* and *oliva*.

Buccinum, the typical genus of the family buccinidæ. In English they are called whelks, which are not to be confounded with the periwinkle, also sometimes called whelk. *B. undatum* is the common whelk. Species of the genus exist in the cretaceous rocks, but it is essentially Tertiary and recent.

Buccleugh (bu-klö), the title (now a dukedom) of one of the oldest families in Scotland, tracing descent from Sir Richard le Scott in the reign of Alexander III. (latter half of the 13th century), and first becoming conspicuous in the person of the border chieftain Sir Walter Scott, of Braxholm and Buccleugh—the latter an estate in Selkirkshire. The son of Sir Walter, bearing the same name, was, for his valor and services, raised to the peerage, in 1606, as Lord Scott of Buccleugh, and his successor was made an Earl in 1619. In 1663 the titles and estates devolved upon Anne, daughter of the second Earl, who married the Duke of Monmouth, illegitimate son of Charles II., the pair, in 1673, being created Duke and Duchess of Buccleugh, etc. Subsequently the Dukedom of Queensberry passed, by marriage, into the family.

Bucentaur, a mythical monster, half man and half ox. The splendid galley in which the Doge of Venice annually wedded the Adriatic bore this name, doubtless because of the figure of a bucentaur on her bow. Three ships were built for this ceremony, enjoined by Pope Alexander III., and all bore a bucentaur figure-head; and the last one was destroyed by the French in 1798.

Bucephalus (bū-sef'a-lus), the celebrated horse of Alexander the Great, whose head resembled that of a bull, whence his name. Alexander was the only one who could mount him. In an engagement in Asia, where he received a heavy wound, he immediately hastened out of the battle, and dropped dead as soon as he had set down the King in a safe place. Alexander built on the river Hydaspes, in India, a city which he called after his name.

Bucer

Bucer, Martin, a Protestant reformer; born in Schelestadt, Alsace, in 1491. In 1521 he left the Dominican Order, and became a convert to Lutheranism. He was at first preacher at the court of Frederick, the Elector of the Palatinate; afterward in Strasburg; and at the same time professor in the university there for 20 years. He took part in the conference of Marburg with the hope of reconciling Luther and Zwinglius. In 1548 King Edward VI. of England, at the suggestion of Archbishop Cranmer, invited him to Cambridge. He died in Cambridge in 1551. In 1557 Queen Mary caused his bones to be burned, to show her detestation of Protestantism. This sentence was repealed, and his memory restored to honor in the reign of Queen Elizabeth. The Cardinal Contarini called him the most learned divine among the heretics. He wrote a commentary on the Psalms and many other works.

Buchanan, Andrews Hays, an American educator; born in Washington Co., Ark., June 28, 1828; was graduated at Cumberland University in 1853; and took a special course in civil engineering and mathematics in Lincoln University; taught civil engineering in 1854-1861; was military topographical engineer in the Confederate army during the Civil War; and became Professor of Mathematics and Civil Engineering in Cumberland University in 1869. He was employed by the superintendent of the United States Coast and Geodetic Survey to take charge of the triangulation of Tennessee, on which work he was engaged for four months in every year from 1876 to 1896. He was the author of "Plane and Spherical Trigonometry"; etc.

Buchanan, George, a Scotch clergyman and historian, born in 1506. After being educated at the Universities of St. Andrew's and Paris, he returned to Scotland, where he soon turned his attention to literature, producing the famous satires, "Franciscanus," and the "Somnium," in which he lashed with caustic severity the mode of life of the monastic orders of that day. For this he was persecuted, and, taking refuge in France, became Professor of Latin in the College of Guienne at Bordeaux. While here, he wrote his remarkable Latin tragedies, the "Baptistes" and the "Jephthes," and enjoyed the friendship of Montaigne and the elder Scaliger. He next successively resided at Paris and in Lisbon, and, in 1554, published his celebrated translation of the "Psalms," begun during his incarceration in a Portuguese dungeon. Returning to Scotland, he became classical tutor to Mary, Queen of Scots, and received high ecclesiastical preferment. In 1571 he became preceptor to the young King James VI. (afterward James I. of England). In 1579 appeared his great work, the "De

Buchanan

Jure Regni apud Scotos," an eloquent appeal on behalf of civil liberty; but which was afterward condemned by the Parliament and suppressed. His last work was the "History of Scotland." He died in 1582.

Buchanan, James, an American statesman, 15th President of the United States, born near Mercersburg, Pa., April 23, 1791; graduated at Dickinson College in 1809, admitted to the bar in 1812. He supported the War of 1812, although affiliated with the Federalist Party. In 1820 he was elected to Congress, serving successive terms by re-election for 10 years, where he made some reputation in the advocacy of bills for reorganizing the courts and judiciary. In 1828 he supported Andrew Jackson for the Presidency, who, in turn, appointed him Minister to Russia, where he distinguished himself by arranging an important commercial treaty. In 1834, he entered the United States Senate, serving there 12 years, where he defended the spoils system instituted by Jackson, and declared against the right or power of the Government to interfere with slavery in the States.

He was appointed Secretary of State by President Polk, after which service he was in retirement for four years. Under President Pierce he was sent in 1853 as



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Minister to England, where his advocacy of the annexation of Cuba by the United States led to his nomination to the Presidency in 1856. His cabinet contained men who supported the secession of South Carolina, and eventually joined the Confederacy. He announced in a message (1860) that the President had neither the right nor the constitutional power to prevent a State from seceding. This unwillingness to take decisive action enabled the seceding States to arm and prepare for war before the Government did anything to prevent. After he retired, however, he supported the Union cause. He died in Lancaster, Pa., June 1, 1868.

Buchanan, Robert Williams, an English author, born in Warwickshire, Aug. 18, 1841. He received his education in Glasgow, and while young went to London to

engage in literature. His attack upon Dante Gabriel Rossetti drew a famous letter from that poet on "The Stealthy School of Criticism," and a scathing pamphlet from Swinburne, "Under the Microscope" (1872). His poems include "Undertones" (1863); "Idylls and Legends of Inverburn" (1865); "London Poems," his best effort (1866); "North Coast Poems" (1867); "Napoleon Fallen: a Lyrical Drama" (1871); "The Drama of Kings" (1871); "Ballads of Love, Life and Humor" (1882); and "The City of Dreams" (1888). His best novels are "The Shadow of the Sword" (1876); "A Child of Nature" (1879); "God and the Man" (1881); "The Martyrdom of Madeline" (1882); and "Foxglove Manor" (1884). Buchanan also wrote successful plays. He died in London, June 10, 1901.

Buchanan, William Insko, an American diplomat; born near Covington, Miami co., O., Sept. 10, 1853; removed to Sioux City, Ia., in 1882; was appointed a member of the World's Columbian Commission and subsequently chief of the department of agriculture and of the live-stock and forestry departments of the exposition; Minister to the Argentine Republic in 1894-1900, and arbitrator of boundary dispute between Chile and Argentina; and Director-General of the Pan-American Exposition at Buffalo, N. Y. On Dec. 12, 1903, he was appointed the first United States Minister to the Republic of Panama. He died Oct. 16, 1909.

Bucharest (bö'char-est), the capital of the former principality of Wallachia and of the present kingdom of Rumania, stands 265 feet above sea level, in the fertile but treeless plain of the small, sluggish Dambovitza. By rail it is 716 miles S. E. of Vienna, 40 N. of Giurgevo on the Danube, and 179 N. W. of Varna on the Black Sea. A strange meeting point of East and West, the town as a whole is but meanly built, but the streets are mostly paved and lighted with gas and electricity. An elaborate system of fortification was undertaken in 1885. There are some handsome hotels; and the metal plated cupolas of the innumerable churches give to the place a picturesque aspect. The royal palace was rebuilt in 1885; and the Catholic Cathedral is a fine edifice of 1875-1884. The number of cafés and gambling tables is excessive; and, altogether, Bucharest has the unenviable reputation of being the most dissolute capital in Europe, with all the vices but few of the refinements of Paris. There is, however, a university, founded in 1864. The Corso, or public promenade, is a miniature Hyde Park. Bucharest is the *entrepot* for the trade between Austria and the Balkan Peninsula, the chief articles of commerce being textile fabrics, grain, hides, metal, coal, timber, and cattle. Its manufactures are unimport-

ant, and the workmen are chiefly Hungarians and Germans. Bucharest has been several times besieged; and between 1793 and 1812 suffered twice from earthquakes, twice from inundations, once from fire, and twice from pestilence. Here in 1812 a treaty was concluded between Turkey and Russia, by which the former ceded Bessarabia and part of Moldavia; and in 1886 the treaty between Servia and Bulgaria was made here. Pop. (1907) 294,572.

Buchez, Philippe Benjamin Joseph (bü-shā'), a French annalist and physician, born in Mortagne, Ardennes, March 31, 1796. With Roux-Lavergne he projected the "Parliamentary History of the French Revolution" (40 vols., 1833-1838), a work of inestimable utility. He died in Rhodéz, Aveyron, Aug. 12, 1865.

Büchner, Ludwig (büch'ner), a German physician and materialist philosopher, born at Darmstadt, March 29, 1824. He studied at Giessen, Strasburg, Würzburg and Vienna; became a lecturer at Tübingen University; and, in 1855, published "Kraft und Stoff" (14th ed., 1876; English translation, "Force and Matter," 1870), in which he attempted scientifically to establish a materialistic view of the universe. A violent controversy was raised; and Büchner saw himself compelled to resign his university post, and begin medical practice in Darmstadt. He contributed numerous contributions to periodicals on physiological and pathological subjects, as also in support of his atomistic philosophy; published in the latter department "Natur und Geist" (1857; 3d ed., 1876); "Aus Natur und Wissenschaft" (1862); as well as works on Darwinism, the idea of God, the intelligence of animals, etc.; and translated Lyell's "Antiquity of Man." He died in 1899.

Büchner, Georg, a German poet, brother of LUDWIG, born near Darmstadt, Oct. 17, 1813; studied natural science and medicine in the Universities of Strasburg and Giessen. In 1834 he entered the political arena with a manifesto entitled "The Rural Messenger," and bearing the motto: "Peace to the cabin; war to the palace." To escape arrest he fled to Strasburg, where he studied the philosophies of Descartes and Spinoza. He was preparing to open a course of lectures in Zürich when he died, Feb. 19, 1837. He wrote a drama in 1834, on "The Death of Danton," the work of a genuine but undisciplined poet. His "Complete Works," with biography, was published in 1879.

Büchner, Luise, a German poet and novelist, sister of GEORG, born June 12, 1821. Her first publication, "Women and Their Calling" (1855), was followed by many others on the "woman's rights question;" it commanded much attention, and reached a fifth edition (1883). She wrote a volume

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of tales, "From Life" (1861); "Poet-Voices of Home and Foreign Lands;" several original poems; "Woman's Heart;" some "Christmas Stories," etc. She died in Darmstadt, Nov. 28, 1877.

Büchner, Max, a German traveler and scientist, born in Hamburg, April 25, 1846. After serving as surgeon in the German army and navy, he traveled around the earth (1875), and spent some time in New Zealand. In 1878 he bore presents from the Emperor to Muatiamvo, in the Kingdom of Lunda, in Equatorial Africa. After several vain attempts to break through toward the N., he returned to the coast. In 1884 he accompanied Nachtigal in founding the colonies of Togo and Kamerun, in West Africa, where he acted temporarily as representative of the German Empire, fought the natives, and concluded treaties with chiefs in the interior. In 1888, as conservator of the Ethnographical Museum of Munich, he traveled in Australia, Guinea, and East Asia. He wrote "A Trip Through the Pacific Ocean" (1878), and "Kamerun" (1888).

Buchtel College, a co-educational institution in Akron, O.; founded in 1871, under the auspices of the Universalist Church; has grounds and buildings valued at over \$170,000; endowment, about \$140,000; volumes in the library, over 9,000; ordinary income, \$44,000; faculty, about 25; students, 300; scholarships, 50; number of graduates since opening, about 400.

Buchu, a South African name for several species of barosma, especially *B. crenata*, *crenulata*, and *serratifolia*. They belong to the order *rutaceæ*, and the section *endiosmeæ*. They have a powerful and usually offensive odor, and have been recommended as antispasmodics and diuretics.

Buck, a name sometimes distinctively appropriated to the adult male of the fallow deer, the female of which is a doe. The term is often also applied to the male of other species of deer, as of the roebuck, although never to that of the red deer, which, when mature, is a stag or a hart.

Buck, Dudley, an American organist, composer, and author, born in Hartford, Conn., March 10, 1839; was organist of the Church of the Holy Trinity, Brooklyn, N. Y., for 25 years; besides a number of cantatas, he wrote several books: "A Dictionary of Musical Terms," a work on the "Influence of the Organ in History" (1882), etc. The "Centennial Cantata," for the opening of the Exposition of 1876, by appointment of the United States Centennial Commission, the "Forty-Sixth Psalm," the "Legend of Don Munio," the "Golden Legend," of Longfellow, and the "Marmion" symphonic overture, are among his larger works with orchestra. He also employed his

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pen in the composition of chamber music, songs, and male voice music. His latest works comprised the "Voyage of Columbus" and the "Light of Asia." He died in 1909.

Buckbean, the English name of *menyanthes*, a genus of plants belonging to the order *gentianaceæ* (gentian worts). Especially the name of *menyanthes trifoliata*, called also marsh trefoil. It has densely creeping and matted roots, ternate leaves, and a compound raceme or thyrses of white flowers, tipped externally with red, and beautifully fringed within with white thread-like processes. An infusion of its leaves is bitter, and is sometimes given in dropsy and rheumatism. In Sweden two ounces of the leaves are substituted for a pound of hops. In Lapland the roots are occasionally powdered and eaten.

Buckeye, the American horse chestnut tree, the *æsculus ohioticus* of botanists. Its fruit, root, and leaves are all said to be poisonous to men and animals. The term is also applied to the State of Ohio.

Buckhound, a kind of hound similar to, but smaller than, a staghound, once commonly used in Great Britain for hunting bucks. The Master of the Buck Hounds is still the title of an officer of the royal household in England.

Buckingham, the county town of Buckinghamshire, England, stands, almost encircled by the Ouse, 61 miles N. W. of London. An ancient place fortified by Edward the Elder (918), it yet has no antiquities, owing to a great fire in 1725. Since 1848, Aylesbury has superseded it as the assize town; and it lost its last member of Parliament in 1885. The church (1781) was restored by Sir Gilbert Scott, who was born close by; and there are a town hall of much the same date, and a grammar school, founded in 1548. The bobbin lace manufacture has declined. Pop. (1901) 3,152. Stowe House, the princely seat of the Duke of Buckingham, 3 miles to the N. W., was rebuilt toward the close of the 17th century. Its art treasures were sold in 1848. William Giffard became Earl of Buckingham in the reign of William I. The same title was conferred on the youngest son of Edward III. In 1784, George Grenville, Earl Temple, became Marquis of the town of Buckingham, and, in 1822, his son became Duke. The title of Duke of Buckinghamshire was conferred in 1703 on John Sheffield, Marquis of Normanby. His town house was bought by George III. in 1761, and has been repeatedly altered and extended; and in 1837 Buckingham Palace became Queen Victoria's ordinary town residence.

Buckingham, George Villiers, Duke of, favorite of James I. and Charles I., of England, born in 1592, his father being George

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Villiers, Knight. At 18 he was sent to France, where he resided three years, and on his return made so great an impression on James I. that in two years he was made a knight, a gentleman of the bed chamber, baron, viscount, Marquis of Buckingham, lord high admiral, etc., and at last dispenser of all the honors and offices of the three kingdoms. In 1623, when the Earl of Bristol was negotiating a marriage for Prince Charles with the Infanta of Spain, Buckingham went with the Prince incognito to Madrid to carry on the suit in person in the hope of securing the Palatinate as dowry. The result, however, was the breaking off of the marriage, and the declaration of war with Spain. During his absence Buckingham was created duke. After the



GEORGE VILLIERS, DUKE OF BUCKINGHAM.

death of James in 1625 he was sent to France as proxy for Charles I. to marry the Princess Henrietta Maria. In 1626, after the failure of the Cadiz expedition, he was impeached, but saved by the favor of the King. Despite the difficulty in obtaining supplies Buckingham took upon himself the conduct of a war with France, but his expedition in aid of the Rochelle proved an entire failure. In the meantime the spirit of revolt was becoming more formidable; the Petition of Right was carried despite the Duke's exertions; and he was again protected from impeachment only by the King's prorogation of Parliament. He then went to Portsmouth to lead another expedition to Rochelle, but was stabbed on Aug. 24, 1628, by John Felton, an ex-lieutenant who had been disappointed of promotion.

Buckingham, George Villiers, Duke of, son of the preceding, born at Westminster in 1627; studied at Trinity College, Cambridge; served in the Royal army under Rupert and then went abroad. In 1648 he returned to England, was with Charles II. in Scotland and at the battle of Worcester, and afterward served as a volunteer in the

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French army in Flanders. He then returned to England, and in 1657 married the daughter of Lord Fairfax. At the Restoration he became master of the horse and one of the King's confidential *cabal* (1667-1673). In 1666 he engaged in a conspiracy, and in 1676 was committed to the Tower for a contempt by order of the House of Lords; but on each occasion he recovered the King's favor. On the death of Charles he retired to his seat in Yorkshire, where he died in 1688. Among his literary compositions the comedy of the "Rehearsal" (1671) takes the first place.

Buckingham, James Silk, an English traveler, writer, and lecturer, born near Falmouth, Aug. 25, 1786. After trying several professions, and wandering over a great part of the world, he went to London, where he established the "Athenæum," well known as a literary journal. He also published his journal of travel in "Palestine" (1822), in "Arabia" (1825), in "Mesopotamia" (1827), and in "Assyria and Media" (1830). In 1832 he was chosen member of Parliament for Sheffield, and retained his seat till 1837. Subsequently he made a tour of three years in the United States. In 1843 he became secretary to the British and Foreign Institute. He also published volumes on his Continental tours and an autobiography. He died in London, June 30, 1855.

Buckingham, William Alfred, an American statesman, born in Lebanon, Conn., May 28, 1804; was for nine years Governor of Connecticut (1858-1866); called the "War Governor" for his zeal in furnishing troops in the Civil War; and was United States Senator from 1869 till his death. He was active in the temperance cause, and a patron of Yale College. He died in Norwich, Conn., Feb. 3, 1875.

Buckingham Palace, a royal palace in London, facing St. James' Park, and forming one of the residences of Queen Victoria.

Buckland, Cyrus, an American inventor, born in Springfield, Mass., Aug. 10, 1799; after assisting in building the machinery for the first cotton mills erected in Chicopee Falls, became, in 1828, the pattern maker in the United States armory, in Springfield. He remained here for 28 years, becoming master-mechanic. He designed machinery and tools for the manufacture of firearms; remodeled old weapons and designed new ones; perfected a lathe for turning out gun stocks; invented machines to bore and turn gun barrels and for rifling muskets, and many other novelties in the manufacture of firearms and ordnance. Much of his machinery was adopted by foreign governments. Having received nothing for his labor at the armory, excepting his salary, Congress voted him

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\$10,000 when ill-health compelled him to resign. He died in Springfield, Feb. 26, 1891.

Buckland, Francis Trevelyan, an English naturalist; born in Oxford, Dec. 17, 1826. His preferences were for practical science, and, after retiring from his place as surgeon to the 2d Life Guards, he founded the journal, "Land and Water," of which he was editor. He was an authority on fish culture, and as such was consulted by foreign governments. He was a resolute opponent of Darwinism. Besides his works on fish culture, he wrote "Log Book of a Fisherman and Zoölogist" (1876); "Notes and Jottings on Animal Life" (1882); "Curiosities of Natural History." He died Dec. 19, 1880.

Buckland, William, an English geologist, born in Tiverton, Devonshire, March 12, 1784. From Winchester he passed in 1801 to Corpus Christi College, Oxford, of which he became a Fellow (1808); and in 1813 he was appointed Oxford Reader in Mineralogy. In 1822 he received the Copley medal for his account of the Kirkdale Cave, which in 1823 he supplemented with "Reliquiæ Diluvianæ; or, Observations on Organic Remains, Attesting the Action of a Universal Deluge," a theory he afterward saw cause to modify; and in 1836 he published his Bridgewater Treatise, "Geology and Mineralogy Considered with Reference to Natural Theology." In 1845 he was made Dean of Westminster; but, under his great and continuous labors to benefit others, his mental faculties gave way seven years before his death, which took place Aug. 14, 1856.

Bucklandia, a magnificent and beautiful evergreen tree of the order *hamamelidæ*, a native of the Himalayas, and growing in the island of Sumatra. The timber is not valuable.

Bucklandite, the name of two minerals: (1) Bucklandite of Hermann, a variety of epidote. (2) Bucklandite of Levy, a variety of allanite (Dana), called orthite in the "British Museum Catalogue." The former authority terms it anhydrous allanite. It is found at Arendal, in Norway.

Buckle, Henry Thomas, an English historian, born in Kent, Nov. 24, 1822; the son of a wealthy London merchant. At an early age he entered his father's counting house, but at 18, on inheriting his father's fortune, he devoted himself entirely to study. The only thing he allowed to distract him from his more serious pursuits was chess, in which he held a foremost place among contemporary players. His chief work, a philosophic "History of Civilization," of which only two volumes (1858 and 1861) were completed, was characterized by much novel and suggestive thought, and by the bold co-ordination of a vast store

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of materials drawn from the most varied sources. Three volumes of his "Miscellaneous" and "Posthumous" works were edited by Helen Taylor in 1872. He died, while traveling, at Damascus, March 29, 1862.

Buckles, metal instruments, consisting of a rim and tongue, used for fastening straps or bands in dress, harness, etc. Both brass and iron are used for them, the chief kinds being called tongue, roller, brace, and gear buckles. The use of buckles, instead of shoe strings, was introduced into England during the reign of Charles II. They soon became very fashionable, attained an enormous size (the largest being called Artois buckles, after the Comte d'Artois, brother of the King of France), and were usually made of silver, set with diamonds and other precious stones. In the latter half of the 18th century the manufacture of buckles was carried on most extensively in Birmingham, England, there being at one time not less than 4,000 people directly employed in that town and its vicinity, who turned out 2,500,000 pairs of buckles annually, the prices ranging from one shilling to five guineas, and even 10 guineas a pair. When the trade was at its height, however, fashion changed, and in 1791 buckle makers petitioned the Prince of Wales for sympathy, on the ground that, owing to the introduction of shoe strings and slippers, 20,000 persons were in terrible distress. The Prince promised to assist them as far as he could by wearing buckles himself, and enjoining his household to do the same; but fashion was too strong even for him, and, before the close of the century, a great staple trade of Birmingham had become extinct, though shoe buckles are still by no means unknown.

Buckley, James Monroe, an American religious editor, born in Rahway, N. J., Dec. 16, 1836. He studied theology at Exeter and joined the Methodist Episcopal Church. Since 1881 he has been editor of the New York "Christian Advocate." He has written "Travels in Three Continents," "Oats, or Wild Oats," and other books.

Bucknell University, a co-educational institution in Lewisburg, Pa.; organized in 1846, under the auspices of the Baptist Church; has preparatory, collegiate, and musical departments; buildings valued at over \$500,000; scientific apparatus, \$40,000; volumes in the library, over 26,000; ordinary income, about \$170,000; professors and instructors, 50; students, average, 775; graduates since opening, over 1,300.

Buckner, Simon Bolivar, an American soldier and politician, born in Kentucky in 1823. He was graduated at West Point in 1840, and served in the Mexican War. He rose to distinction in the Confederate army.

Buckram

during the Civil War, attaining the rank of Lieutenant-General. He was one of the pall bearers at Gen. Grant's funeral in



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1885, by the personal selection of the ex-President, who had been warmly attached to him for many years. In 1896 he was nominated for Vice-President by the Gold Democrats, having previously served

a term as Governor of Kentucky.

Buckram, a coarse textile fabric stiffened with glue and used in garments to give them or keep them in the form intended.

Buckshot, a kind of leaden shot larger than swan-shot. About 160 or 170 of them weigh a pound. They are especially designed to be used in hunting large game.

Buckskin, a kind of soft leather, generally yellow or grayish in color, prepared originally by treating deerskins in a particular way, but now in general made from sheepskins. This may be done by oil, or by a second method, in which the skins are grained, brained and smoked.

Buckstone, John Baldwin, an English dramatist, born in London, Sept. 14, 1802. From 1823 to 1853 he was a well known London actor; he became manager of the Haymarket Theater, and produced nearly 200 plays, which were all successful, largely owing to his knowledge of stage effect and humor. Among the best are "The Wreck Ashore," "Victorine," "Green Bushes," "The Flowers of the Forest," "Married Life," "Leap Year," "Second Thoughts," and "Nicholas Flam." He died near London, Oct. 31, 1879.

Buckthorn, the English name of *rhamnus*, a genus of plants, the typical one of the order *rhamnaceæ* (rhamnads). The berries of the common species are black, nauseous, and, as the specific name *rhamnus catharticus* imports, highly cathartic; they afford a yellow dye when unripe, as the bark of the shrub does a green one. They are sold as French berries. The alder buckthorn, again, has dark purple purgative berries, which, in an unripe state, dye wool green and yellow, and when ripe bluish gray, blue, and green. The bark dyes yellow, and, with iron, black. Of the foreign species, the berries of the rock buckthorn,

Buckwheat

or *R. saxatilis*, are used to dye the Maroquin, or Morocco leather, yellow, while the leaves of the tea buckthorn, *R. thezans*, are used by poor people in China as a substitute for tea. The species best known to the pharmacopœia of this country is the *R. purshiana*, otherwise called *cascara sagrada*.

Buckwheat, or Brank (*Polygonum fagopyrum*), a plant of the order *Polygoneæ*, with branched herbaceous stem, somewhat arrow-shaped leaves, and purplish-white flowers, growing to the height of about 30 inches, and bearing a small triangular grain of a brownish-black without and white within. The stalk is round and hollow, generally green, but sometimes tinged with red. It is jointed, with lateral branches growing out at the joints. Buckwheat was first brought to Europe from Asia by the Crusaders, and hence in France is often called Saracen corn. It is cultivated in China and other Eastern countries as a bread corn. The flowers appear about July, and the seeds ripen in October; but so tender are the plants that a single night's sharp frost will destroy a whole crop. As a grain, buckwheat has been principally cultivated for oxen, swine, and poultry; and although some farmers state that a single bushel of it is equal in quality to two bushels of oats, others assert that it is a very unprofitable food. Mixed with bran, chaff, or grain, it is sometimes given to horses. The flour of buckwheat is occasionally used for bread, but more frequently for the thin cakes called in England crumpets. In Germany it serves as an ingredient in pottage, puddings, and other food. In the United States it is very extensively used throughout the winter in cakes, which are cooked upon a gridiron. Beer may be brewed from it, and by distillation it yields an excellent spirit. It is used extensively in Danzig in the preparation of cordial waters. The best mode of harvesting this grain is said to be by pulling it out of the ground like flax, stripping off the seeds with the hand, and collecting these into aprons, or cloths tied round the waist. If left standing it affords both food and shelter to the birds during winter. With some farmers it is the practice to sow buckwheat for the purpose only of plowing it into the ground as a manure for the land. The best time for plowing it in is when it is in full blossom, allowing the land to rest till it decomposes. While green it serves as food for sheep and oxen, and mixed with other provender it may also be given with advantage to horses. If sown in April two green crops may be procured during the season. The blossoms may be used for dyeing a brown color. It is cultivated as food for bees to whose honey it imparts a flavor by no means unpleasant. The principal ad-

vantage of buckwheat is that it is capable of being cultivated upon land which will produce scarcely anything else, and that its culture, compared with that of other grain, is attended with little expense.

Buckwheat Huller, a form of mill, or an ordinary mill with a particular dress and set of the stones, adapted to remove the hull from the grains of buckwheat.

Bud. Buds are modified shoots in which, owing to the non-development of the axis, the lateral organs become crowded together. They contain the rudiments of future organs, as stems, branches, leaves, and organs of fructification. The usual form of a bud is an elongated ovoid, and according to their position they are described as terminal, that is, formed at the end of a branch, or axillary, that is, produced in the axis of a leaf. Besides the rudimentary organs found in the interior, buds are in cold or temperate climates often covered externally with a viscous and resinous coating, and furnished internally with a downy tissue, destined to defend the inclosed organs from the rigor of winter. No envelopes of this kind are observed on the buds of the greater number of tropical plants. Buds on exogenous plants are in their commencement cellular prolongations from the medullary rays, which force their way through the bark. The cellular portion is surrounded by spiral vessels, and is covered with rudimentary leaves. When the vascular part of the bud develops the central cellular portion remains as pith, inclosed in a medullary sheath which isolates it from the parent stem. Thus it remains till the second year. The bud here described, which contains the rudiments of future leaves, branches, etc., is called a leaf-bud. Sometimes more than one bud is found in or near the axil of a single leaf, in which case all but the proper axillary bud are called accessory buds. The buds begin to show themselves as soon as the leaves have taken their full development. They are then very small, as the developed leaves absorb the nutritive juices of the plant, leaving them little nourishment. On the fall of the leaf they enlarge, and take the form they are to retain during winter, in which season they are stationary. On the return of spring they begin to swell, and burst the scales which form their external covering, and the young shoots which these have served to protect now make their appearance. The external scales of the bud are usually deciduous, that is, fall off when the young shoot appears; sometimes, however, they are persistent. These scales sometimes represent leaf-blades, as in lilac; sometimes stipules, as in the beech; or petioles, as in the horse-chestnut. Flower-buds are produced in the axil of leaves called floral leaves or bracts. They are not capable of extension by the

development of the central cellular portion, and instead of the conservative organs of plants, leaves and branches, they produce the reproductive organs, flowers and fruit. Perennial herbaceous plants spring from a subterranean bud called the *turio*, which is developed annually, and from which the new stem is produced. The bulb is a species of bud of this kind. The arrangement of the leaves in a leaf-bud is called its veneration; of the petals and sepals in a flower bud, its æstivation.

Budæus (bu-de'us) (the Latinized form of GUILLAUME BUDÉ), a French scholar; born in Paris in 1467. His works on philology, philosophy, and jurisprudence display extensive learning, the two best known being the "De Asse et Partibus ejus" (1514), which contains a very thorough investigation into ancient coins, and the "Commentarii Linguae Græcæ" (1519), the basis of all subsequent works in this department. His abilities were manifested not only in literature, but in public business. Louis XII. twice sent him to Rome, and Francis I. also employed him in several negotiations. At Budæus' suggestion, Francis founded the Collège de France, and was also persuaded to refrain from prohibiting printing, which the bigoted Sorbonne had advised in 1553. He was royal librarian at the time of his death, Aug. 23, 1540.

Budapest, the official name of the united towns of Buda or Ofen and Pest or Pesth, the one on the right, the other on the left of the Danube, forming the capital of Hungary, the seat of the Hungarian Parliament and supreme courts. Buda, which is the smaller of the two, and lies on the W. bank of the river (here flowing S.), consists of the fortified Upper Town on a hill, the Lower Town or Water Town at the foot of the hill, and several other quarters, including Old Buda farther up the river. Among the chief buildings are the royal castle and several palaces, the arsenal, town hall, government offices, etc., the Church of St. Matthew, dating from the 13th century, during the Turkish occupation a mosque for 150 years, and recently rebuilt; and the finest Jewish synagogue in the empire. Pest, or the portion of Budapest on the left or E. bank of the river, consists of the inner town of Old Pest on the Danube, and a semicircle of districts — Leopoldstadt, Theresienstadt, Elizabethstadt, etc.—which have grown up around it. The river is at this point somewhat wider than the Thames at London, and the broad quays of Pest extend along it for from 2 to 3 miles. It is spanned by fine suspension and other bridges. Pest retains, on the whole, fewer signs of antiquity than many less venerable towns. Its fine frontage on the Danube is modern, and includes the new Houses of Parliament, the academy of science, exchange,

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custom house, and other important buildings. The oldest church dates from 1500; the largest building is a huge pile used as barracks and arsenal. Other buildings include the old and the new town house, national museum, national theater, university buildings, various palaces, the opera house, etc.

Budapest contains the most important of the three universities of Hungary, attended by about 4,500 students and having over 220 professors, lecturers, etc. Another important educational institution is the technical high schools, with 60 teachers and 1,100 to 1,200 students, and a library of 60,000 volumes. In commerce and industry Budapest ranks next to Vienna in the empire. Its chief manufactures are machinery, gold, silver, copper, and iron wares, chemical, textile goods, leather, tobacco, etc. A large trade is done in grain, wine, wool, cattle, etc. At Budapest are the largest electrical works in all Europe. Engineers employed there have brought to perfection the science of applying electricity to motors. They constructed there the first successful underground trolley lines. Their ideas have been adopted in the construction of electric roads all over the world. Budapest is strongly Magyar in character and sentiment, and as a factor in the national life may almost be regarded as equivalent to the rest of Hungary. Old Buda was founded by the Romans about A. D. 150. Pest is of much later origin. From 1541 to 1686 Buda was the seat of a Turkish pasha, the Turks being then driven out. The towns were united as one municipality in 1873. It was not until 1799 that the population of Pest began to outdistance that of Buda; but from that date its growth was very rapid and out of all proportion to the increase of Buda. In 1799 the joint population of the two towns was little more than 50,000; in 1890 it was 506,384; in 1900, 732,322.

Budaun (bö-dä'ön), a town of India, Northwest Provinces. There is a handsome mosque, American mission, etc. Pop. 33,680. The district of Budaun has an area of 2,000 square miles. Pop. 906,451.

Buddha, or The Buddha (that is "the enlightened"), the sacred name of the founder of Buddhism, who would appear (according to the judgment of those scholars who have given most attention to this point) to have lived in the 5th century B. C. His personal name was Siddhartha, and his family name Gautama; and he is often called also Sakya-muni (from *Sakya*, the name of his tribe, and *muni*, a Sanskrit word meaning solitary). His father was King of Kapilavastu, a few days' journey N. of Benares. Siddhartha was early filled with a deep compassion for the degeneracy and misery of the human race, and a deep feeling of the vanity of earthly

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things. His melancholy thoughts would not be stilled in the enjoyments of his father's court: he must find peace for his own soul, and bestow it on others. To this end he left his father's court and after having attended the schools of the Brahmans without profit and lived for years a life of solitude and asceticism, he at last, by dint of profound meditation, acquired clear notions on the life of man and his relations to the universe, and found out the true path which was to lead his fellow-creatures to the goal of life. It was then that he became the Buddha, and began to teach his new faith in opposition to the prevailing Brahmanism. The first place at which he taught, or, in the mystic phrase of Buddhism, "turned the wheel of the law," was Benares. He soon made many converts, especially among the lowly and oppressed, for his teaching was addressed to all alike, without distinction of person or caste. Many of the Brahmans also joined him, wearied with the severe and oppressive observances of their own religion, which contrasted so unfavorably with the simplicity of the new faith. Among his earliest converts were the monarchs of Magadha and Kosala, in whose kingdoms he chiefly passed the latter portion of his life, respected, honored, and protected.

The theory of the "four sublime verities" lies at the foundation of the doctrines of the Buddhists. The first verity is that pain is inseparable from existence, inasmuch as existence brings old age, sickness, and death; the second, that pain is the offspring of desire, and of faults which desire has made us commit in previous states of existence (for Sakya-muni adopted fully the prevailing doctrine of Brahmanism with regard to the transmigration of souls) or in the present; the third verity tells us that existence, and therefore pain, can only cease through Nirvana; the fourth, that in order to attain Nirvana our desires and passions must be suppressed, every obstacle to the extinction of desire must be set aside, the most extreme self-renunciation must be practised, and we must, in short, forget our own personality so far as possible. The last verity is the most important in its practical application, as pointing out the way to salvation and providing a rule of conduct. The way to salvation consists of eight parts or conditions that a man must fulfil. The first is in Buddhist language right view; the second is right judgment; the third is right language; the fourth is right purpose; the fifth is right profession; the sixth is right application; the seventh is right memory; the eighth is right meditation. The five fundamental precepts of the Buddhist moral code are not to kill, not to steal, not to commit adultery, not to lie, and not to give way to drunkenness. To these there

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are added five others of less importance, and binding more particularly on the religious class, such as to abstain from repasts taken out of season, from theatrical representations, etc. There are six fundamental virtues to be practised by all men alike, viz., charity, purity, patience, courage, contemplation, and knowledge. These are the virtues that are said to "conduct a man to the other shore." The devotee who strictly practises them has not yet attained Nirvana, but is on the road to it. The Buddhist virtue of charity is universal in its application, extending to all creatures, and demanding sometimes the greatest self-denial and sacrifice. There is a legend that the Buddha in one of his stages of existence (for he had passed through innumerable transmigrations before becoming "the enlightened") gave himself up to be devoured by a famishing lioness which was unable to suckle her young ones.

There are other virtues, less important, indeed, than the six cardinal ones, but still binding on believers. Thus not only is lying forbidden, but evil speaking, coarseness of language, and even vain and frivolous talk, must be avoided. Buddhist metaphysics are comprised in three theories—the theory of transmigration (borrowed from Brahmanism), the theory of the mutual connection of causes, and the theory of Nirvana. The first requires no explanation. According to the second, life is the result of 12 conditions, which are by turns causes and effects. Thus there would be no death were it not for birth; it is therefore the effect of which birth is the cause. Again, there would be no birth were there not a continuation of existence. Existence has for its cause our attachment to things, which again has its origin in desire; and so on through sensation, contact, the organs of sensation and the heart, name and form, ideas, etc., up to ignorance. This ignorance, however, is not ordinary ignorance, but the fundamental error which causes us to attribute permanence and reality to things. This, then, is the primary origin of existence and all its attendant evils. Nirvana is eternal salvation from the evils of existence, and the end which every Buddhist is supposed to seek. It is not so easy to determine exactly what this Nirvana means, however; but the best authorities (Burnouf, Turnour, Spence Hardy, Barthélemy Saint-Hilaire, etc.) affirm that it means the complete annihilation of the thinking principle. Sakya-muni did not leave his doctrines in writing; he declared them orally, and they were carefully treasured up by his disciples, and written down after his death. The determination of the canon of the Buddhist scriptures as we now possess them was the work of three successive councils, and was finished two centuries at least before Christ. The

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religion soon spread through Hindustan, though it was afterward (probably through persecution) entirely banished from it. Many rock temples, inscriptions, etc., testify to its former prevalence in this region. From Hindustan it spread in all directions—to Ceylon, Java, Cochin-China, Laos, Burma, Pegu, Nepal, Tibet, Mongolia, Tartary, China (where Buddha is called Fo), and Japan, in which countries it still prevails. At present it is professed by perhaps a third of the human race.

Buddhism, the system of faith introduced or reformed by Buddha. In its origin Buddhism was a reaction against the caste pretensions of the Brahmins and other Aryan invaders of India, and was, therefore, eminently fitted to become, as it for a long time was, the religion of the Turanians.

The language in which Gautama or Buddha taught was the Māgadhī or Pali, the language of Magadha, now called Bahar or Behar. It was a Prākrit or Aryan vernacular of a province, but has now been raised to the dignity of the Buddhist sacred tongue throughout the world. Gautama's followers believe that his sayings were noted down in the Tripitaka, or "Three Treasuries of Discipline, Doctrine and Metaphysics," which constitute the Buddhist scriptures. What their real age is has been a matter of dispute; the discovery by General Cunningham, in 1874, of allusions to them in the "Bharhut Sculptures," which are of date 3d century B. C., is in favor of their genuineness and antiquity. This work is in Pali; the Sanskrit Buddhist books discovered by Brian Hodgson in Nepaul are much more modern, and present a corrupt form of Buddhism.

The first general council of the Buddhist Church was held at Rajagriha, the capital of the Magadha kingdom, in B. C. 543; the second at Vesal (Allahabad [?], or a place near Patna) about B. C. 443 or 377 (?), and a third at Pataliputra (Greek, Palibothra = modern Patna), on the Ganges, in B. C. 307 or 250. This last one was called by Asoka, an emperor ruling over a great part of India, who had been converted to Buddhism, and is sometimes called the Constantine of that faith, having established it as the State religion of his wide realm. He sent missionaries into Western, Central and Southern India, and also to Ceylon and to Pegu. Buddhism was dominant in India for about 1,000 years after its establishment by Asoka. Then, having become corrupt and its vitality having decayed, reviving Brahminism prevailed over it, and all but extinguished it on the Indian continent, though a modification of it, Jainism, still exists in Marwad and many other parts. It has all along held its own, however, in Ceylon. On losing Continental India, its missionaries transferred their efforts to China, which they converted, and

Buddhistic Architecture

which still remains Buddhist. The religion of Gautama flourishes also in Tibet, Burma and Japan, and is the great Turanian faith of the modern as of the ancient world.

The Rev. G. Smith points out resemblances between Buddhism and Roman Catholicism (these, it may be added, were first discovered by the Jesuit missionaries, who were greatly perplexed by them): "There is the monastery, celibacy, the dress and caps of the priests, the incense, the bells, the rosary of beads, the lighted candles at the altar, the same intonations in the services, the same ideas of purgatory, the praying in an unknown tongue, the offerings to departed spirits in the temple." The closest similarity is in Lamaism, an amplification of Buddhism in Tibet. But most of the resemblances are ceremonial; there is no close similarity in doctrine between the two faiths.

Buddhistic Architecture, a style of architecture characteristic of the Indian or other Buddhists. There is no known specimen of architecture in India the date of which carries us beyond the 3d century B. C. When the curtain rises the architecture visible is Buddhist. In 250 B. C. the great Emperor Asoka introduced the first great era of Indian architecture, that of the Buddhists proper. Up to this time all erections had been wood; with him the use of stone commenced. He engraved edicts, enjoining tenderness and humanity to animals, on *lats* (pillars), in Cuttack, Peshawur, and Surastra, in the Dhun or Dhon, and other parts of the Himalayas and Tibet. He built innumerable *topes* (mounds). No built temples or monasteries of Buddhist origin have come down to our times, if indeed, any ever existed; but multitudes of rock-cut temples and monasteries, assembled in groups, have been found in Behar, Cuttack, the Bombay Presidency, and elsewhere. Those of Behar, which are cut in granite, are the oldest, and it is from *bihar* = a monastery, that Behar itself is called. Those of Cuttack followed. Those of the Bombay Presidency, embracing nine-tenths of the whole, were the last; they are cut in amygdaloidal trap. The Buddhist architecture, though essentially independent, yet showed a tinge of Greek influence. It originated the Jaina system of architecture.

Buddhism, Esoteric. See THEOSOPHY.

Budding, the art of multiplying plants by causing the leaf bud of one species or variety to grow upon the branch of another. The operation consists in shaving off a leaf bud, with a portion of the wood beneath it, which portion is afterward removed by a sudden jerk of the operator's finger and thumb, aided by the budding knife. An incision in the bark of the stock is then made in the form of a T; the two side lips are

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pushed aside, the bud is thrust between the bark and the wood, the upper end of its bark is cut to a level with the cross arm of the T, and the whole is bound up with worsted or other soft fastening, the point of the bud being left exposed. In performing the operation, a knife with a thin, flat handle and a blade with a peculiar edge is required. The bud must be fully formed; the bark of the stock must separate readily from the wood below it; and young branches should always be chosen, as having beneath the bark the largest quantity of cambium or viscid matter out of which tissue is formed. The maturer shoots of the year in which the operation is performed are the best. The autumn is the best time for budding, though it may also be practiced in the spring.

Buddlea, or Buddleia (named after ADAM BUDDLE, a discoverer of localities for many rare plants), a genus of plants belonging to the order *scrophulariaceæ* (figworts). The species are evergreen or deciduous shrubs from this country, Africa or Asia. *B. neemda* is one of the most beautiful plants in India. *B. globosa*, from Chile, is also highly ornamental. Fully 60 species of buddlea are known.

Bude Light (from Bude, in Cornwall, England, where Mr. Gurney, the inventor of the light, lived), an oil or gas burner supplied with a jet of oxygen gas; the flame is very brilliant.

Budgell, Eustace, an English writer, author of about three dozen papers, signed "X," in the "Spectator," born in St. Thomas, Aug. 19, 1686. He was first cousin to Addison, and went with him to Dublin in 1709 as secretary. On the accession of George I., Budgell obtained several valuable Irish appointments, from which he was removed for an attack on the lord-lieutenant, the Duke of Bolton. He lost three-fourths of his fortune in the South Sea Bubble, and spent the rest in a fruitless attempt to get into Parliament. Disgraced by an attempted fraud in connection with Dr. Matthew Tindal's will, he committed suicide by drowning in the Thames, May 4, 1737.

Budget, the annual statement relative to the finances of a country, made by the proper financial functionary, in which is presented a balance sheet of the actual income and expenditure of the past year, and an estimate of the income and expenditure for the coming year, together with a statement of the mode of taxation proposed to meet such expenditure.

Budrun, a seaport town of Asiatic Turkey, on the N. shore of the Gulf of Kos, about 96 miles S. of Smyrna. It is the site of the ancient Halicarnassus, the birthplace of Herodotus and Dionysius. Pop. about 6,000.

Budweis

Budweis (böd-vīs', Czech BUDEJOVICE), a town of Bohemia, on the navigable Moldau, 133 miles N. W. of Vienna by rail. It has a cathedral with a detached belfry dating from about 1550, manufactures of stoneware, machines, lead pencils, saltpeter, etc., besides a brisk trade in grain, wood, coals and salt. Pop. (1900) 39,328. In the neighborhood is Schloss Frauenberg (1840-1847), the seat of Prince Schwarzenberg.

Buel, Clarence Clough, an American editor and author, born at Laona, Chautauqua county, N. Y., July 29, 1850. He was connected with the New York "Tribune" from 1875 to 1881, when he joined the staff of the "Century Magazine;" and, in 1883, in conjunction with Robert Underwood Johnson, he began the editing of the celebrated "Century War Articles," which were afterward expanded into the notable "Battles and Leaders of the Civil War" (1887).

Buell, Don Carlos, an American military officer, born near Lowell, O., March 23, 1818. He was graduated at West Point in 1841, and served in the Mexican War. When the Civil War broke out he was adjutant-general of the regular army, and was made a Brigadier-General of Volunteers and attached to the Army of the Potomac. In November, 1861, he succeeded Gen. W. T. Sherman in command of the Department of the Ohio. He resigned from the volunteer service on May 23, 1864, and on June 1, following, also resigned his commission in the regular army. He was President of the Green River (Ky.) Iron Works from 1865 to 1870, when he engaged in coal mining. From 1885 to 1890 he served as United States Pension Agent at Louisville. He died near Rockport, Ky., Nov. 19, 1898.

Buenaventura (bwān'a-vān-tör'a), a town on the Pacific coast of the Republic of Colombia. It has a hot, sickly climate, but is the port for the healthful and rich Cauca valley. Pop. 5,000.

Buena Vista, a village of Mexico, 7 miles S. of Saltillo, where, on Feb. 22-23, 1847, some 5,000 United States troops, under Taylor, defeated 20,000 Mexicans under Santa Ana.

Buen-Ayre, French BONAIRE (bwān-ī-rā), a West Indian island, 60 miles from the coast of Venezuela, and 30 E. of Curacao, like which it belongs to the Dutch. It produces timber, cattle, cochineal, and salt. Area, 127 square miles; pop. 4,043.

Buendia, Juan (bwān'dyü), a Peruvian general, born in Lima in 1814. He was put in command of the Army of the South in the Chilian War in 1879, and attacked 10,000 Chilians on the heights of San Francisco (Nov. 8), where he was defeated with terrible loss. He was court-martialed, but freed from blame and afterward served in the defense of Lima.

Buffalo

Buenos Ayres, or Aires (bwā'nōs ī'rez), a city of South America, capital of Argentina, on the S. W. side of the La Plata, 150 miles from its mouth. It was founded in 1535 by Don Pedro de Mendoza, and is built with great regularity, the streets uniformly crossing each other at right angles. It contains the palace of the President, the House of Representatives, a Town Hall, a number of hospitals and asylums, a cathedral, several monasteries, nunneries, and Catholic and Protestant churches; several theaters, a university and a custom house. The university, founded in 1821, is attended by about 800 students. There are also a medical school, normal and other schools, besides literary and scientific societies. Since 1889 the city has undergone notable changes in the way of local improvement. The most important is the creation of a new system of docks, involving the construction of five long wet docks and great basins. The basins have ample area for the largest ocean steamships, and along their walls are hydraulic elevators by which every hatchway of a vessel may be worked at once. Buenos Ayres is one of the leading commercial centers of South America, its exports and imports together annually amounting to over \$60,000,000. Chief exports are ox and horse hides, sheep and other skins, wool, tallow, horns, etc. There are six railways running from the city, and over 100 miles of tramway in the city and suburbs. About one-fourth of the inhabitants are whites; the rest are Indians, negroes and mixed breeds. Pop. (1910) 1,265,395. The province of Buenos Ayres has an area of about 82,000 square miles, and presents nearly throughout level or slightly undulating plains (*pampas*), which afford pasture to vast numbers of cattle and wild horses. These constitute the chief wealth of the inhabitants. Pop. (1908) 1,647,029.

Buffalo, city and county-seat of Erie co., N. Y., second city in population and importance in New York. It is built at the E. end of Lake Erie, at the head of the Niagara river, 20 miles above the Falls. It is the W. terminus of the Erie canal, and has a navigable water front of 8 miles, with numerous piers, breakwaters, basins and canals, giving it one of the finest harbors on the lakes and making it a great commercial center. The city is connected by several steamship lines with the chief lake ports, and by ferries with Victoria and Fort Erie, on the Canadian side. The International Bridge, costing \$1,500,000 and completed in 1873, connects Buffalo with these towns. Area, 42 square miles; population (1900) 352,218; (1910) 423,715.

Topography.—Buffalo is situated on an elevated plain, 50 feet above the lake and 600 feet above sea level. From this plain the ground slopes gradually to the lake.

Buffalo

It is bordered on three sides by water, the Niagara river, Lake Erie and Buffalo river. Buffalo river is navigable for 2 miles, and two canals pass between the river and the lake. The city is noted for its wide and beautiful streets, and the abundance of shrubbery and trees decorating them. The principal streets are Main, Niagara, Delaware, Broadway, and Linwood and Elmwood avenues, 120 feet wide, and all over 5 miles in length. Buffalo claims to be the cleanest and healthiest city in the United States and to possess a greater extent of asphalt paving than any other city of its size in the country.

Municipal Improvements.—The city owns an extensive waterworks system, costing \$9,000,000. The reservoirs have a storage capacity of 200,000,000 gallons daily, and the water is distributed through 500 miles of mains. The consumption averages 100,000,000 gallons per day. There are in all 700 miles of streets, of which 330 are paved. The sewerage system has about 409 miles of pipe, and the sewage is carried off, by means of a tunnel, into the Niagara river. The city is lighted by gas and electricity at an annual cost of about \$335,000. Much natural gas, piped from Pennsylvania and Canada, is used for heating and manufacturing purposes. The average cost of the police department exceeds \$769,800 per annum, and that of the fire department, \$611,900. The annual death rate averages 12.25 per 1,000. There are more than 50 miles of street railways and a steam belt-line connects with the suburbs.

Public Parks.—Buffalo has a public park system consisting of several parks containing 741½ acres and connected by boulevards and approaches, affording a continuous drive of 15 miles, and containing an area, with the minor parks and places, of 276½ additional acres. There are several attractive parks and squares in the business portions of the city, among them Lafayette, Niagara and Franklin. Lafayette square contains the Soldiers and Sailors' Monument, erected at a cost of \$50,000, and the Buffalo Library. A portion of the Niagara river front rises in an abrupt bluff and is known as The Front. It affords a grand view in all directions and is the site of Fort Porter, where several companies of United States troops are stationed. The Parade Ground is one of the principal parks and contains 50 acres of land.

Notable Buildings.—The principal public buildings are the Federal Building, containing the Post-office and Custom-house, a large building of freestone; the State Arsenal; the Board of Trade Building; the Old and New Armories; Grosvenor Library; Normal School; two public high schools; Erie County and Buffalo Savings Banks; the Erie County Penitentiary; and the City and County Hall. The latter is of granite

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with a tower 245 feet high, situated in Franklin street, completed in 1880 at a cost of about \$1,400,000. Besides these, there is the Buffalo Library, in Lafayette Square, containing a circulating library of 77,000 volumes, and, in the same building, are the Buffalo Historical Society, the Buffalo Fine Arts Society and School of Arts, and the Society of National Sciences. The State Insane Asylum has a plot of 203 acres and adjoins the Buffalo Park. Other notable structures are the numerous grain elevators. Buffalo is one of the greatest grain shipping cities of the United States and contains some of the largest grain elevators in the world. The first elevator in the world was built at Buffalo in 1843, and in 1890 there were 45 such buildings, storing 16,000,000 bushels. The "Niagara B" is the largest and will store 1,200,000 bushels.

Manufactures.—According to the United States census of 1900 the city had 3,902 manufacturing establishments, employing \$103,939,655 capital and 47,606 persons; paying \$23,596,308 for wages and \$73,359,466 for materials used; and yielding products of an aggregate value \$122,230,061. The principal industries according to the value of products was slaughtering and meat packing, wholesale (\$9,631,187); the manufacture of foundry and machine shop products (\$6,816,057); linseed oil (\$6,271,170); railroad cars (\$4,513,333); malt liquors (\$4,269,973); soap and candles (\$3,818,571); flour and grist mill products (\$3,263,697); planing mill products (\$3,095,760). Other important manufactures are leather goods, patent medicines, clothing, and furniture.

Commerce.—In the fiscal year ending June 30, 1900, the imports of merchandise aggregated in value \$4,134,917; and the exports, \$14,488,028. The movement in gold and silver reported for the Buffalo Creek and Niagara customs districts was, imports, \$728,529; exports, \$798,956. The entrances of shipping (1898-1899), at Buffalo Creek, were 633 American sailing vessels of 127,570 tons, 338 American steam vessels of 115,990 tons, 24 foreign sailing vessels of 4,017 tons, and 98 foreign steam vessels of 19,043 tons, total vessels 1,093, total tonnage 266,620. The clearances were 631 American sailing vessels of 115,209 tons, 319 American steam vessels of 96,597 tons, 923 foreign sailing vessels of 15,659 tons, total vessels, 1,067, total tonnage 231,299. The principal exports are grain and packed meat.

Banks.—On Sept. 7, 1899, there were 3 National banks in operation, having a combined capital of \$1,000,000; and a surplus fund of \$440,000. There were also 18 State and savings banks. The exchanges at the United States clearing-house in the year ending Sept. 30, 1899, aggregated

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\$241,128,187, an increase over the preceding year of \$22,956,744.

Education.—The city has 60 grammar schools, 3 high schools, State Normal School, numerous kindergartens, and many minor and private schools. At the close of the school year 1897–1898 the children of school census age aggregated 76,600; the enrollment in public day schools was 56,718, and in the private and parochial schools (largely estimated), 18,647; and the average daily attendance in public day schools was 40,806. There were 1,195 regular teachers; 85 buildings used for public school purposes; and public school property of an estimated value of \$3,175,882. The institutions for higher education are Canisius College (Roman Catholic), opened in 1870; German Martin Luther Theological Seminary (Evangelical Lutheran), 1854; Buffalo University; Niagara University; Buffalo College of Pharmacy; State Normal School; and Training Schools for Nurses at the Buffalo Hospital of Sisters of Charity, Buffalo State Hospital, Children's Hospital, Erie Hospital, General Hospital, Homœopathic Hospital, Lexington Heights Hospital, Providence Retreat, Riverside Hospital, and Woman's Hospital.

Churches and Charitable Institutions.—Buffalo has nearly 260 churches. St. Joseph's Cathedral (Roman Catholic) is of blue stone trimmed with white, in the Gothic style, and has a set of 42 chimes. Trinity (Protestant Episcopal) and the First Presbyterian are both noteworthy edifices. Among the charitable institutions besides the hospitals mentioned are the Orphan Asylum, Home for the Friendless, St. Vincent's Orphanage for Girls, State Asylum for the Insane, Church Home for Aged Women, St. Mary's Asylum for Widows and Foundlings, Ingleside Home for Erring Women, St. Mary's Institution for Deaf Mutes, and the Fitch Institute. This latter contains a *creche* and various other charities, all managed by the Charity Organization Society.

Finances.—On Oct. 1, 1900, the total bonded debt of the city was \$15,705,057; the sinking funds, \$1,225,767, making a net debt of \$14,479,290, including the water debt of \$3,754,382. In addition to this indebtedness there was outstanding, Oct. 1, 1900, \$1,724,734, for local warrants collectable by assessment. The city owned real estate and personal property to the estimated value of \$20,528,815. The assessed valuations in 1900 were real estate \$223,018,810; personal property, \$22,799,577; total \$245,875,587; tax rate, \$18.25 per \$1,000.

History.—The site of Buffalo was first visited by the French, under La Salle, in 1679. In 1687 a settlement was made by Baron La Honton and Fort Supposé was

Buffalo

erected. It was held by the British as Fort Erie during 1783–1784, and was incorporated as the village of Buffalo and soon afterward burned by the British, in 1813. It was rebuilt in 1815; but its progress was slow until the completion of the Erie canal in 1825. It became a city in 1832 and since then it has been very prosperous. A Pan-American Exposition was held here between May 1 and Nov. 2, 1901; President McKinley was fatally wounded while attending it on Sept. 6. CONRAD DIEHL.

Buffalo, a name often applied to two distinct bovine genera or sub-genera — viz., the Asiatic buffalo (*bubalus*) with the Cape buffalo; and the American buffalo, better named bison. The genus or sub-genus *bubalus* has the usual bovine characteristics, and, whatever be its exact limits in strict zoölogical classification, remains, for practical purposes, a large, clumsy ox. The horns rise from the posterior side corners of the skull, are usually thickened out of proportion at the base, and irregularly ridged, though smooth toward the points; the forehead is short and arched; the covering of hair is comparatively sparse. The common or Asiatic buffalo (*B. buffelus*) has beautifully twisted horns, thick and broad at the base, rough on to the middle, somewhat triangular in section. The horns lie back on the shoulders when the animal walks or runs, with its muzzle projecting characteristically forward. The hair is short and scanty, almost bristly, slightly longer on head, shoulders and front of neck, and all but black in color. The bare, brown, polished hide is, however, the more striking feature. The animal measures about 7 feet in length, and stands about 4 feet high at the shoulder. It is a native of the East Indies, has been domesticated in India, and thence introduced into Egypt, Greece, Italy, Hungary, etc. It is said to have reached Italy toward the end of the 6th century A. D. The buffalo is a very powerful animal, much more powerful than the ox, and capable of dragging or carrying a far heavier load. The female yields a much greater quantity of milk than a cow, and of excellent quality. It is from buffalo milk that the *ghee* or semi-fluid butter of India is made. The hide is greatly valued for its strength and durability, but the flesh is decidedly inferior to that of the ox. The Arnee is a very large variety of the common buffalo; a head has been known to measure 13 feet 6 inches along the horns. It occurs in the Indian islands and in Farther India in a wild state, but is also domesticated and used as a beast of burden. The Cape buffalo (*bos caffer*) is generally regarded as a distinct species. The horns are very large; they spread horizontally over the top of the head, and are then

Buffalo Berry

bent down laterally, and turned upward at the point. The head is carried, as by the common buffalo, with projecting muzzle and reclining horns, but the bases of the horns nearly meet on the forehead, where they are from 8 to 10 inches broad. The length of a full grown Cape buffalo is about 8 feet from the root of the horns to the tail, and the height is 5½ feet. This animal is regarded as more formidable than any other in South Africa. The buffalo is still found in large herds in the marshy wooded regions of Central and South Africa, but in Cape Colony, where it was once plentiful, it has now become comparatively rare. It grazes chiefly in the evening, and lies in woods and thickets during the day. It will readily act on the aggressive, and has never been domesticated. The flesh, though coarse, is palatable. *B. brachyceros* is another African species. The dwarf wild cow of the island of Celebes (*anoa* or *probubalus celebensis*) is also related to the buffaloes. For the American buffalo, see BISON.

Buffalo Berry (*shepherdia argentæa*), a shrub of the oleaster family, a native of the United States and Canada, with lanceolate, silvery leaves and close clusters of bright red acid berries about the size of currants, which are made into preserves and used in various ways.

Buffalo Grass (*tripsacum dactyloides*), a strong growing North American grass, so called from forming a large part of the food of the buffalo, and said to have excellent fattening properties; called also gama grass.

Buffer, a cushion or mechanical apparatus formed with a strong spring, to deaden the concussion between a body in motion and one at rest. Buffers are chiefly applied to railroad carriages, there being two at each end.

Buffet, anciently a little apartment, separated from the rest of the room, for the disposing of china, glass, etc. It is now a piece of furniture for the dining-room, called a sideboard, for the same purpose.

Buffier, Claude, a writer of considerable eminence; born in Poland of French parents in 1661; was brought up at Rouen, became a Jesuit, and for some time occupied a chair of theology. Among his works is a "Traité des Premières Vérités," which proves him to have been an able metaphysician, and is praised by Dugald Stewart. He died in Paris in 1737.

Buffington, Adelbert Rinaldo, an American military officer; born in Wheeling, Va., Nov. 22, 1837; was graduated at the United States Military Academy in 1861; entered the Ordnance Department; was promoted Colonel in 1889, and became Chief of Ordnance with the rank of Brigadier-General, April 5, 1899. He had command of the

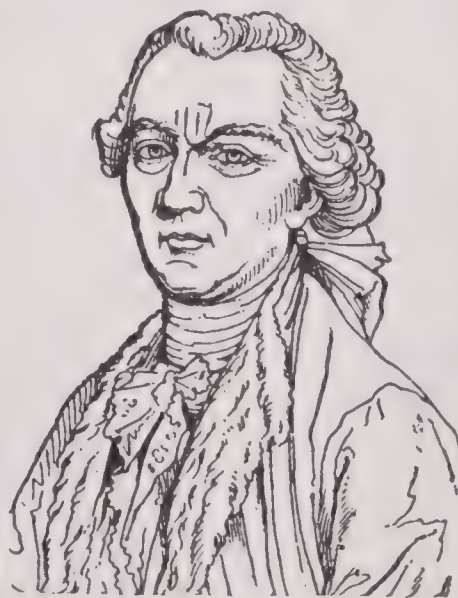
Buffon

National Armory in 1881-1892; is the inventor of a magazine firearm, carriages for light and heavy guns, and parts of models of 1884 Springfield rifles; introduced gas forging furnaces and improved methods in the Springfield armory; and originated the niter and manganese method in use there for bluing iron and steel surfaces of small arms.

Buff Leather, a strong oil leather, prepared from the hide of the buffalo, elk or ox. Formerly it was largely used for armor. It was said to be pistol-shot proof, and capable of turning the edge of a sword. It was tanned soft and white. Its place is now filled by the leather of cow skins for a common, and of the buffalo or bison of this country for a superior, article. It is still, however, much used in the saber, knapsack, and cartridge box belts of armies, as well as occasionally to cover the buffers and buff wheels of the cutler, lapidary and polisher.

Buffon, George Louis Leclerc, Comte de, one of the most celebrated naturalists and authors of the 18th century; born in Montbard, Burgundy, Sept. 17, 1707; received from his father, Benjamin Leclerc, counsellor to the parliament of his province, a careful education. Chance connected him at Dijon with the young Duke of Kingston, whose tutor, a man of learning, inspired him with a taste for the sciences. They traveled together through France and Italy, and Buffon afterward visited England. In order to perfect himself in the language without neglecting the sciences, he translated Newton's "Fluxions," and Hales' "Vegetable Statics." After some time he published some works of his own, in which he treated of geometry, natural philosophy, and rural economy. He laid his researches on these subjects before the Academy of Sciences, of which he became

a member in 1733. The most important were on the construction of mirrors for setting bodies on fire at a great distance, as Archimedes is said to have done, and experiments on the strength of different kinds of wood, and the means of increasing it, particularly by removing the bark



COMTE DE BUFFON.

of the trees some time before felling them.

Buffon, in his earlier years, was animated only by an undefined love of learning and

fame, but his appointment, as superintendent of the Royal Garden (now the Jardin des Plantes), in 1739, gave his mind a decided turn toward that science in which he immortalized himself. Considering natural history in its whole extent, he found no works in this department but spiritless compilations and dry lists of names. There were excellent observations indeed on single objects, but no comprehensive work. Of such a one he now formed the plan, aiming to unite the eloquence of Pliny and the profound views of Aristotle with the exactness and the details of modern observations. To aid him in this work, by examining the numerous and often minute objects embraced in his plan, for which he had not the patience nor the physical organs requisite, he associated himself with Daubenton, who possessed the qualities in which he was deficient; and after an assiduous labor of 10 years, the two friends published the 3 first volumes of the "Natural History," and, between 1749 and 1767, 12 others, which comprehend the theory of the earth, the nature of the animals, and the history of man and the viviparous quadrupeds. The most brilliant parts of them, the general theories, the descriptions of the characters of animals, and of the great natural phenomena, are by Buffon. Daubenton limited himself to the description of the forms and the anatomy of the animals. The 9 following volumes, which appeared from 1770 to 1783, contain the history of birds, from which Daubenton withdrew his assistance. The whole shape of the work was thus altered. Descriptions, less detailed, and almost entirely without anatomy, were inserted among the historical articles, which at first were composed by Guéneau de Montbeillard, and afterward by the Abbé Bexon.

Buffon published alone the 5 volumes on minerals, from 1783 to 1788. Of the 7 supplementary volumes, of which the last did not appear until after his death in 1789, the 5th formed an independent whole, the most celebrated of all his works. It contains his "Epochs of Nature," in which the author, in a style truly sublime, and with the triumphant power of genius, gives a second theory of the earth, very different from that which he had traced in the first volumes, though he assumes at the commencement the air of merely defending and developing the former. This great labor, with which Buffon was occupied during 50 years, is, however, but a part of the vast plan which he had sketched, and which has been continued by Lacépède in his history of the different species of cetaceous animals, reptiles, and fishes, but has remained unexecuted as far as regards the invertebrate animals and the plants. There is but one opinion of Buffon as an author. For the elevation of his views, for powerful and profound ideas, for the majesty of

his images, for noble and dignified expression, for the lofty harmony of his style in treating of important subjects, he is perhaps unrivaled. His pictures of the sublime scenes of nature are strikingly true, and are stamped with originality. The fame of his work was soon universal. It excited a general taste for natural history and gained for this science the favor and protection of nobles and princes. Louis XV. raised the author to the dignity of a count, and D'Argivilliers, in the reign of Louis XVI., caused his statue to be erected, during his life, at the entry of the Royal Cabinet of Natural Curiosities, with the inscription "*Majestati naturæ par ingenium.*"

The opinions entertained of Buffon as a natural philosopher and an observer have been more divided. Voltaire, D'Alembert, Condorcet, have severely criticized his hypothesis and his vague manner of philosophizing from general views. But although the views of Buffon on the theory of the earth can no longer be defended in detail, he will always have the merit of having made it generally felt that the present state of the earth is the result of a series of changes which it is possible to trace, and of having pointed out the phenomena which indicate the course of these changes. His theory of generation has been refuted by Haller and Spallanzani, and his hypothesis of a certain inexplicable mechanism to account for animal instinct is not supported by facts; but his eloquent description of the physical and moral development of man, as well as his ideas on the influence which the delicacy and development of each organ exert on the character of different species of animals, are still of the highest interest.

The views of Buffon on the degeneracy of animals, and of the limits prescribed to each species by climates, mountains, and seas, are real discoveries which receive daily confirmation, and furnish to travelers a basis for their observations, which was entirely wanting before. The most perfect part of his work is the "History of Quadrupeds"; the weakest, the "History of Minerals," in which his imperfect acquaintance with chemistry and his inclination to hypothesis have led him into many errors. His last days were disturbed by a painful disease, which did not, however, prevent the prosecution of his great plan. He died in Paris, April 16, 1788, at the age of 81 years, leaving an only son, who perished in the Revolution by the guillotine. Buffon was of a noble figure, and of great dignity of manners. His conversation was remarkable for a simplicity which strikingly contrasted with the style of his writings. The best edition of his "Natural History" is that published from 1749 to 1789, in 36 vols.

Bufo

Bufo, a genus of batrachians, the type of the family bufonidæ. The body is inflated, the skin warty, the hind feet of moderate length, the jaws without teeth, the nose rounded. At least 20 species are known.

Bufonidæ, a family of batrachians. They are distinguished from the *pipidæ* by their possessing a well developed tongue, and from the *ranidæ* (frogs) by the absence of teeth.

Bufonite, literally, toad-stone; a name given to the fossil teeth and palatal bones of fishes belonging to the family of pycnodonts (thick teeth), whose remains occur abundantly in the Oolitic and Chalk formations. The term bufonite, like those of serpents' eyes, batrachites, and crapaudines, by which they are also known, refers to the vulgar notion that those organisms were originally formed in the heads of serpents, frogs and toads.

Bug, the English name of the sub-order heteroptera, one of two ranked under the order hemiptera or rhyncota. Most of the species essentially resemble the bed-bug, except that they have wings. Some suck the blood of animals, and others subsist on vegetable juices. Not a few species are beautiful, but many have the same unpleasant smell which emanates from the bed-bug. The unattractive form and manner of life of the bed-bug are too well known to require description. The eggs, which are white, are deposited in the beginning of summer. They are glued to the crevices of bedsteads or furniture, or to the walls of rooms. Before houses existed, the bug probably lived under the bark of trees.

Bug, the name of two Russian rivers. The Western Bug rises in Austrian Galicia, and after a course of about 470 miles, forming, for the most way, the E. frontier of Poland, it joins the Vistula near Warsaw. The Eastern Bug, the Hypanis of the ancients, rises in Podolia, and flows 520 miles S. E. into the estuary of the Dnieper.

Bugbane, a name given in this country to *cimicifuga*, a plant of the order *ranunculaceæ* (crowfoots). It is called in England bugwort.

Bugeaud (bö-gō'), **Thomas Robert, Duc d'Isly**, a marshal of France, born Oct. 15, 1784. He entered the army in 1804 as a simple grenadier, but rose to be colonel before the fall of Napoleon. After the Revolution of 1830 he obtained a seat in the Chamber of Deputies. He was afterward sent to Algeria, where he gained many advantages over the Arabs. On the Revolution of 1848 he adhered to Louis Philippe to the last. Under the Presidency of Louis Napoleon he was appointed commander-in-chief of the Army of the Alps. He died in Paris, June 10, 1849.

Buhr Stone

Bugenhagen, Johann (bö'gen-hä'gen), a German reformer, friend and helper of Luther in preparing his translation of the Bible, born in 1485. He fled from his Catholic superiors to Wittenberg in 1521, where he was made, in 1522, Professor of Theology. He effected the union of the Protestant free cities with the Saxons and introduced into Brunswick, Hamburg, Lübeck, Pomerania, Denmark, and many other places, the Lutheran service and church discipline. He translated the Bible into Low German (Lübeck, 1533); wrote an "Exposition of the Book of Psalms" and a "History of Pomerania." He died in 1558.

Buggy, a name given to several species of carriages or gigs; in England, a light one horse, two wheeled vehicle without a hood; in the United States, a light, one horse, four wheeled vehicle, with or without a hood or top; in India, a gig with a large hood to screen those who travel in it from the sun's rays.

Bugis. See CELEBES.

Bugle (*Ajuga*), a palæarctic genus of *Labiataæ*. The common bugle. (*A. reptans*) is abundant in moist pastures and woods of Europe. Its flowers are generally blue, but white and purplish varieties are sometimes grown in flower borders. *A. alpina* is one of the beautiful flowers of the Swiss Alps.

Bugle, a treble instrument of brass or copper, differing from the trumpet in having a shorter and more conical tube, with a less expanded bell. It is played with a cupped mouthpiece. In the original form it is the signal horn for the infantry, as the trumpet is for the cavalry.

Bugloss, a popular name applied to a number of plants of the natural order *Boraginææ*, and in particular to the alkanet.

Buhl (named from ANDRÉ BUHL or BOULLE, an Italian, who was born in 1642. He died in 1732; lived in France in the reign of Louis XIV., and made the work since called after him), unburnished gold, brass, or mother of pearl, worked into patterns for ornamenting furniture. It is set as an ornament into surfaces of ebony or dark wood, or tortoise shell.

Buhl Saw, a saw resembling a frame or bowsaw in having the thin blade strained in a frame.

Buhr Stone, a variety of quartz containing many small, empty cells, which give it a peculiar roughness of surface. They are used principally as mill-stones. The best kinds are creamy white, with a granular and somewhat cellular texture, and are obtained in the Tertiary formation of the Paris basin, and chiefly at La Ferté-sous-Jouarre. They are cut into wedge shaped parallelopipeds, called panes, which are

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bound together with iron hoops to form large mill stones. Numerous substitutes for the French buhr stone have been found in the United States, the most important being furnished by the buhr stone rock of the bituminous coal measures of Northwestern Pennsylvania and Eastern Ohio, but they cannot compete in the great markets with the French rock.

Building is the art of putting materials together in such a way as to form a shelter. The first materials used for the purpose were probably rough stones, laid up into a wall, and covered with branches of trees, so as to supplement, or imitate, the caves which seem to have been the earliest human dwellings; but, as population extended, the settlers in alluvial regions, where no stones were available, learned to form walls with clay and loam, while the dwellers in the forests, who had neither clay nor stone, contrived to pile logs of wood upon each other, notching them near the ends, so that they could be locked together into a strong and weather-resisting structure. Notwithstanding the improvements which have been made in detail, all these methods of construction are in use to this day,—the walls of clay and loam in the cottages of Southern England and the “pisé” buildings of the neighborhood of Lyons, and the structure of notched tree-trunks in the log cabins of North America and Scandinavia and the timber houses of German Switzerland. The first important improvement in the building art consisted in the employment of means for moulding clay into blocks, or bricks, of regular shape, which, when dried in the sun, or baked in the fire, were hard enough to handle and to lay up into smooth and strong walls, which could be made still stronger by cementing the bricks with liquid clay, or mineral pitch, or, later, with mortar made of lime from calcined limestone; while even decorative effects could be obtained by means of larger blocks, of ornamental shapes, made of baked clay, called, in this form, “terracotta.” Although something had been done from the earliest times in the way of dressing and smoothing stones by pounding off the protuberances with harder lumps, it was not until the discovery of processes for making tools of hardened iron or copper that it became practicable to work stone readily into regular shapes; so that building with cut stone, although architecturally the most important development of the art, on account of the variety and perfection of the forms which can be given to the material, is of comparatively recent origin. The use of cut stone made possible great advances in construction, as well as in design, and the principles established in a very remote antiquity are still followed.

On all soils except rock it is necessary, in order to prevent stone walls, when built,

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from sinking into the soft ground, to prepare for them a wide “footing,” which distributes the weight over an area of soil large enough to afford the required resistance. On these footings the wall is built, the stones being “bonded,” by laying each across the joint between the stones below, and by placing long stones alternately in the adjacent walls at the angles, so as to resist any tendency to tearing apart which may be caused by settlement or unequal pressure. Window and door openings are formed in the wall as required, and, at the appropriate levels, beams of wood or iron are inserted, which carry the floors; while, at the top of the walls, a roof is formed, usually with inclined timbers, supporting a covering of slate, tile or other impervious material. In practice, it is usual to cut accurately only the stones which form the exposed face of the wall, leaving the inner side of these rough, and completing the required thickness of the wall by a “backing” of rough stones or brick, which is concealed from view by the plastering applied over it to form the finish of the rooms; and all stone or brick masonry is now laid in mortar made of lime, or of cement, which is a calcined mixture of lime and clay, mixed with sand and water. Either sort of mortar adds to the strength of a wall of this kind, but cement mortar, in which needle-like crystals, hard and adherent, slowly form, is much the stronger of the two, so that a moistened mixture, in proper proportions, of cement, sand and pebbles, or broken stone, forms a mass, known as concrete, which soon becomes harder and stronger than most natural stones. In order to avoid the use of combustible material in floors and roofs, and the consequent liability of the building to destruction by fire, various devices have for many centuries been employed to span the spaces between walls with arches, domes and vaults of different kinds, constructed in stone or brick. As, however, the weight of all arches, vaults or domes of masonry tends to push outward the walls supporting them, it is necessary to increase the resistance of the latter to overturning by thickening them, or, more commonly, by increasing the width of their base at certain points by means of buttresses, or exterior projections; and the balancing of the resistance of buttresses against the outward push, or thrust, of vaults and arches presents some of the most difficult problems in the art of building. Where floors are simply laid with beams, although no thrust is exerted on the walls, it is usual to fasten the beams and walls together with iron anchors, so that the floors act as a tie across the building, and assist in maintaining the walls in a vertical position. If the beams are of wood, the flooring over them generally consists of boards, nailed to the beams; if

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they are of iron, it is customary to form arches between them, of brickwork, terracotta or concrete, which support a flooring of wood or other material.

In recent years, the tendency in the development of building has been to extend the use of framing. Until half a century ago, although roofs were usually made with framed trusses, consisting of combinations of timbers, fastened together in such a way as to give each other mutual support, the principles on which their action was based were very imperfectly understood. The application, at that period, of mathematical analysis to the study of the strains and resistances in such frames showed how wider spans could be covered, with greater economy, than by the old methods, and the invention of processes for rolling beams, angles and other shapes of iron, calculated for affording the highest resistance with the least weight of metal, put into the hands of the builder materials of great strength and variety at the same time that mathematical science began to teach him how to use them. The result has already been to make possible the construction of roofs many times wider, and of buildings far higher and stronger, than any ever known before; and, although certain details of modern framed construction are still crude and illogical, it can hardly be supposed that an art which, within a generation, has attained results that would previously have been considered impossible, will hereafter remain stationary; and the future will probably see a great development and extension of the steel-framed construction, which fulfils, better than any other, many of the requirements of modern life. See also ARCHITECTURE; BRICK; BUILDING STONE; CARPENTRY; MASONRY.

T. M. CLARK.

Building and Loan Associations, combinations of individuals, who agree to pay a fixed sum monthly, by which a fund is accumulated which is loaned to members who desire to purchase or improve real estate. Their capital stock, which is prospective, is usually divided into shares of a par value of \$200 each. Each shareholder pays upon each share he holds a monthly subscription of \$1 till such payments, with accrued profits, bring the value of the share to par. The number of shares each member may hold varies in different associations, the general rule being not less than two nor more than 25, the latter limitation being intended to prevent speculation. When money sufficient to declare a loan has accumulated in the treasury, a single share of \$200 is put up at auction and knocked down to the member who bids the highest premium. He has the option, at the same premium, of taking as many shares as he may desire, within fixed limits. The age of

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the association depends on these premiums; the larger the premium bid, the more quickly the association terminates. Premiums vary with the age and location of the association, and also with the demand for money. There are two methods of treating these premiums, known as the gross and instalment plans. The gross plan treats the premium at once as profits earned, though the amount bid will not be paid in full for 10 or more years. The instalment plan declares as profits only such amount of the premium as is actually paid in during the year. So far as the final result is concerned, there is no difference between the two. Building and loan associations are formed on two plans, called terminal and serial. The terminal associations compel all members to begin payments on the same day. A new member joining after the beginning of the association is thus forced to pay arrearages. This is avoided in serial associations by allowing new members to join at stated intervals, usually six months or a year, without the payment of arrearages. The advantages of building and loan associations are: That each share, whether borrowed upon or not, has credited to it a pro rata amount of all profits declared. Loans are generally advanced to within 80 per cent. of the appraised value of the property. No large salaries are paid. All officers, appraisers, auditors, etc., are elected in open meeting. Members may withdraw at any time after the first year, obtaining a fair share of the profits. Loans are invariably secured by first mortgage. Only members may obtain loans. Mortgages may be paid off at any time. There are no speculative features, the association buys nothing, the borrowing member making all contracts. In 1910 the United States League of Building and Loan Associations reported 5,713 associations, with 2,016,651 members and \$856,332,719 assets, an increase in a year of 96,394 in members and \$72,156,969 assets. The receipts during 1909 were \$579,892,352; the disbursements included \$224,349,510 on mortgage loans; cash balance, \$28,365,045.

Building Lease, a lease of land for a long term of years, usually 99 years, at a rent called a ground rent, the lessee covenanting to erect certain edifices thereon, and to maintain the same during the term. At the expiration of the lease the houses built become the absolute property of the landlord. In Scotland it is called a *feu*, and the price assumes the shape of an annual feu-duty.

Building Stone, any stone used in the construction of buildings. The stones mostly employed are granite, sandstone, limestone, marble, serpentine, and trap. In order that a stone may be used to advantage for building purposes, it must possess

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certain physical and chemical properties; these are durability, permanency of color, crushing strength, elasticity, and cheapness. Stones vary greatly in their durability, depending upon their chemical composition and the purposes for which they are used. As soon as a stone is quarried, it becomes exposed to changes in temperature, causing expansion and contraction of its particles and ending ultimately in its disintegration; to the chemical action of rain and atmosphere; and to frost and various mechanical forces, all tending to weaken it.

Granite.—The best building stones are those which have a compact formation, are not susceptible of chemical changes, and are easily worked. Granite comes nearest to perfection in this line. It is the strongest stone in use, and, having been employed for ages, is found to withstand severer tests than any other stone. It is a very hard silicious rock, having a massive and granular crystalline structure, containing the minerals quartz, feldspar, mica, hornblende, and, occasionally, a little iron. The general color is gray, due to the presence of black mica or hornblende in the white quartz and feldspar. The red and pink varieties are caused by the presence of a red feldspar. The greatest granite beds in the United States are found in Maine and Massachusetts. These granites are chiefly gray. A large amount of red granite is quarried in Nova Scotia, Scotland, and Sweden.

Limestone.—Next to granite, the most durable building stones are the limestones. These vary greatly in both structure and color. Marble and chalk are the purest limestones, but it will be convenient to notice first those more or less composite limestones which are sufficiently hard and strong for building, yet not highly crystalline like marble. One of the best varieties of this stone is the Indiana limestone. It has a white or cream color, is of fine granular structure, and is readily worked. Many of the largest buildings in New York and Chicago are built of this stone. One of the best English building stones is the dolomite, or magnesian limestone of the Permian formation, which ranges from Nottingham to Tynemouth. It is a double carbonate of lime and magnesia, containing a varying proportion of silica. The Houses of Parliament are built of this dolomite, which unfortunately decays rapidly under the influence of the London atmosphere. Among ancient buildings, some parts of York Minster show its perishable nature. Yet in Conisborough Castle, built in the 12th century, and in some country churches nearly as old, it has stood the effects of time very well.

Marble.—Marble is a purer grade of limestone, of a finely crystallized structure. It

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is composed almost entirely of calcium carbonate. Its color varies from a pure white to a black, and it often occurs with a red, yellow, or brown color. These colors are due to the presence of carbonaceous matter and iron oxides. Marbles occur in the United States in the beds of the Silurian limestone, which border the Appalachian Mountains, and also in the Rocky Mountains. The best grades are quarried in Vermont, and a very good marble for building use is found in Western Massachusetts and in Connecticut. In Europe, the principal sources of marble are Northern Italy, France, Spain, and Portugal. The Numidian marble from Algeria has a great international reputation.

Sandstone.—Sandstones are composed of consolidated sand, and vary in color, structure, and composition. They are, as a rule, composed principally of quartz, some English sandstones containing as much as 97 per cent. The other substances they contain are chiefly carbonate of lime, alumina, and oxide of iron. It is hardly possible to tell a good sandstone merely by chemical analysis. A hard, non-porous stone is, of course, more likely to be lasting than one which is soft and porous. In color, they vary from a gray, through buff and red, to brown; this coloration being due to the presence of iron as an oxide or carbonate. The sandstones mostly used in the United States are the Ohio freestones, or Berea grits, from the Subcarboniferous formation of Ohio, and the red and brown freestones of Triassic formation on the Atlantic coast. A blue-gray sandstone, containing a large amount of alumina, occurs in New York State, and, on account of its thin stratification, it is split in slabs and used for flagging purposes.

Serpentine.—This stone is composed of silica and magnesium in about equal portions. It is a greenish color and of massive structure. It is rather soft, and is not very durable; but is used to a large extent in interiors and in the trimmings of churches and other places where a pleasing color effect is desired.

Trap.—Trap, or basalt, is one of the most durable stones known; but, on account of its extreme hardness, is little used in building. It is of igneous origin, and will withstand great changes in temperature and extreme frost. It ranges from gray to black in color, is massive in structure, very heavy, and of irregular cleavage. It occurs in almost all parts of the world, and is used to a considerable extent in the United States in the building of asylums, prisons, and other State institutions. Its somber color seems to make it quite appropriate for this purpose.

Besides these commoner stones, many others are employed for interior and orna-

Buitenzorg

mental work, among them various colored slates, onyx, alabaster, and a great variety of artificial stone, brick, and tile.

Government reports show the value of the best known building stones quarried in the United States during 1908, as follows:

Granite.....	\$18,420,080
Trap rock.....	4,282,406
Sandstone (including bluestone).....	7,594,091
Marble.....	7,733,920
Limestone.....	27,682,002
Total.....	\$65,712,499

The largest amount of granite was quarried in Vermont, \$2,451,933, Maine, \$2,027,508, and Massachusetts, \$2,027,463; of trap rock, New Jersey, \$1,079,514, and California, \$979,139; of sandstone, New York, \$1,774,843, Pennsylvania, \$1,368,784, and Ohio, \$1,244,752; of marble, Vermont, \$4,679,900, and Georgia, \$916,281; of limestone, Pennsylvania, \$4,057,471, Indiana, \$3,643,261, Ohio, \$3,519,557, and Illinois, \$3,122,552.

Buitenzorg ("without care"), a favorite residential town in the Island of Java, about 40 miles S. of Batavia, with which it is connected by rail. It contains a fine palace of the governor-general, celebrated botanic gardens, etc.

Bukowina (bō-kō-vē'na) ("beech land"), a Province in the extreme E. of the Austro-Hungarian Empire, surrounded by Galicia, Russia, Moldavia, and Hungary. Area, 4,035 square miles; pop. (1900) 730,195, of whom 42 per cent. are Ruthenians, 32 Moldavians, and 13 Jews, while 70 per cent. belong to the Greek Church. It is traversed by offsets of the Carpathians, culminating at 6,077 feet; gives rise to many rivers flowing toward the Black Sea; and abounds in wood, along with considerable mineral riches.

Bulacan, a town in Luzon, Philippine Islands, about 22 miles N. W. of Manila, with which it is connected by railway; pop. about 10,000. The town is composed mainly of native huts, although there are factories in which silk matting is made. Sugar boiling is also an industry of importance. The place has strategic advantages, which caused it to become a theater of military operations after the Spanish-American War. It was fully pacified in 1900, and made a military post by the United States authorities.

Bulawayo, the principal town and chief commercial center of Matabeleland, in Southern Rhodesia, South Africa, to which point the railroad from Cape Town was completed in 1897, a total distance of 1,360 miles. The place has a population of 5,000; several hotels, good business blocks and residences, and is rapidly growing in size and importance. Bulawayo a few years ago was the site of a native village of rude huts, in an inclosure of wattles, whose inhabitants were savages of the lowest type.

* For Map, see TURKEY.

Bulgaria

Bulb, a scaly body, formed at or beneath the surface of the ground, sending roots downward from its lower part and a stem upward from its center. It propagates itself by developing new bulbs in the axils of the scales of which it is formed. There are two kinds of bulbs: (1) A tunicated bulb, literally a coated bulb, that is, a bulb furnished with a tunic or covering of scales, the outer series of which is thin and membranous, example, the onion; and (2) a naked bulb, or one in which the outer scales are not membranous and united, but distinct and fleshy like the inner ones; example, the lilies. The so-called solid bulb of the crocus is, properly speaking, not a bulb at all, but an underground stem with buds upon it, technically called a corm, whereas a proper bulb is analogous not to an underground stem, but to a bud only. Bulbs placed in water tend to rot; they flourish best when fixed in very light soil or even in the air an inch above water, into which their roots enter. They should have abundance of light.

Bulbul, the Indian name of any bird belonging to the *pycnonotinæ*, a sub-family of *turdidæ* or thrushes. The bulbuls are admired in the East for their song, as are the nightingales. Some species are found in Africa. *P. jocosus*, which can be easily tamed, is kept for this end, and *P. hæmorrhous* for fighting purposes.

Bulfinch, Thomas, an American author, born in Boston, Mass., July 15, 1796; graduated from Harvard University in 1814. Although engaged in business, he managed to devote considerable time to literature. Among his best known works are "The Age of Fable" (1855); "Age of Chivalry" (1858); "Legends of Charlemagne" (1864); "Oregon and Eldorado" (1866). He died in Boston, May 27, 1867.

***Bulgaria**, kingdom (1908) in the Balkan peninsula, bounded by the Danube and Rumania on the N., the Black Sea on the E., Turkey on the S., and Servia on the W.; capital, Sofia. It has an area of 38,080 square miles. Its surface is a gradually sloping plain, broken by occasional mountains, which give rise to many rapid tributaries to the Danube. The soil is excellent and the slopes of the mountains are richly wooded. The inhabitants, though not skilled in agriculture, are able to produce a considerable export in grain products beyond what they require for themselves. Wheat is the chief export. Fruit is raised in abundance, and vegetables for home use; roses, for the production of the attar, are raised in large quantities; 80,000 gallons of wine are made annually; silk worms are bred in some regions, and tobacco is raised. There is little mining, although the mountains are rich in minerals. Domestic industries are chiefly carpets, cloths, hosiery,

and ribbons. The roads are very bad, and there is but a single line of railroad; about 500 miles, on the route between Vienna and Constantinople. All traffic is carried on by the rivers, and the export trade by the Black Sea. The population is about 74 per cent. Bulgarians, 19 per cent. Turks, the rest Spanish Jews, with a sprinkling of Greeks; 77 per cent. are of the faith of the Orthodox Greek Church; only 2½ per cent. Moslems. The government is Christian; there is a National militia; military service compulsory. The Bulgarians were originally of Finnish extraction, but coalesced with a Slavic populace, whose language was the richest of the old Slavic tongues. In their older literature are found many valuable works, chiefly popular songs and translations of the Bible. They adopted Christianity in the 9th century. From that to the 12th their rulers were powerful over the Balkan Peninsula. Then they were conquered and ruled by the Turks for about 500 years. In 1876, on account of the atrocities of the Turkish soldiers, an insurrection broke out. Russia took the part of Bulgaria against Turkey, and the war of 1877-1878 followed. In 1879, Alexander of Battenberg, a German Prince, was made sovereign of part of Bulgaria, the rest being made a separate province called East Rumelia, to prevent Bulgaria becoming a strong state. In 1885 there was a revolution in East Rumelia, which annexed itself to Bulgaria. Servia intervened, and Alexander was forced to abdicate. Against Russia's will, Ferdinand of Saxe-Coburg accepted the vacant throne in 1887. The head of the government is a hereditary prince, with responsible ministers and legislative assembly. In 1908 Bulgaria was declared by Prince Ferdinand an independent state, and war averted by agreement of France, England, and Russia. Pop. (1908) 4,158,409.

Bulgarin, Faddéï Venediktovich (böl'-gar-in), a Russian author and journalist, born in Minsk in 1789; served in the Russian army, but, finding himself neglected, in 1810 joined Napoleon. In 1819 he returned to St. Petersburg, where his writings soon attracted notice by their intense satire and intense servility. In 1825 he started the "Ssévernaja Ptchelá" ("Northern Bee"), a daily paper, which for long was alone permitted to discuss political questions. A zealous supporter of reaction and of absolutism, he enjoyed, through relations with the secret police, an unlimited power, which he freely used to the detriment of opponents. He was a witty and versatile writer, and published travels, histories, novels, and statistical works. He died Sept. 13, 1859.

Bulkhead, a partition made across a ship, whereby one part is divided from another; also, a wood or stone construction designed to prevent earth or water from

falling or flowing into the space protected by a bulkhead. A bulkhead line is a line a given distance from the shore, beyond which it is not permissible to build a dock, according to the rules of the War Department at Washington.

Bull, the male of any quadruped of the *bovidæ* family. Also, a sign of the zodiac: Taurus. It is likewise a cant term used on the New York Stock Exchange, and applied to those brokers who contract to buy any quantity of stock or shares without having the intention or the ability to pay for them, and who are therefore obliged to sell again, either at a profit or a loss, before the time at which they have contracted to take it. It is the opposite of bear.

Bull, an instrument, edict, ordinance, or decree of the Pope, equivalent to the proclamations, edicts, letters patent, or ukases of secular princes. Bulls are written on the wrong side of parchment, to which a leaden seal is affixed, and are granted for the consecration of bishops, the promotion to benefices, and the celebration of jubilees, etc. The publication of papal bulls is termed fulmination; and it is done by three commissioners, to whom they are usually addressed. The seal, or bull, is thus described by Matthew Paris, A. D. 1257: "*In bulla domini Papæ stat imago Pauli a dextris crucis in medio bullæ figuratæ, et Petri a sinistris.*" Bulls are generally designated by the first words of their text; thus, the *B. unigenitus*, or *In cæna Domini*, etc. The value of the discovery of America to Spain was seriously jeopardized by the existence of papal bulls authorizing discoveries, and conferring title in 1452, 1454, 1479, and 1481, on Portugal; and the claims of this power were so technically strong that on the familiar principle of "a hair of the dog that bit him," another bull had to be issued to protect Spain; and the famous line of demarcation from the North to the South Pole was drawn by Pope Alexander VI., on May 4, 1492. So strong still remained the technical claims of Portugal, that it was not till 1750 that the details of a controversy, interesting, but fit only for a larger history than this, were finally arranged. Up to the time of the discovery of America, it will be remembered, the influence of the Pope had been paramount and almost universally recognized in international affairs.

GOLDEN BULL is the term particularly applied to a statute or enactment of the Emperor Charles IV., published in 1536, in two diets held in succession at Nuremberg and Metz, for the purpose of fixing the laws in the election of the Emperor, and of regulating the number and privileges of the electors (*Churfürsten*). The original copy of this instrument is preserved at Frankfort-on-the-Main, and has a seal of gold ap-

Bull

pendant; whence the appellation "golden bull" is derived.

Bull, George Joseph, a Canadian ophthalmic surgeon, born in Hamilton, Ontario, Feb. 16, 1848. He was graduated at McGill University in 1869, and, after studying in Paris, began the practice of medicine in Montreal, devoting himself especially to diseases of the eye. He took up his residence in Paris in 1886, and has won celebrity as an expert in ophthalmic subjects. He has written "Ophthalma and Optometry," and many similar works.

Bull, John, the popular sobriquet or characteristic name applied to the English nation. Its origin is obscure. It appears to have been first used in Arbuthnot's famous satire, the "History of John Bull," written in ridicule of the Duke of Marlborough. This work is included in those of Dean Swift.

Bull, John, an English musician, born in Somersetshire about 1563; was appointed organist in the Queen's Chapel in 1591; first music lecturer at Gresham College in 1596; and organist to James I. in 1607. A Catholic, he fled beyond the seas in 1613, and at Brussels entered the Archduke's service; in 1617 he became organist at Antwerp Cathedral. Little of his music has been printed. The claim advanced for him to the authorship of "God Save the King," is unfounded. He died in Antwerp, March 12, 1628.

Bull, Ole Bornemann, a Norwegian violinist, born in Bergen, Feb. 5, 1810. He secured great triumphs both throughout Europe and in the United States by his wonderful playing. He lost all his money in a scheme to found a colony of his countrymen in Pennsylvania, and had to take again to his violin to repair his broken fortunes. He afterward settled in Cambridge, Mass., and had also a summer residence in his native city, where he died, Aug. 17, 1880.

Bulla, a genus of mollusks called, from the thinness of their shells, bubble shells. The shell is oval, ventricose, convoluted externally, or only partially invested by the animal. The animal has a large cephalic disk bilobed behind; the lateral lobe is much developed. It occurs in temperate and tropical seas from 25 to 30 fathoms. Over 50 recent species are known and 70 fossil, the latter from the Oölite onward.

Bullace, the English name of a tree, the *prunus communis*, variety *insititia*. It is akin to the variety *spinosa* (the sloe), but differs in having the peduncles and under side of the leaves pubescent and the branches slightly spinous, whereas the *spinosa* has the peduncles glabrous, the leaves ultimately so also, and the branches decidedly spinous.

Buller

Bullace Plum, the Jamaican name of the pleasant fruits of *melicocca bijuga*, a sapindaceous tree introduced from Guiana and New Granada.

Bullæ, miniature blisters, or blebs. They are larger than vesicles, with a large portion of cuticle detached from the skin and a watery transparent fluid between. The skin beneath is red and inflamed.

Bull Baiting, the barbarous sport of setting dogs on a bull, who is tied to a stake and worried by the dogs for the amusement of the spectators. It was a favorite sport in England from a very early period, till it was finally put down by Act of Parliament in 1835.

Bulldog, a variety of the common dog, called by naturalists *Canis molossus*; remarkable for its short, broad muzzle, and the projection of its lower jaw, which causes the lower front teeth to protrude beyond the upper. The head is massive and broad, and the frontal sinuses large. The lips are thick and pendulous; the ears pendant at the extremity; the neck robust and short; the body long and stout; and the legs short and thick. The bulldog is a slow motioned animal, better suited as a watchdog than for any purpose requiring activity and intelligence. He is also said to be capable of great affection for his master. His fearlessness is well known, and in fighting, bulldogs display the most indomitable spirit. They are apt to become vicious as they advance in years, but ordinarily a bulldog is not more ready than any other dog to attack persons without some cause.

The name was originally given to this dog on account of its being commonly employed in bull-baiting in the days when this barbarous sport was in vogue. The bull terrier is a dog that partakes of the character of both the bulldog and the terrier, and is rather a favorite among lovers of dogs.

Buller, Sir Redvers Henry, a British soldier; born in Devonshire, England, in 1839; entered the army in 1858; served in the campaigns in China (1860), Ashanti (1873-1874), South Africa (1878-1879), Egypt (1882-1884), and the Sudan (1884-1885); in 1890 succeeded Lord Wolseley as adjutant-general of the army and became lieutenant-general. On the breaking out of the Boer-British War in South Africa, in October, 1899, he was placed in command of the British forces who went to the relief of Ladysmith. On Dec. 15, following, in attempting to force the passage of the Tugela river at Colenso, he was repulsed, with a loss of 1,097 officers and men and 11 guns; but he succeeded in relieving Ladysmith, March 3, 1900. He died in 1908.

Bullet

Bullet, the projectile used for small-arms, either spherical or of an elongated form. The elongated bullet is now in general use for rifles, and there has also been introduced some means of dilating the bullet at the moment of explosion, so that it is forced into the grooves of the rifle and exactly fits the barrel. In some cases there is merely a cavity left at the base of the bullet into which the gases formed on the explosion of the gunpowder are forced, so that these have the effect of dilating the bullet in the manner required. In other cases a plug is inserted in the cavity, which is driven forward by the explosion of the gunpowder, and has the same effect. Spherical bullets remained in use long after the invention of the rifle, though several kinds of elongated bullets were suggested by various inventors of the 17th and 18th centuries. In 1837 the French adopted an elongated bullet invented by Delvigne, but this was superseded by the Minié bullet about 1846. A similar form, but with a wooden plug instead of an iron cup to cause the expansion, was introduced into the British army with the Enfield rifles of 1855. Previous to this, in 1841, the Prussians had adopted the celebrated needle breech-loading rifle, with an egg-shaped bullet resting on a thick wad which alone took the grooves of the rifle. In 1864 the three-grooved Enfield barrel was combined with the Snider breech-action in the rifles of the British army. The bullet supplied with this arm had a plug of baked clay and a hollow head, the lubrication being effected by bees' wax placed in four cannelures running round its base. In 1866 the Chassepôt rifle was adopted by the French authorities, the bullet having shoulders serving the same end as the wad in the needle gun bullet. The temporarily introduced Snider-Enfield rifles were replaced in 1874 by the Martini-Henry type, whose bullet, though longer and of smaller diameter, has the cylindrical form with domed end found in the French Chassepôt. The lubrication in this case was effected by a covering of wax paper and a bees' wax wad. The diminution in the diameter of the bullet was carried still further in the Enfield-Martini rifle of 1886, the bullets then supplied measuring only about two-fifths of an inch in diameter; and in several subsequent types of rifle they are of still smaller diameter. This decrease in caliber has been accompanied by an increase in length in order to preserve the weight of the bullet, and it has also been found necessary to cover the lead of the bullet with a thin coating of some such metal as steel, copper, nickel, or German silver. These changes are all embodied in the bullets of the Lee-Metford magazine rifle at present in use in the British army, and the necessity for lubricators is thus done away with. The

Bullfights

Lee-Metford bullet has a length of 3.05 inches, and the diameter of .312 inch. There is considerable variation in the weight of bullets. The old Brunswick bullets weighed 557, and its successor in Britain, the Minié, 680 grains. The Enfield bullet had a weight of 535 grains; the Snider and Martini-Henry, 480; the Enfield-Martini, 384, while the Lee-Metford bullet weighs only 216 grains. The French Lebel magazine rifle has a bullet with a weight of 215 grains, and in a later French form, the Berthier, the weight is 205 grains. The Lebel bullet is flattened at the point in order to lessen the risk of explosion in the magazine. The German Mauser and Mannlicher magazine rifles have bullets of the same weight as the Lee-Metford. The slenderness of the modern rifle bullets has necessitated the construction of rifles of very small bore, and this in turn has compelled the substitution of pellets of compressed powder for the older loose powder. In recent years a peculiar kind of bullet known as the dum-dum has been employed by British troops in warfare with uncivilized races. See DUM-DUM BULLETS: FIREARM: RIFLE.

Bullfights, the favorite or national diversion of the Spaniards, as now practised said to be of comparatively modern origin, having been devised by the Moors of Spain mainly for the exhibition of horsemanship, courage, and dexterity with the lance. At first it was practised by gentlemen armed only with a short spear or javelin; and on grand occasions, especially the coronation of a king, such combats are still exhibited. But generally the combatants are professionals. The excommunications of the Popes have not been sufficient to induce the Spaniards to abandon this amusement. Charles IV. abolished it; but it was soon revived again. The assailants are seldom killed in these sports. Bullfights are got up either for private gain or for the benefit of some public institution. This characteristic national sport or diversion is exhibited at Madrid through the summer at least once a week for the benefit of the general hospital. The bullfights are held in special rings or amphitheatres, that at Madrid being capable of seating 12,700 persons, its cost of erection having been \$400,000.

All the spectators of the fight, many of whom are ladies, are dressed in their best. The combatants march into the arena in procession, with some magistrate at their head. They comprise the *picadores*, combatants on horseback, in the old Spanish knightly garb; the *banderilleros*, combatants on foot, in short variegated frocks, with banners; and lastly, the *matador* (the killer). As soon as the signal is given the bull is loosed from the stall. The *picadores*, who have stationed themselves near him, commence the attack. Sometimes a

Bull Finch

horse is wounded, and the rider is obliged to run for his life. A peculiar kind of foot combatants, *chulos*, assist the horsemen by drawing the attention of the bull with their banner; and in case of danger they save themselves by leaping over the wooden fence which surrounds the arena. The *banderilleros* then come into play. They try to fasten on the bull their *banderillas*—hollow tubes filled with powder, having strips of paper wound round them and small hooks at the ends. If they succeed the squibs which are attached to them are discharged, and the bull races madly about the arena. The *matador* now comes in gravely, with a naked sword, and aims a fatal blow at the animal. If it is effectual the slaughtered bull is dragged away, and another is let out from the stall. If a bull is too inactive the dogs are set upon him; if he is too violent several horses are often killed.

The bull is more furious in proportion as the heat of the weather is greater. Burlesque scenes accompany the spectacle: apes are trained to spring on the neck of the bull, without his being able to reach them. Men of straw are set up before him, upon which he exhausts his strength. Some of the foot combatants likewise dress themselves grotesquely, to irritate the bull, and amuse the spectators. After they had made conquests in the New World, the Spaniards carried into those dominions beyond the sea, their national pastime, and it became a settled institution.

Bull Finch, a well known bird, the *pyrrhula vulgaris*, locally known as the norsk-pipe, the coal-hood, the hoop, or the tony hoop, the alp, and the hope. In the male



BULL FINCH.

the head, the part surrounding the bill, the throat, and the tail are lustrous black; the nape, the back and the shoulders bluish gray; the cheeks, neck, breast, the fore part

Bullion

of the belly and the flanks red; the rump and the vent white. A pinkish white bar runs transversely across the wing. Its length is about $6\frac{3}{4}$ inches. The female is less brightly colored. It feeds on pine, fir, and other seeds, on grain, on berries, on buds, etc. Its nest is usually of moss, the eggs, generally four, bluish white, speckled and streaked with purplish or pale orange brown at the thicker end. Its song is much prized. It is often domesticated. It is found in many lands.

Bull Frog, any frog which croaks with a deep rather than a sharp sound. A species of frog (*rana pipiens*) found in Carolina and the parts adjacent, which has a voice not unlike that of a bull. It is six or eight inches long, by three or four broad, without the legs. It swallows ducks and young goslings whole. It is difficult to catch from its length of leap, besides which it is generally left unharmed because it is said to purify rather than to pollute the waters in which it lives.

Bullhead, various fishes having large heads. (1) The river bullhead, a spiny finned fish, *cottus gobio*. It is called also the miller's thumb and the tommy lugge. It has a broad and flat head, the preopercle with one spine, the body dusky clouded with yellow, the belly whitish. Its length is about four inches. The bullhead in this country is confounded with the catfish. (2) The fish genus *aspidophorus*, of the same family *triglidae*. *A. europæus* is the armed bullhead. (3) A name given to several species of plover, the black bellied and the golden.

Bullinger, Henri, a celebrated Swiss reformer; born in Bremgarten in 1504; studied first in Emmerich, in the duchy of Cleves, and afterward in Cologne. His intention was to become a Carthusian monk, but after perusing the writings of Melancthon and other reformers he changed his views, formed a close connection with Zwinglius, became one of the most strenuous supporters of his views, and ultimately succeeded him in his charge of Zürich. He was one of the authors of the first Helvetic Confession, drew up in concert with Calvin the formulary of 1549, by which the differences between the churches of Zürich and Geneva on the subject of the Lord's Supper were terminated, and kept up a close correspondence with the principal English reformers. The "Zürich Letters," a compilation published by the Parker Society, contains part of this correspondence, and among others, letters addressed to him by Lady Jane Grey. He died in Zürich in 1575.

Bullion, uncoined gold and silver in bars or in the mass. United States standard bullion contains 900 parts of pure gold or pure silver, and 100 parts of copper alloy.

Bull Run

The coining value of an ounce of pure gold is \$20.67183, and the coining value of an ounce of standard gold is \$18.60465. The coining value in standard silver dollars of an ounce of pure silver is \$1.2929, and the coining value of an ounce of standard silver is \$1.1636.

Bull Run, or **Bull's Run**, a stream in Virginia, dividing Fairfax and Prince William counties, in the N. E. part of the State, and flowing into the Occoquan river 14 miles from the Potomac. On its banks were fought two of the most memorable battles during the Civil War. After a series of heavy skirmishes, July 16-19, 1861, the Union army under General McDowell was, on the 21st, utterly routed by the Confederates under the command of Generals Beauregard and J. E. Johnston. The Union loss was about 3,000 men, while that of the Confederates was estimated at nearly 2,000 men. The former lost, in addition, 27 guns, besides an immense quantity of small arms, ammunition, stores, provisions, and accoutrements. On Aug. 30, 1862, another great battle was fought here between the Union forces commanded by General Pope, and the Confederates under Generals Lee, Longstreet, and "Stonewall" Jackson, when the former were again defeated with heavy loss. The three battles of Groveton, Bull's Run, and Chantilly, fought in three successive days, cost the Union cause about 20,000 men in killed, wounded, missing, and prisoners, 30 guns, and 30,000 small arms. The first battle of Bull Run is sometimes known as the battle of Manassas.

Bull's Horn Coraline (so named because the shape of the cells is like a bull's horn), a zoöphyte of the family *cellariadæ*. It is the *eucratia loricata*. It is branched subalternate, and has the cells conical, with a raised orifice, beneath which is a spinous process.

Bull Terrier, a variety of dog, a cross breed between the bull dog and terrier.

Bull Trout, an English name for *salmo eriox*, called also the gray trout, and the round tail. It is a British fish.

Bull Weed, a plant, the black centaury (*centaurea nigra*).

Bulnes, Manuel (böl-nās'), a Chilean soldier and statesman, born in Concepcion, Dec. 25, 1799. He served in most of the battles of the Chilean revolution. In 1838 he commanded the Chilean army of 5,000 men against Santa Cruz, in Peru, and was finally instrumental in driving Santa Cruz from the country and breaking up the Peru-Bolivian confederation. In 1841 he was elected President of Chile and served for 10 years. He was afterward Senator and Councilor of State. He died in Santiago, Oct. 18, 1866.

Bulrush

Bülow, Friedrich Wilhelm von (bö'lō), a Prussian general, born in 1755; was actively engaged against the French at the earliest periods of the Revolutionary War; and his services in 1813 and 1814, especially at Grosbeeren and Dennewitz, were rewarded with a Grand Knightship of the Iron Cross and the title of Count Bülow von Dennewitz. As commander of the 4th Division of the allied army he contributed to the victorious close of the battle of Waterloo. He died in 1816.

Bülow, Hans Guido von, a German pianist and composer, born in Dresden, Jan. 8, 1830; was intended for a lawyer, but adopted music as a profession. He studied the piano under Liszt, and made his first public appearance in 1852. In 1855 he became leading professor in the Conservatory at Berlin; in 1858 was appointed court pianist; and in 1867 he became musical director to the King of Bavaria. His compositions include overture and music to "Julius Cæsar," "The Minstrel's Curse," and "Nirwana," songs, choruses, and piano-forte pieces. He was considered one of the first of pianists and orchestral conductors. He died in Cairo, Feb. 13, 1894.

Bülow, Karl Eduard von, a German author, born at Berg vor Eilenburg in Saxony in 1803. His literary fame rests mainly on his "Book of Tales," after ancient Italian, Spanish, French, English, Latin, and German originals (4 vols., 1834-1836), which was followed by a supplementary volume. Of his own original compositions, the "Springtide Wandering Among the Hartz Mountains" is one of the best. He wrote also the very interesting story of "The Youth of a Poor Man of Toggenburg," founded on the autobiography of Ulrich Brüker, a Swiss weaver. He published the original later. He died in 1853.

Bülow, Margarete von, a German novelist, born in Berlin in 1860. She wrote four volumes of stories, viz.: "Stories" (1885); "Jonas Briccius" (1886); "Chronicle of the Riffelshausen Folks," and "New Stories." She delineated character with great precision, and showed true insight into the human heart. She lost her life in an attempt to rescue a boy from drowning, in 1885.

Buloz, François (bü-lōz'); born near Geneva, Switzerland, 1803, died at Paris in 1877; founder and editor of the "Revue des Deux Mondes," the celebrated French fortnightly literary magazine.

Bulrush, or **Bullrush**, a name sometimes given to the botanical genus *typha*, called also cat's tail or reed mace. It is also the name of the genus *scirpus*, called also club-rush. Especially used of the species *scirpus lacustris*, lake clubrush. The bulrush of Scripture is the translation of two distinct

Bulthaupt

Hebrew words, *agmon*, possibly an *arundo* or some similar genus, in Isa. lviii: 5, and *gome*, evidently the *papyrus nilotica* (Ex. ii: 3, Isa. xviii: 2).

Bulthaupt, Heinrich Alfred (bölt'haupt), a German poet and dramatist, born in Bremen, Oct. 26, 1849. On quitting the university he was for a while a private tutor; then he traveled in the East, in Greece, and in Italy. He was a lawyer in his native town for some years, and in 1879 became custodian of the city library. Of his dramatic compositions the list is very long, comprising tragedies, "Saul," "A Corsican Tragedy," plays dealing with the questions of the time, "The Workman;" comedies, comic operas, etc. He has also written a work, already of high authority, on "Dramaturgy of the Theater" (3 vols.); also "Dramaturgy of the Opera" (2 vols.).

Bulti, the N. part of KASHMIR (*q. v.*).

Bul-tso (borax lake), a lake of Tibet, 100 miles N. W. of Lassa. Its area is 24 square miles.

Bulwer, Henry Lytton Earle (Lord Dalling), an English author and diplomatist, brother of Sir Edward Bulwer-Lytton, born Feb. 13, 1801; was minister to Madrid in 1843; in 1849 had a diplomatic mission to Washington, and was one of the negotiators of the BULWER-CLAYTON TREATY (*q. v.*); was ambassador to Turkey in 1858-1865. Among his works are "An Autumn in Greece" (1826); "France, Social, Literary, and Political" (1834-1836); and "Life of Byron" (1835). He died in Naples, May 23, 1872.

Bulwer-Clayton Treaty, a treaty negotiated at Washington, D. C., in April, 1850, by John M. Clayton, Secretary of State under President Taylor, and Sir Henry Bulwer, British Minister to the United States. The treaty provided that neither the United States nor Great Britain should attempt to control a proposed canal across Nicaragua. The treaty provided further for the neutrality of the canal, and it guaranteed encouragement to all lines of interoceanic communication. The terms of the treaty were afterward much disputed. In 1882 the United States Government intimated to Great Britain that the canal having become impracticable because of reasons for which Great Britain alone was responsible, the United States considered the treaty as no longer binding, but Great Britain continued to hold it as in force. On March 3, 1899, Congress passed a bill providing for the construction of a canal on the Nicaragua route, which also authorized the President to open negotiations with Great Britain for the abrogation of the Bulwer-Clayton Treaty, and under the last clause a convention between the two countries, abrogating the portions of the treaty

Bunion

that were deemed to be against the interests of the United States, was signed in Washington, Feb. 5, 1900.

Bulwer-Lytton, Edward, Lord Lytton, an English novelist, playwright, and poet, born in London, May 25, 1803; was the son of Gen. Earle Bulwer and Elizabeth B. Lytton, heiress of Knebworth, to whose estates he succeeded in 1844 and assumed the surname of Lytton. In 1847, and again in 1852, he sat in Parliament; and in 1858-1859 was Colonial Secretary, during which he called into existence the colonies of British Columbia and Queensland. In 1866 he was raised to the peerage as Baron Lytton. Altogether his works exceed 60 in number, and fill 110 volumes. His novels display great versatility, range of power, power of handling psychological and social problems, variety of incident and portraiture; and many are based on romantic and occult themes. Among the most famous are "Falkland" (1827); "Pelham" (1828); "Devereux" (1829); "Paul Clifford" (1830); "Eugene Aram" (1832); "Godolphin" (1833); "Pilgrims of the Rhine" (1834); "Last Days of Pompeii" (1834); "Rienzi" (1837); "Ernest Maltravers" (1837); "Alice, or the Mysteries" (1838); "Last of the Barons" (1843); "Harold" (1843); "The Caxtons" (1850); "My Novel" (1853); "What Will He Do with It?" (1859); "A Strange Story" (1862); "The Coming Race" (1871); "Kenelm Chillingly" (1873); and "The Parisians" (1873). Three of his dramas — "The Lady of Lyons" (1838); "Richelieu" (1838); and "Money" (1848) — still hold the stage. He died in Torquay, Jan. 18, 1873.

Buncombe, a county in North Carolina. The term bunkum, meaning talking for talking's sake, bombastic speech making, is said to have originated with a Congressional member for this county, who declared that he was only talking for Buncombe when attempts were made to cut his oratory short.

Bundesrath (bön'des-rät), the German Federal Council which represents the individual States of the Empire, as the Reichstag represents the German nation. It consists (1900) of 58 members, and its functions are mainly those of a confirming body, although it has the privilege of rejecting measures passed by the Reichstag.

Bungalow, the name applied to the kind of houses erected by Europeans in India. They are generally of one story, and with the roof thatched, the ceiling being often of white-washed cloth. They are not well adapted for defense against a foe.

Bunion, a term applied in surgery to enlarged bursæ, or synovial sacs, situated on any part of the foot; but most common over the metatarso phalangeal joint of the

first or the fifth toe (see Foot), and accompanied by more or less distortion of the joint. In the great majority of cases, bunions are directly produced by the pressure of badly fitting boots; and if the boots are constructed of patent leather, or any material which stops the excreting action of the skin, this, too, may be regarded as an indirect cause of their formation. Sometimes, however, the tendency to suffer from bunions is hereditary, and almost irremediable. A bunion begins as a painful and tender spot at some point exposed to pressure; the part gradually enlarges, and there are indications of an effusion into a natural bursa or a newly formed sac. The progress of the affection may stop here, the enlarged bursa remaining, and serving to protect the subjacent parts from pressure; but far more frequently the bunion undergoes repeated attacks of inflammation, causing further increase in size; or becomes the seat of corns or of suppuration. The last action may be followed either by obliteration of the cyst and a cure; or, especially in persons of languid circulation, by a troublesome form of ulcer. The one great thing, when there is a tendency to bunions, is the wearing of roomy boots or shoes, of soft and pervious material, and so shaped as not to press upon susceptible points. When pain occurs, wet lint covered with waterproof material, or poultices, should be applied, at all events at night. Enlargement may sometimes be reduced in its earlier stages by the application of iodine or a mercurial ointment. Where suppuration takes place, the sac should at once be laid freely open. The disease sometimes proves so troublesome that amputation of the toe, or excision of the ends of the bones affected, has been resorted to.

Bunker Hill, an eminence, 110 feet high, in the Charlestown district of Boston, Mass., connected by a ridge with another elevation, 75 feet high, named Breed's Hill. These heights are memorable as being the seat of a battle, June 17, 1775, and known under the name of Bunker Hill. The city of Boston was occupied by the British under General Gage, who had resolved to begin offensive operations against the rebels. This design becoming known in the American camp, it was determined to seize and fortify the heights of Charlestown on the night of June 16. The execution of this perilous mission was confided to Colonels Prescott and Pepperell at the head of a brigade of 1,000 men; and at dawn of day a strong redoubt was already completed on Breed's Hill. About 1,500 Americans advanced successively to the relief of Prescott, and General Warren entered the redoubt as a volunteer, refusing the command which was tendered to him. At about 2:30 o'clock, two columns of the British advanced to a

simultaneous assault; they were received with a terrific fire, and twice repulsed in disorder. When the Americans had exhausted all their ammunition, Prescott gave the order for retreat. They received a destructive volley as they left the redoubt, and Warren fell, shot through the head with a bullet. The retreat was harassed by a raking fire from the British ships and batteries, but there was no pursuit beyond Charlestown Neck. The British loss was 226 officers and men killed, and 828 wounded; that of the Americans 145 killed or missing, and 304 wounded. Although a defeat, the moral result of this action was great. The Americans had seen superior numbers of the disciplined soldiers of England retreat before their fire, and given the proof that they were able to defend their liberties. On Breed's Hill, and near the spot where Warren fell, stands now the Bunker Hill Monument, the corner stone of which was laid by the Marquis de Lafayette, June 17, 1825. This monument was inaugurated June 17, 1843. It consists of a plain granite shaft, 220 feet high, 31 feet square at the base, and 15 at the top. The monument affords a magnificent panoramic view of the surrounding country.

Bunner, Henry Cuyler, an American poet and story writer; born in Oswego, N. Y., Aug. 3, 1855; became a journalist in 1873, and was editor of "Puck" from shortly after its start till his death. Author of "A Woman of Honor" (New York, 1883); "Airs from Arcady and Elsewhere" (1884); "The Midge" (1886); "The Story of a New York House" (1887); "Zadoc Pine and Other Stories" (1891); "Short Sixes" (1891); "The Runaway Browns" (1892); "Jersey Street and Jersey Lane" (1896). He died in Nutley, N. J., May 11, 1896.

Bunsen, Christian Karl Josias, Chevalier, a distinguished German statesman and philosopher; born in Korbach, in the principality of Waldeck, Aug. 25, 1791. From early youth he turned his attention to the science of philology, studying it under Heyne at Göttingen, and subsequently proceeding to Holland and Denmark to acquire a critical knowledge of the Danish and Dutch languages. In the end of 1815 he made the acquaintance at Berlin of the celebrated Niebuhr, and in the spring of 1816 proceeded to Paris, where he studied Persian and Arabic under Sylvestre de Sacy. The same year he visited Rome, where he married, and renewed his intimacy with Niebuhr, then Prussian ambassador at the papal court. Niebuhr procured for his friend the appointment of secretary to the Prussian legation, and on his quitting Rome in 1823, Bunsen was in-

Bunsen

trusted with the performance of his duties, and in 1827 formally accredited as resident Prussian minister. In this capacity he continued till 1838, and conducted several important negotiations with the Papal See, the result of one of which was the brief of Leo XII. relative to mixed marriages. His situation ceased to be agreeable after the commencement of the Cologne embroilments, which he vainly tried to adjust, and he accordingly applied for a recall, which was granted under the form of permission to visit England. At Rome he had industriously pursued his philosophical and historical studies, including more especially that of the Platonic philosophy, and investigations into the religious and ecclesiastical history of mankind. The liturgies of the Church received his especial attention, and a service of his own framing, introduced by him into the chapel of the Prussian embassy at Rome, was printed by order of the King of Prussia, who himself wrote a preface to it. This work was published without the author's name in Hamburg in 1846, under the title of "General Hymn and Prayer Book of the Evangelical Lutheran Church," and may be regarded as a new edition of the "Versuch eines allgemeinen evang. Gesang- und Gebetbuchs," published in Hamburg in 1833.

In 1841 Bunsen was summoned to Berlin from Switzerland to go to England in charge of a mission for the establishment, in conjunction with that country, of a bishopric in Jerusalem. Shortly afterward he was nominated Prussian ambassador in England. In the matter of the Schleswig-Holstein question he strenuously supported, in his capacity of English ambassador, the claims of Prussia and the German Confederation in opposition to those of Denmark. Because of the views taken by him in relation to the Russian war he was recalled from London in 1854, and abandoning politics, retired to Heidelberg to devote himself exclusively to literary pursuits. The results of these have established his reputation as one of the most profound and original critics in the department of Biblical and Church history. Among his works are: "The Constitution of the Church of the Future" (Hamburg, 1845); "Egypt's Place in the World's History" (Hamburg, 1845); "Hippolytus and his Time" (London, 1851); and lastly, his greatest work, "Bible Commentary for the Community," the first part of which was published in 1858, and was intended to be completed in 1862. It had occupied his attention for nearly 30 years. Death prevented his completing the undertaking. He died in Bonn, Nov. 28, 1860.

Bunsen, Robert Wilhelm Eberhard, a German chemist; born in Göttingen, March 31, 1811. He was successively professor in Cassel, Marburg and Heidelberg. Among his

Bunting

many discoveries and inventions are the production of magnesium in quantities, magnesium light, spectrum analysis, and the electric pile and the burner which bear his name. He died in Heidelberg, Aug. 16, 1899.

Bunsen Battery, a modification of the Grove battery, plates or bars of gas coke being used instead of platinum. The electromotive force is slightly less than that of the Grove battery.

Bunsen's Burner, a form of gas burner especially adapted for heating, consisting of a tube, in which, by means of holes in the side, the gas becomes mixed with air before consumption, so that it gives a non-luminous smokeless flame.

Bunt, the *tilletia caries*, which attacks the ears of wheat, completely filling the grains with a black, fetid powder. This powder is a mass of spherical, reticulated spores, which, when crushed, give out a most disagreeable smell. It was formerly called *uredo foetida*, or stinking rust. Bread made from flour containing this fungus has a disagreeable flavor and a dark color. Such flour, however, is said to be sometimes used in the manufacture of gingerbread, the molasses effectually disguising the flavor. The presence of bunt is readily detected by the microscope.

Bunter Sandstone, one of the three great divisions of Triassic formation. It is the lowest, *i. e.*, the oldest, of the series. It corresponds to the *grès bigarré* (variegated freestone or grit) of the French. In the Hartz it is more than 1,000 feet thick; in Cheshire and Lancashire, England, about 600. The footprints of old called chirotherium, now known to be labyrinthodont, are found in the bunter; the plants are chiefly ferns, cycads, and conifers.

Bunting, the popular name of a number of insessorial birds, family *emberizidæ*, chiefly included in the genus *emberiza*; such



REED BUNTING.

Bunting

as the English or common bunting; the rice bunting; the Lapland, snow, black-headed, yellow, cirl, and ortolan buntings. The yellow bunting or yellow hammer (*E. citrinella*) is one of the most common British birds. The common or corn bunting (*E. miliaria*) is also common in cultivated districts. The snow bunting (*plectrophanes nivālis*) is one of the few birds which cheer the solitudes of the Polar regions.

Bunting, a thin woolen stuff, of which the colors and signals of a ship are usually formed; hence a vessel's flags collectively.

Bunyan, John, author of the "Pilgrim's Progress," was the son of a tinker, and was born in the village of Elstow, near Bedford, England, in 1628. After receiving a scanty education, he for some time led a wandering life. During the civil war he served as a soldier, most probably in the army of the Parliament; and his mind now became impressed with a deep sense of religion. This reformation in his life was powerfully assisted by the piety of his wife, whom he married in 1648 or 1649, and who died some seven years later. He joined a Nonconformist body in Bedford, and at length in 1657 formally undertook the office of a public teacher among them. Acting in defiance of the severe laws enacted against dissenters from the Established Church, Bunyan was arrested on Nov. 12, 1660, and committed for trial to the county jail. He was indicted at the quarter-sessions early in 1661, and after an irregular trial was sentenced to three months' imprisonment, which was to be followed by banishment if he persisted in his determination to repeat his offense. He could not be induced to moderate his zeal, and consequently though not banished, he lay in prison almost continuously till 1672; and was again imprisoned in 1675 for six months.

To this confinement he owes his literary fame, for, in the solitude of his cell, his ardent imagination, brooding over the mysteries of Christianity, the miraculous narratives of the sacred Scripture, and the visions of Jewish prophets, gave birth to that admired religious allegory, the "Pilgrim's Progress"—a work which, like "Robinson Crusoe," has remained unrivaled amid a host of imitators. The first edition appeared in 1678; the second, describing the journey of Christian's wife and children, was published in 1684. His "Holy War made by Shaddai upon Diabolus" (1682), his other religious parables, and his devotional tracts, which are numerous, are also remarkable, and many of them valuable. Among the most noteworthy are: "Grace Abounding to the Chief of Sinners"; "The Jerusalem Sinner Saved"; "The Life and Death of Mr. Badman." On obtaining his liberty, Bunyan resumed his functions as a minister at Bedford, and be-

Burbage

came extremely popular. He often went to London to preach and was there welcomed by very large congregations. The conditions of travel in those days made these trips a great drain upon his health and strength, and he was attacked by a fever to which he succumbed after a few days. He died during a visit to London, Aug. 31, 1688.

Buol-Schauenstein (bwal-shou'en-stīn), **Karl Ferdinand, Count**, an Austrian statesman, born May 17, 1797; was minister in succession at Karlsruhe, Stuttgart, Turin, and St. Petersburg. He was second Austrian plenipotentiary at the Dresden Conference (1850), after which he was minister at London, until the death of Schwarzenberg recalled him to Vienna, to hold the portfolio of foreign affairs. He presided at the Vienna Conference in 1855, and represented Austria at the Congress of Paris. He died Oct. 28, 1865.

Buonaparte. See BONAPARTE.

Buonarroti, Michael Angelo. See ANGELO.

Buoy, any floating body employed to point out the particular situation of a ship's anchor, a shoal, the direction of a navigable channel, etc. They are made of wood, or, now, more commonly of wrought iron plates riveted together and forming hollow chambers. They are generally moored by chains to the bed of the channel, etc. They are of various shapes, and receive corresponding names; thus, there are the can buoy, the nun buoy, the bell buoy, the mooring buoy, the whistling buoy, etc. The name is also given to a floating object intended to keep a person afloat till he can be taken from the water: more particularly called a life buoy.

Buphaga, a genus of insessorial African birds, family *sturnidæ* (starlings). See BEEF EATERS.

Buprestidæ, or **Buprestidans**, a family of insects, section *pentamera*, sub-section *sternoxi*. They are akin to the *elateridæ*, or click beetles, but cannot leap like them. They are splendidly colored, green being the most common hue, after which follow blue, red, gold, and copper. More than 500 species are known.

Buprestis [from Greek, *bouprēstis* = a poisonous beetle (the Spanish fly?), which, eaten by cattle in their grass, makes them swell up and die, from *bous* = ox, and *pretho* = to blow up], the typical genus of the family *buprestidæ*. The buprestis of modern entomologists is not identical with that of the etymology.

Burbage, Richard, an English actor and contemporary of Shakespeare, was the son of James Burbage, also an actor, and the first builder of a theater in England, born about 1567. He was a member of the same

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company as Shakespeare, Fletcher, Hemming, Condell, and others, and filled all the greatest parts of the contemporary stage in turn. He was the original Hamlet, Lear, Othello, and Richard III., and played the leading parts in the plays of Beaumont and Fletcher, Ben Jonson, Webster, Marston, etc. Besides being an eminent actor, he seems to have been also a successful painter in oil colors. He died in 1619.

Burbank, Luther, an American naturalist, born in Lancaster, Mass., March 7, 1849; passed his boyhood on a farm; was educated at the Lancaster Academy, and early became interested in the study of plant-life. Removing in 1875 to Santa Rosa, Cal., this "modest gardener" there gained such success as an originator of new varieties of plants, fruits, and flowers as to place him in the front rank of naturalists. On his experiment farms he has originated, besides the Burbank potato, new varieties of plums, prunes, apples, peaches, nuts, berries, roses and other flowers, grasses, grains, trees, etc. Perhaps his greatest achievement is the thornless cactus, furnishing food for man and beast. In scientific and practical results no other cross-breeder has approached him. "The magnitude of Burbank's work," says Prof. Hugo de Vries, the eminent Dutch naturalist, "exceeds anything that ever was done before, even by large firms, in the course of generations." He has shown the possibilities of variation in plant-breeding to be practically unlimited.

Burbot, a fish of the cod family (*Lota maculosa*), shaped somewhat like an eel, but shorter, with a flat head. It has two small barbs on the nose and another on the chin. It is called also eel-pout or coney-fish, and is found in the fresh waters of northern Europe, Asia and America. It is much used as food in fur countries, but elsewhere is regarded as inferior.

Burbridge, Stephen Gano, an American military officer, born in Scott co., Ky., Aug. 9, 1831; organized for the Union army the famous 26th Kentucky Regiment, which he led at Shiloh, where he was promoted to the rank of Brigadier-General of Volunteers. He was engaged in the Vicksburg expedition under General Grant; led the charge at Arkansas Post and at Port Gibson, being the first to enter each of these places, and was retired with the brevet of Major-General in 1865. He died in 1894.

Burchard, Samuel Dickinson, an American Presbyterian clergyman, born in Steuben, N. Y., Sept. 6, 1812; for many years pastor in New York city; created much political excitement throughout the United States by an alliterative characterization of the Democratic Party during the Presidential campaign of 1884. A company of clergymen, about 600 in number, called on James G. Blaine, the Republican candidate, at the Fifth Avenue Hotel, New York city,

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where Burchard made an address, in which he affirmed that the antecedents of the Democracy were "Rum, Romanism, and Rebellion." He died Sept. 25, 1891.

Burckhardt, Johann Ludwig, a Swiss traveler, born in Lausanne in 1784. He went to England in 1806, and undertook a journey of exploration to the interior of Africa for the African Association. He started in 1809, assuming an Oriental name and costume; spent some time in Syria, thence visited Egypt and Nubia; spent several months at Mecca, and visited Medina; and, after a short stay in Egypt, died at Cairo while preparing for his African journey, in 1817. He wrote: "Travels in Nubia" (1819); "Travels in Syria and the Holy Land" (1822); "Travels in Arabia" (1829); "Notes on the Bedouins and Wahabys" (1830), and "Arabic Proverbs" (1831).

Burden, Henry, an American inventor, born in Dumblane, Scotland, April 20, 1791; was brought up on a farm, and, at an early age, showed his inventive genius by making a variety of labor-saving machinery, including a threshing machine. He came to the United States in 1819; engaged in the manufacture of agricultural implements; invented an improved plow; the first cultivator made in this country; machines for making horse shoes and hook-headed spikes used on railroads; a self-acting machine for rolling iron into bars; and a new machine for making horse shoes, which received a rod of iron and turned out completed shoes at the rate of 60 a minute. He died in Troy, N. Y., Jan. 19, 1871.

Burden of Proof, in legal procedure, signifies the obligation to establish by evidence certain disputed facts; and, as a general rule, this burden lies on the party asserting the affirmative of the issue to be tried or question in dispute, or on the party who would fail if no evidence were adduced on either side. Accordingly, it almost always rests on the plaintiff or pursuer in an action, or on the party asserting the facts on which the result of the litigation must depend. There may, however, be such a legal presumption in favor of the pursuer, that the burden falls on the defender. Thus, where a deed granted by a client in favor of a law agent is impeached, the law agent would have to prove that it was properly obtained and afterward confirmed by the client. And matters alleged in defense must, of course, be proved by the defender.

Burdett, Sir Francis, an English politician, born Jan. 25, 1770. He sat in the British Parliament for 40 years, as a Liberal of the most ultra type; was one of the earliest advocates of Parliamentary reform, and suffered bitter persecutions at the hands of the Tory government of those times. He was twice imprisoned in the Tower of Lon-

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don for his outspoken Liberalism, fined \$5,000, and condemned to three months' further imprisonment in the King's Bench. He died Jan. 23, 1844.

Burdette, Robert Jones, an American journalist and humorist, born in Greensboro, Pa., July 30, 1844. He served in the Union army during the Civil War. He is famous for humorous newspaper skits, of rare variety, charm, and unrepentitious freshness; begun in the Burlington (Ia.) "Hawkeye," of which he became associate editor in 1874. Among his works are "The Rise and Fall of the Mustache," a lecture (1877); "Hawkeyes," collected articles (1880); "Life of William Penn" (1882); "Sons of Asaph," "Chimes from a Jester's Bells," etc. He was licensed as a Baptist clergyman in 1887.

Burdett-Coutts, The Right Hon. Angela Georgina, Baroness, daughter of Sir Francis Burdett, born April 21, 1814. In 1837 she inherited much of the property of her grandfather, Thomas Coutts, the banker, on the death of his widow, Miss Mellon the actress once, afterward Duchess of St. Albans. Besides spending large sums of money in building and endowing churches and schools, she endowed the three colonial bishoprics of Cape Town, Adelaide, and British Columbia, founded an establishment in South Australia for the improvement of the aborigines, organized the Turkish Compassionate Fund (1877), and established a fishery school at the Irish village of Baltimore (1887). To the city of London she presented, besides several handsome fountains, the Columbia Market, Bethnal Green (1870), for the supply of fish in a poor district; she also built Columbia Square, consisting of model dwellings at low rents, for about 300 families; and the People's Palace owes much to her generosity. In 1871 she accepted a peerage. In 1881 she was married to William Ashmead-Bartlett (born in 1846), who in 1882 obtained the royal license to assume her name, and who, in 1885, was elected Conservative member for Westminster. She died Dec. 30, 1906.

Burdick, Francis Marion, an American jurist and legal writer, born in De Ruyter, N. Y., Aug. 1, 1845. He was graduated at Hamilton College in 1869 and at its Law School in 1872. He practiced law in Utica, N. Y., from 1872 to 1883, and was later Professor of Law at Hamilton College and at Cornell. Since 1891, he has been Professor of Law at Columbia. He has written "Law of Sales," "Law of Partnership," and other legal text books.

Burdock, the English name of *arctium*, a genus of plants belonging to the order *asteraceæ* (composites), and the sub-order *tubulifloræ*. The common burdock, *A. lappa*, is well known.

Burgess

Bureau, a French word signifying a writing table or desk; also an office for transacting business, a department of government, or the officials that carry it on. In the United States, it is also used in the latter sense; but is universally the word for a chest of drawers.

Bureaucracy, government by departments of State, acting with some measure of independence of each other, instead of government by the heads of those departments acting as a cabinet on their joint responsibility.

Buren, Martin Van. See VAN BUREN.

Bürger, Gottfried August (bürg'er), a German poet, born in Molmerswende, Anhalt, Dec. 31, 1747. Shakespeare and Percy's "Reliques of English Ballad Poetry" had a decisive influence in giving direction to his efforts

at poetic expression.

"Lemore" (1773), estab-

lished his reputation

as a poet,

which was sustained by

the ballads that followed it, "The

Parson's Daughter,"

"The Wild Huntsman,"

"The Song of the Brave

Man," "Kaiser and Abbott." Specimens

of his burlesque ballads are "The Robber

Count," "The Wives of Weinsberg." He

died in Göttingen, June 8, 1794.

Burgess, Edward, an American naval architect, born in West Sandwich, Mass., June 30, 1848. He was educated at Harvard, where he graduated in 1871, and became secretary of the Boston Society of Natural History. He was instructor of entomology at Harvard from 1879 to 1883. He then became a designer of sailing yachts. In 1884 he designed the "Puritan," the winner of the America's Cup in 1885; and a year later the "Mayflower," the winner in 1886. He died in Boston, Mass., July 12, 1891.

Burgess, James, a Scotch Orientalist, born in Kirkmahoe, Dumfriesshire, Aug. 14, 1832. He went to India in 1855 and became director-general of archæological surveys there. He has published "The Rock Temples of Elephanta," "Epigraphia Indica," and similar works of importance.

Burgess, John William, an American educator; born in Cornersville, Tenn., Aug. 26, 1844. He was educated at Cumberland



GOTTFRIED A. BÜRGER.

Burgh

University, Lebanon, Tenn., and at Amherst. He studied law, and began its practice at Springfield in 1869. During this year he was appointed Professor of English Literature and Political Economy at Knox College. Two years later, he studied abroad at Göttingen, Leipsic, and Berlin. On his return, he became Professor of History and Political Science at Amherst, and in 1876 Professor of History, Political Science and International Law in Columbia College and of Public Law and Political Science in its Law School. In 1880 he was made Professor of Constitutional and International History and Law in the School of Political Science at Columbia College.

Burgh, the same as borough. The spelling borough is the common one in England, while burgh is that which chiefly prevails in Scotland. Examples: Scar-borough, Edinburgh. A burgh of barony, in Scotland, is a certain tract of land created in a barony by the feudal superior, and placed under the authority of magistrates. A royal burgh in Scotland is a corporate body created by a charter from the crown. There is a convention of royal burghs. In the United States the termination borough was for generations added to the names of places, as in England; but, under a decision of the United States Board on Geographic Names, the form is now boro, as Brattleboro.

Burgher, a former subdivision of the Scottish Secession Church. The Secession, which originated through the withdrawal of Ebenezer Erskine and some other ministers from the Scottish establishment in 1732, split in two in 1747, part having felt free to take, while others refused what they deemed an ensnaring burgess oath. They reunited in 1820 under the name of the Associate Synod, and, joining with the "Relief" in 1847, formed the United Presbyterian Church.

Burghley, Lord. See BURLEIGH.

Burglary, the crime of breaking into an inhabited house, a church, or the gates of a town by night with the intention of committing a felony. In the United States, burglary is punished by State laws, but the common law is generally followed. Some States include breaking into shops, offices, warehouses, factories, and meeting houses as burglary. An Act of Congress of 1825 expressly includes breaking into boats and vessels with intent to commit a felony. In some States the same deed done in the daytime is defined as burglary in the second degree. The night is the time, between one hour after sunset and one hour before sunrise, or when the features of a man cannot be clearly discerned. In the United States, burglary is never punished by penal servitude for life, but long sentences are frequently imposed.

Burgoyne

Burgkmair (börk'mer), a family of German artists in the 15th and 16th centuries, the best known of whom is HANS, born in Augsburg in 1472. Several of his paintings are to be seen at Augsburg, Munich, Nürnberg, etc., but these have contributed far less to his fame than his woodcuts, which are not inferior to those of his friend, Albert Dürer. The most celebrated is the series of 135 cuts representing the "Triumph of the Emperor Maximilian." He is supposed to have died in 1559.

Bürglen (börg'len), a village of Switzerland, in the Canton of Uri, about a mile from Altorf; is the traditional birthplace of William Tell. The supposed site of the patriot's house is now occupied by a chapel, erected in 1522, upon the walls of which are represented certain well known scenes from his history.

Burgos, a city of Northern Spain, once the capital of the kingdom of Old Castile, and now the chief town of the Province of Burgos. It stands on the declivity of a hill on the right bank of the Arlanzon, and has dark, narrow streets full of ancient architecture, but there are also fine promenades in the modern style. The cathedral, commenced in 1221, is one of the finest examples of Gothic architecture in Spain. It contains the tombs of the famous Cid, and of Don Fernando, both natives of Burgos, and celebrated throughout Spain for their heroic achievements in the wars with the Moors. Before the removal of the court to Madrid, in the 16th century, Burgos was in a very flourishing condition, and contained thrice its present population. It has some manufactures in woolens and linens. Pop. (1900) 30,167. The Province has an area of 5,480 square miles, largely hilly or mountainous, but with good agricultural and pastoral land. Pop. (1900) 338,828.

Burgos, Francisco Javier de, a Spanish statesman and poet, born at Motril, in Granada, in 1778. In his dramatic compositions he sought to restore the classical Spanish comedy. Among them are "The Three (Women) Equals," "The Masked Ball," "The Optimist and the Pessimist." He wrote a celebrated "Ode to Reason." He died in 1845.

Burgoyne, John, an English general and dramatic author, born Feb. 24, 1723: After having served with distinction in Portugal, he was sent to America in 1775. He joined General Gage at Boston, with large reinforcements, and witnessed the battle of Bunker Hill, of which he has left an animated description. After proceeding to Canada as Governor, he returned to England, but in 1777 was dispatched to take command of that expedition from Canada against the United States, the failure of which so largely contributed to the establishment of American freedom. Few bat-

Burgoyne

bles, indeed, have achieved, in their ultimate influence, results so great as the surrender of Burgoyne with 5,791 fighting men, well provided with artillery, at Saratoga, to the army of General Gates. On his return home, he was received by the King with marked disfavor. Burgoyne did not possess the genius of a great general, and was in many respects utterly inadequate to the tasks imposed upon him, yet no one can read the work published in his defense—"State of the Expedition from Canada" (London, 1780)—without acknowledging his courage, and detecting qualities, which, in a less exalted station, might have been of service to his country. Disgusted with his treatment by the government, he retired into private life, and devoted his leisure to the production of dramas, many of which, as the "Maid of the Oaks," "The Lord of the Manor," etc., were highly popular in their day. His best play, "The Heiress," still keeps the stage. He died in London, Aug. 4, 1792.

Burgoyne, Sir John Fox, an English engineer, son of the preceding, born in London, July 24, 1782. Entering the Royal Engineers he served in Malta, Sicily, Egypt, and, with Sir John Moore and Wellington, in the Peninsula from 1809 to 1814, and was present at all the sieges, generally as first or second in command of the engineers. In 1851 he was made a lieutenant-general, and was chief of the engineering department at Sebastopol till recalled in 1855. In the following year he was created a baronet, and in 1868 a field marshal. He died Oct. 7, 1871.

Burgundy, a region of Western Europe, so named from the Burgundians, a Teutonic or Germanic people originally from the country between the Oder and the Vistula. They migrated first to the region of the Upper Rhine, and, in the beginning of the 5th century, passed into Gaul and obtained possession of the S. E. part of the country, where they founded a kingdom having its seat of government sometimes at Lyons and sometimes at Geneva. They were at last wholly subdued by the Franks. In 879 Boson, Count of Autun, succeeded in establishing the royal dignity again in part of this kingdom. He styled himself King of Provence, and had his residence at Arles. His son, Louis, added the country beyond the Jura, and thus established Cis-Juran Burgundy. A second kingdom arose when Rudolph of Stettlingen formed Upper or Transjuran Burgundy out of part of Switzerland and Savoy. Both these Burgundian kingdoms were united, and finally, on the extinction of Rudolph's line, were incorporated with Germany. But a third State, the historical DUCHY OF BURGUNDY, consisting principally of the French Province of Bourgogne or Burgundy, had been formed as a

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great feudal and almost independent Province of France in the 9th century. This first ducal line died out with a Duke Philip, and the duchy, reverting to the crown, was, in 1363, granted by King John of France to his son, Philip the Bold, who thus became the founder of a new line of Dukes of Burgundy. A marriage with Margaret, daughter of Louis III., Count of Flanders, brought him Flanders, Mechlin, Antwerp and Franche-Comté. He was succeeded by his son, Duke John the Fearless, whose son and successor, Philip the Good, so greatly extended his dominions that, on his death in 1467, his son Charles, surnamed the Bold, though possessing only the title of Duke, was in reality one of the richest and most powerful sovereigns of Europe. Charles left a daughter, Mary of Burgundy, the sole heiress of his States, who by her marriage to Maximilian of Austria transferred a large part of her dominions to that Prince, while Louis XI., of France, acquired Burgundy proper as a male fief of France. Burgundy then formed a Province, and is now represented by the four Departments of Yonne, Côte-d'Or, Saône-et-Loire, and Ain. It is watered by a number of navigable rivers, and is one of the most productive provinces in France, especially of wines.

Burgundy Pitch, the *pix burgundica*, the resinous exudation of the stem of the spruce fir, *abies excelsa* or *pinus abies*, melted and strained. It is got from Switzerland, but seldom genuine. It is hard and brittle, opaque, of a dull reddish brown color, empyreumatic odor, and aromatic taste. It gives off no water when heated, is not bitter, and is free from vesicles. It consists chiefly of resin and a little volatile oil, whence its odor. The resin resembles that of turpentine. Pitch plaster acts externally as a slight stimulant to the skin. It enters also into the composition of the iron plaster.

Burgundy Wine, the finest of all the French wines, the produce of vines cultivated in the Côte-d'Or, a portion of the ancient Province of Burgundy. The most noted of the red wines of Burgundy are Richebourg and Chambertin. The white wines are less celebrated.

Burhānpur, a town of India, Central Provinces, formerly the capital of Kandeish, and famous for its muslin and flowered silk manufactures, which still exist to some extent, though the town has long been declining.

Burial, the most universal method of disposing of the dead, the practice of burning them on a funeral pile, prevalent to a limited extent among the Greeks and the Romans, and nearly universal among the Hindus, being the exception and not the rule. The Egyptians, and, at least in some

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special cases, the Jews, embalmed their dead (Gen. 1: 3, 26; John xix: 39, 40). In Europe, according to Sir John Lubbock, interments in which the corpse is in a sitting or contracted posture belong to the stone age, those in which it has been burned and only the ashes interred, to the bronze age, and those in which the corpse lies extended, presumably to the age of iron. During the first French Revolution a proposal was made to adopt the process of cremation, but it failed. The project was revived on the Continent during the 19th century, and recommended in England, in 1873, by Dr. Henry Thompson, but as yet it has met with little acceptance from the public. In 1875 Sir Seymour Hadden advocated the "earth to earth" system of sepulture, and in the same year wicker coffins were exhibited at Stafford House, but this innovation, too, has as yet been unpopular. Several crematories are in operation in the United States, the best known of which are those at St. Louis, Mo., Albany, N. Y., Fresh Pond, N. Y., San Francisco, Cal., and Chicago, Ill. In 1693, 1733 and 1783, acts were passed in England imposing a tax on burials, but it has been long since repealed. A *felo de se* or suicide was formerly buried in the highway with a stake driven through his body, and all his goods and chattels were forfeited to the king.

Buriats, a nomadic Tartar people allied to the Kalmucks, inhabiting the S. part of the government of Irkutsk and Transbaikalia. Their number is about 200,000. They live in huts called *yurts*, which, in summer, are covered with leather, in winter with felt. They support themselves by their flocks, by hunting, and the mechanical arts, particularly the forging of iron.

Buridan, Jean (bö-rē-dän'), a French scholastic philosopher, born in Bethune, about 1300. The events of his life, as well as the manner of his death, are very obscure. He is now best known for an apologue which he invented to illustrate the doctrine of free will. "An ass," says he, "placed midway between two bundles of hay, would maintain his position, and die of starvation, if he had no choice; but if he turns to one side or the other for the purpose of satisfying his appetite, then he has choice, and of course freedom of will." This proposition, commonly called "Buridan's Ass," was long a source of great perplexity to the schools. It has been said that this celebrated sophism was adduced, not by Buridan, but by his adversaries, who wished to ridicule his metaphysical doctrine of determinism. He died about 1358.

Burin, or **Graver**, the principal instrument used in copper engraving, is made of tempered steel, and is of prismatic form, the graving end being ground off obliquely to a sharp point. The distinctive style of a

Burke

master is frequently described by such expressions as a soft burin, a graphic burin or a brilliant burin.

Buriti (bur-rē'tē), a South American palm (*mauritia vinifera*) growing to the height of 100 to 150 feet, preferring marshy situations, and bearing an imposing crown of fan shaped leaves. A sweet vinous liquor is prepared from the juice of the stem, as also from the fruits.

Burke (from BURKE, an Irishman, who, when popular prejudice against allowing human corpses to be dissected had run up their price to a high figure, tried to make a living by luring the unwary into his house and suffocating them, to sell their bodies to the doctors. After he had admittedly made away with 15 people in this manner, he was executed in Edinburgh, on Jan. 28, 1829), to smother or suffocate after the manner adopted by Burke; to kill a person for the purpose of selling his body for dissection. The word is also applied to the act of quietly putting out of existence a parliamentary motion or anything similar, making as little noise as possible over the transaction.

Burke, Edmund, a British orator and statesman; born in Dublin, Ireland, Jan. 12, 1729. His father was an attorney of reputation, and he received his education under Abraham Shackleton, a Quaker, at Ballitore. In 1743 he was entered at Trinity College, Dublin, as pensioner, where he chiefly occupied himself with a plan of study of his own, the principal objects of which were the classics, logic, metaphysics, morals, history, rhetoric, and composition. He left Trinity College, after taking a bachelor's degree, in 1748; and not much is recorded of his life for the next few years. In 1750 he first entered the great theater of London as a law student at the Middle Temple, but he did not study with assiduity and was never called to the bar. He is said to have become the admiration of his intimates, however, for the brilliancy of his parts and the variety of his acquisitions. Applying himself to literature, he supported himself by his pen, and by intense occupation brought himself into a state of ill health. This illness, by making him a guest of Dr. Nugent, an eminent physician, led to his marriage with that gentleman's daughter. In 1756 he published, without a name, his first work, entitled "A Vindication of Natural Society, in a Letter to Lord ———, by a late Noble Writer." This work exhibited so complete an imitation, although ironical, of the style of Bolingbroke, that many persons were deceived by it, not perceiving Burke's intention to prove that the same arguments with which that nobleman had attacked religion might be applied against all civil and political institutions whatever. In the same year he published

his "Philosophical Inquiry into the Origin of our Ideas of the Sublime and Beautiful." The elegance of its language and the spirit of philosophical investigation displayed in it introduced the author to the best literary acquaintance. In 1758 he suggested to Dodsley the plan of the "Annual Register," and took upon himself the composition of the historical part, which he continued for a number of years. He was thus gradually forming himself for a statesman.

His political career may be said to have commenced in 1761, when he went to Ireland as confidential friend to William Gerard Hamilton, then secretary to the lord-lieutenant, Lord Halifax. In 1763 Hamilton obtained for him a pension of £300 per



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annum on the Irish establishment, but the conduct of his patron soon led him to throw it up. On his return to London he joined the club to which Dr. Johnson, Garrick, and Reynolds belonged, all of whom became his intimate friends. In 1765, he was introduced to

the Marquis of Rockingham, who made him his private secretary; and through the same interest he entered Parliament as member for Wendover. The marquis also made him a nominal loan, but real gift, of a large sum, which, together with funds otherwise obtained, placed him for a time in easy circumstances, and enabled him to purchase his elegant seat near Beaconsfield.

The first speech of Burke in Parliament was on the Grenville Stamp Act; and it was at his advice that the Rockingham administration took the middle and undecided course of repealing the act, and passing a law declaratory of the right of Great Britain to tax the American colonies. This ministry was soon dissolved to make room for a new cabinet under Pitt. Burke concluded his official labors by his pamphlet entitled, "A Short History of a Short Administration" (1766). In the proceedings against Wilkes he joined the remonstrants against the violation of the rights of election, and in 1770 published his "Thoughts on the Causes of the present Discontents," the sentiments of which are consistent with his future doctrines and conduct.

He opposed the ministerial measures antecedent and consequent to the American war; and the whole powers of his eloquence were exerted, first to prevent and then to heal the fatal breach between the mother country and her colonies. In 1774 he was chosen member for Bristol, and for the next eight years Fox warmly supported him in his opposition to Lord North's administration. In 1778 he delivered his famous speech against the employment of the Indians in the American war. He subsequently ventured to give offense to his Bristol friends, by his support of the Irish petitions for free trade, and for moderating the penal statutes against the Roman Catholics. In 1780 he introduced his famous economical reform bill, which he unsuccessfully advocated with an extraordinary union of wit, humor, and financial detail. Next year, being now member for Malton he again brought it forward without success. In 1783 Lord North's ministry was dissolved; and on the return of the Marquis of Rockingham and his party to power, Burke obtained the lucrative post of paymaster-general of the forces and a seat at the council board. He also embraced the auspicious opportunity to reintroduce his reform bill, which passed, but not without considerable modifications. On the death of the Marquis of Rockingham, and the succession of Lord Shelburne, Burke resigned and joined the coalition. The India Bill formed the ostensible cause for dismissing this ill-judged combination; and Pitt succeeded to the helm, his administration lasting for 17 years. The next great political event in Burke's life was his share in the prosecution of Warren Hastings, which trial, indeed, originated with him. His conduct in this affair gained him little in the public estimation, except increased fame as an orator. On the settling of the regency in 1788 he argued against the principle of the ministers that the regency was elective and not hereditary.

The last great act of his political life was the part he took in the discussions on the French Revolution. He early manifested his dislike to it, and in 1790 loudly condemned the principles and conduct of the revolutionists. It was mainly this feeling that made him oppose Fox's bill for the repeal of the Test and Corporation Acts (March, 1790). His famous "Reflections on the Revolution in France" appeared in November of that year; and no work ever attracted more attention or produced more effect. It exhibits both the merits and defects of the writer, and contains much justness of argument, profundity of observation, and beauty of style; but it is equally obvious that he commits the very fault which he intended to reprobate in his "Vindication of Natural Society," by making his arguments applicable to the defense

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of all establishments, however tyrannical, and censure of every popular struggle for liberty, whatever the oppression. It had an unprecedented sale, and obtained unbounded praise from all who trembled for odious character which the French Revolution was beginning to assume. On the establishments or were alarmed at the other hand, it met with severe and formidable critics and opponents, and, among other things, produced the celebrated "Rights of Man," of Thomas Paine, and the "Vindiciæ Gallicæ," of Sir James Mackintosh. Burke followed up this attack with a "Letter to a Member of the National Assembly" (1791); an "Appeal from the New to the Old Whigs" (1791); "Letter to a Noble Lord on the Subject in Discussion with the Duke of Bedford" (1796); "Letters on a Regicide Peace" (1796-1797); etc. In all these productions he displayed unabated powers of mind. In 1792 he published a "Letter to Sir Hercules Langrishe, on the Propriety of admitting Roman Catholics to the Elective Franchise." In 1794, after a nine days' speech against Warren Hastings, he withdrew from Parliament, and was succeeded in the representation of Malton by his only son. Decay, by gradual approaches, terminated his life on July 9, 1797.

He preserved his senses to the last; and a few hours before he died he had read to him Addison's paper in the "Spectator," on the immortality of the soul. Amiable in private life, and exemplary in his domestic and social relations, he was greatly beloved by his friends. His conversation was delightful and instructive. He was exceedingly charitable and beneficent, and founded a school for the children of French emigrants, the permanent support of which formed one of his latest cares. His public character will be best understood from a study of his political career, and his powers of mind from his publications. In delivery, the effect of his speeches was by no means proportioned to their absolute merit; their length, their copiousness, abundance of ornament, and wide field of speculation, producing impatience in men of business absorbed in the particular subject of debate.

Burke, Sir John Bernard, an English herald and genealogist; son of John Burke (1787-1848), representative of a Tipperary family, who in 1826 published the "Peerage and Baronetage of the United Kingdom." The son, born in London, in 1815, and educated at Caen in Normandy, was trained as a lawyer and called to the bar in 1839. Besides editing the successive issues of the "Peerage" founded by his father (49th ed., 1887), published other

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works on the "Landed Gentry" (1846); "Extinct Peerages" (1846); "Anecdotes of the Aristocracy" (1849); "Family Romance" (1853); "The Vicissitudes of Great Families" (1859); "The Rise of Great Families" (1873); and "Reminiscences" (1882). He died in Dublin, Dec. 13, 1892.

Burke, Robert O'Hara, an Irish explorer; one of the first white men to cross the Australian continent from S. to N., was born at St. Cleram, County Galway, in 1820; educated in Belgium; served in the Austrian army (1840), became captain. joined the Irish constabulary (1848), and emigrated to Australia in 1853. While inspector of police in Victoria he accepted the leadership of an expedition for crossing the Australian continent. After many hardships, Burke and Wills reached the tidal waters of the Flinders river. He died of starvation on his return journey, June 28, 1861.

Burkitt, Francis Crawford, an English Biblical scholar, born in London, Sept. 3, 1864. He was graduated at Trinity College, Cambridge. He has published "Early Christianity Outside the Roman Empire," "Fragments of Aquila," "The Rules of Tyconius," and other important studies.

Burleigh, William Cecil, Lord, an English Secretary of State under Edward VI. and Elizabeth, and Prime Minister of England for 40 years, born in Lincolnshire, Sept. 13, 1520. In 1588 Parliament was assembled, and, by his advice, a plan of religious reform was laid before it. In this he had a considerable share; and he also took the leading part in the establishment of the Thirty-nine Articles of faith, which form the basis of the reformed religion of the State. To him is also due the regulation of the coinage, which had been altered since Henry VIII.'s time. He was created Baron Burleigh in 1571, and, in 1588, concluded an advantageous treaty with the Netherlands. He died in London, Aug. 4, 1598. His son, ROBERT CECIL, minister under Elizabeth and James I., was sent to the court of Henry IV., of France, to negotiate a treaty of peace with Spain. He was greatly instrumental in the death of the Earl of Essex, was loaded with honors by James I., and created Earl of Salisbury.

Burlesque, a low form of the comic, arising generally from a ludicrous mixture of things high and low. High thoughts, for instance, are clothed in low expressions, noble subjects described in a familiar manner, or *vice versa*. The true comic shows us an instructive, if laughable, side of things; the burlesque travesties and caricatures them in order to excite laughter or ridicule.

Burlingame, Anson, an American diplomatist, born in New Berlin, N. Y., Nov. 14,

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1822. Having embarked in politics, he was elected a member of the Senate of Massachusetts, and afterward of Congress. He was sent as United States Minister to the Chinese Government in 1861. On his retirement from this post, in 1867, he was requested by the Regent, Prince Kung, to go on a special mission for the Chinese Government to some foreign courts. After visiting the United States, where he concluded a treaty, July 4, he sailed from New York, and arrived at Liverpool in September, with the Chinese mission, including 10 Chinese and 2 European secretaries. The mission, received by the Queen, Nov. 20, 1868, left England for Paris, Jan. 2, 1869. He died in St. Petersburg, Feb. 23, 1870.

Burlingame, Edward Livermore, an American man of letters, born in Boston, May 30, 1848. He studied at Harvard and acted as private secretary to his father, Anson Burlingame, United States Minister to China. Since 1879 he has been associated with the publishing house of Charles Scribner's Sons, and in 1886 became editor of "Scribner's Magazine."

Burlington, a city and port of entry in Burlington co., N. J., on the Delaware river and the Pennsylvania railroad; 18 miles N. E. of Philadelphia. It is a manufacturing trade center for surrounding towns, and contains St. Mary's Church, endowed by Queen Anne; St. Mary's Hall, the oldest church school for girls in the country; the State Masonic Home; Van Rensselaer Seminary; Burlington Academy, and many fine old residences; and has manufactories of shoes, stoves, iron pipe, terra cotta, and canned goods. The city was settled in 1677, by Friends, under the name of New Beverly; was for many years the seat of government of West Jersey; and was the residence of the last Colonial Governor, William Franklin. It was bombarded by the British in 1776, and was incorporated in 1784. Pop. (1890) 7,264; (1900) 7,394; (1910) 8,336.

Burlington, city, port of entry and county-seat of Chittenden co., Vt.; on Lake Champlain and the Central Vermont and Rutland railroads; 40 miles N. W. of Montpelier. It has a very large lake commerce and manufactories of lumber, cotton and woolen goods, and iron. The environment is agricultural. The city is the seat of the State University of Vermont and of the State Agricultural and Medical Colleges; Bishop Hopkins Hall; the Cathedral of the Immaculate Conception (Roman Catholic); the Fletcher, University, Billings and Burlington Law Libraries; a County Courthouse; United States Government Building, and a Young Men's Christian Association Hall. Burlington is noted for its benevolent and educational institutions, which in-

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clude the Mary Fletcher Hospital, Home for Aged Women, Home for Friendless Women, Home for Destitute Children, Adams Mission House, Louisa Howard Mission, Providence Orphan Asylum, Cancer Relief Association, Lake View Retreat, several sanitariums, the Vermont Episcopal Institute, St. Joseph's and St. Mary's Academies (Roman Catholic), and high and graded schools. The city was settled in 1773; was a garrisoned post during the War of 1812; and was incorporated in 1865. Its material development has been largely due to its great lumbering industries. The famous Col. Ethan Allen is buried beneath a handsome monument in Greenmount Cemetery. Pop. (1890) 14,590; (1900) 18,640; (1910) 20,463.

Burma, a province of British India; on the E. side of the Bay of Bengal; bounded on the E. by Siam, the Laos territory, and China, and on the N. and N. W. chiefly by Assam and other parts of India. At one time it formed the greater portion of a native kingdom or empire, which is said to have extended from lat. 9° to 26° N., and from lon. 92° to 104° E., its greatest length being about 1,000 miles, and its breadth 600; its area being then about 270,000 English square miles. But in 1826 the provinces or divisions of Arracan and Tenasserim were wrested from it by the British, and in 1852 Pegu and the province of Martaban shared the same fate. This portion was then known as British Burma, and continued to be so till in 1886 the rest of the kingdom was annexed by Great Britain, when the two portions came to be designated Upper and Lower Burma respectively. They now form together one province, which is under a lieutenant-governor and legislative council. The area of Lower Burma is 87,957 square miles. It is to a large extent mountainous in character, the only extensive level being in Pegu, where the valleys of the Irrawadi and Sittaung form an alluvial tract of about 10,000 square miles. The rainfall varies from less than 60 inches in some places to 190 or more in others. About half the soil is believed to be cultivable, but a comparatively small portion is as yet under cultivation, though agriculture is extending year by year. Since the occupation of the country by the British it has rapidly increased in prosperity, and the revenue is generally greater than the expenditure. The imports and exports together exceed £10,000,000, the bulk of the trade being with Great Britain. The capital and principal port is Rangoon. Others are Moulmein, Akyab, and Bassein. The population, which in 1881 was 3,736,771, had in 1901 increased to 5,371,328. Upper Burma has an area of 83,473 square miles; pop. (1901) 3,849,833. It is on the whole simi-

lar in character to Lower Burma, but is less productive, and has generally a smaller rainfall. It is rich in minerals, including gold, silver, precious stones, marble, iron, lead, tin, antimony, arsenic, sulphur, and petroleum. Only a few of these are worked. The chief precious stones are the ruby and the sapphire; amber and jade are also found. All precious stones used to be sent to the royal treasury and strangers were prohibited from approaching the places where they were found. These districts are still the subject of special regulation under the British rule. The whole country is intersected by numerous streams, which, following the direction of the chief mountain chains, flow generally S. to the Indian Ocean. The chief of these are the Irrawadi, the Salween, and the Chindwin, which joins the Irrawadi, the combined stream being of great volume. The Irrawadi is of great value as a highway of communication and traffic, being navigable beyond Bhamo, near the Chinese frontier. In their upper courses the rivers flow through narrow valleys; in their lower courses they traverse low-lying districts, and in the rainy season often overflow their banks. Among the wild animals of the country are the elephant, rhinoceros, tiger, leopard, deer of various kinds, and the wild hog. The rivers abound with fish. Of domestic animals we may mention the ox, buffalo, horse, elephant, and cat. In the S. districts, owing to the numerous rivers, the soil is most productive. Here grow rice, sugar cane, tobacco, cotton, indigo, and all the tropical fruits. Tea is cultivated in many of the more elevated parts. The forests produce timber of many sorts, including teak. A great part of the trade of the country is carried on by means of the Irrawadi river. From Bhamo goods are conveyed to China, and this branch of trade is believed to be capable of great development. Rice is the great crop (occupying about 80 per cent. of the cultivated area), and this grain forms the chief export, others being teak, cotton and silk stuffs, petroleum, saltpeter, paper, and lacquer ware. Railways have been introduced, and the number of miles open is now about 1,000. From Rangoon two lines proceed N., one along the left bank of the Irrawadi to Prome and Meaday, the other through the Sittaung valley to Mandalay, and from that on the other side of the Irrawadi to Bhamo and Mogaung.

The Burmese have many skillful weavers, smiths, sculptors, workers in gold and silver, joiners, etc. Among industrial establishments are rice-mills, saw-mills, a few works for iron goods, shipbuilding yards, cutch works, etc. Other industries include boatbuilding, weaving, pottery, lacquer-work, and brasswork. The weaving of cotton and silk goods is carried on by the women everywhere. The pottery of the

country is strong and durable, if not specially artistic; and the gold and silver work finds numerous purchasers outside the country. Wood-carving is extensively practised for the adornment of houses, boats, etc. The native vessels plying on the Irrawadi and other rivers are often of 100 to 150 tons burden, while thousands of small craft are engaged in trade or fishing. Large numbers of good cigars are made by women, and are partly used in the country, partly exported. The buildings among the Burmese are very slight, as the government used to require them to be chiefly of wood or bamboo, and prohibited the use of stone or brick except for pagodas, and other important structures.

People.—The Burmese are divided into several tribes, and belong to the common Indo-Chinese stock. Among the tribes other than the Burmese proper are the Karens, Kachyens, Shams, etc. The Burmese proper are of a brown color, with lank, black hair, and vigorous, well-proportioned frames. No Burmese can have more than one wife; but he may have as many mistresses as he will. The latter live in the same house with the wife, and are her servants. The Burmese women enjoy a good deal of freedom; they are not shut up as in some parts of the East, and can even engage in a lawsuit in their own name. The chief amusement of the Burmese is their theater, where declamation, dancing, and music are given by turns. The new year (which begins in April) is celebrated with what is known as the "water feast," when young men and women throw water on each other and the passers-by. The Burmese usually write on palm leaves with an iron style or on black tablets with a pencil; the rich have libraries, with books the leaves of some of which are thin pieces of ivory, with gilt edges. Their materia medica is chiefly confined to herbs, spices, and mercury; with vaccination they have long been acquainted. The language is monosyllabic, like Chinese, and written with an alphabet (derived from India), the characters of which are more or less circular. Among the common people the principal part of the male dress consists of a double piece of cloth about five yards long, loosely wrapped about the body. Over this a frock is worn, with sleeves open in front, and reaching below the knees. The lower classes of women wear only a single garment, resembling a sheet, wrapped round the body and fastened under the arms. Men of rank wear a long robe of flowered velvet or satin, with open sleeves and collar, a mantle or scarf being thrown over this. On the head is worn a high velvet or silk cap, plain or embroidered, according to rank. The men wear ear-rings, often of large size. Women of the higher classes generally wear a shift which reaches only to the pit of the stomach, where it is drawn tight and fas-

tened by strings. This is covered by a loose jacket, with tight sleeves. A piece of silk or cloth encircles the waist and descends to the feet. When a woman wishes to be particularly fine she stains her nails and palms a red color, and tinges her teeth and the edges of her eyelids with black. Both sexes wear the hair long; the men tying it in a knot on the crown of the head, the women on the back. Sandals are often worn, but neither boots, shoes, nor stockings; every man, woman, and child, however, carries an umbrella. The chewing of betel and smoking of tobacco are universal. The Kakhyens or Singfo are a courageous people inhabiting the upper basin of the Irrawadi above Bhamo. They practise a sort of nature worship, and are active as traders, though at present rather lawless. Their villages are ruled by hereditary chiefs. The Chinese from Yunnan have of late years settled in considerable numbers as traders and agriculturists in the Kakhyen country; and in Lower Burma they are now a highly important element in the population as traders and otherwise. In the hilly districts of Tenasserim and Pegu we find the Karens, a somewhat secluded people, less intelligent and more ignorant than the Burmese, and not so purely Mongolian in physical character. The Talaings or Mons of the Irrawadi delta resemble the Burmese, but speak a distinct language. The Shans are a numerous people closely allied to the Siamese, and inhabiting Eastern and North-eastern Burma, together with portions of the neighboring countries.

The native government was an absolute monarchy, the king having unlimited power over life and property. The seat of government, after oscillating between Ava and Amarapura, was latterly fixed in Mandalay, a new town founded in 1857, and situated in a dusty plain a little over 2 miles from the left bank of the Irrawadi, and about 28 miles N. W. from Amarapura. The king was assisted in governing by a council of State known as the *Hloot-daw*, to which belonged at once the functions of a legislature, a cabinet, and a supreme court of justice. It was composed of officials of 14 grades, the president being the king himself, some other member of the royal family, or the prime minister. The king had power to punish at his pleasure anyone, including even the great officers of State. The public revenue was derived from taxes levied in a very irregular and capricious manner, and as the officials received no fixed salary corruption and oppression were extremely prevalent. The criminal laws were barbarously severe. Capital punishment was commonly inflicted by decapitation, but crucifixion and disemboweling were also practised. Torture might be applied to principals or witnesses; and trial by ordeal was not unknown. The standing army was small.

Levies were made, in case of war, by way of conscription; and a specified number of houses was required to furnish a soldier or pay a fine.

The religion of the country is that of Buddha, which is said to exist here in great purity. The tutelary divinities worshiped in various Buddhist countries are unknown, and the vows of poverty and chastity taken by the monks are said to be less frequently broken here than elsewhere. The Burmese possess a complete system of education, so far as male children are concerned. All boys are required to reside in a religious house for three years, and there they act as servants to the priests, who instruct them in reading, writing, and arithmetic, as well as the doctrines of their religion.

History. — The Burmese empire is of little note in ancient or general history. Buddhism and civilization are said to have been introduced from India. The last native dynasty was founded by a Burmese called Alompra, a man of obscure birth, who defeated the Peguans, and in 1753 obtained possession of Ava. Having made himself master of Burma, he invaded Siam; but, during this invasion he died suddenly in 1760. Alompra ruled well and wisely, and Namdogee, his eldest son and successor, who died in 1764, inheriting his father's spirit, introduced various reforms and useful measures. Shembuan (Tshen-bo-yen), the emperor's brother, became regent as guardian for his nephew Momien; but he usurped the throne himself and conquered Siam. In 1771, however, Siam recovered its independence, while the principal part of the Burmese forces were engaged in a war with China. In this war they were victorious, and compelled the Chinese whom they took prisoners to intermarry with Burmese females, and to remain in their territory. In 1776 Shembuan left his empire, much enlarged, to his son Chenguza. This prince lived in the unrestrained indulgence of every appetite till in 1782 he was dethroned and put to death. In consequence of the revolution, Mentaragyi, the fourth son of Alompra, ascended the throne. He ordered his nephew Momien, who was a State prisoner, to be drowned, and in 1783 subdued the kingdom of Arracan. He then engaged in a war with Siam, which continued till 1793, when peace was made on certain conditions.

About this period, it happened that some robbers fled from the Burmese empire, and took refuge in the territory of the East India Company. The Burmese demanded that they should be delivered up, and on their demands not being immediately complied with, marched with a strong force into the offending country. At the same time they carried on a friendly negotiation with the government in Calcutta, which resulted in the surrender of the criminals,

Burmeister

and the conclusion of a treaty of amity and commerce between the two governments, negotiated by Captain Symes. The last victory of the Burmese was in 1822 over the province of Assam. The party driven from Assam, together with the Burmese rebels, fled to the British territories, whence they intended to invade Burma. The British government disarmed the insurgents, but refused to deliver them up or to drive them from the island of Shapuri, which they had occupied. At length the Burmese sovereign demanded of the government at Calcutta the cession of Northern Bengal as being a part of Ava, and in January, 1824, his forces marched into Cachar, which was under British protection. Lord Amherst, as governor-general of the British East Indies, now declared war against Burma, and Gen. Archibald Campbell prosecuted it so successfully that after the victory at Prome (Dec. 1-3, 1825), he obliged the monarch to conclude a peace at Palanagh in 1825. As the treaty was not ratified on the part of the Burmese emperor by the time specified (Jan. 18, 1826), Campbell renewed the war and stormed the fortress of Munnum. On Feb. 24 the peace was ratified, and the war concluded with the cession of Arracan, Mergui, Tavoy, etc. In 1852 a second war broke out, at the conclusion of which Rangoon and the whole of Pegu fell into the hands of the British. About 1860 the new city Mandalay supplanted Amarapura as the capital. In 1867 British steamers were permitted by treaty to navigate Burmese rivers, and not long after traffic was carried on up the Irrawadi as far as Bhamo. In 1885 the outrageous proceedings of King Theebaw provoked another war, and a British force proceeded from Rangoon up the Irrawadi river, took Mandalay, and sent King Theebaw a prisoner to Rangoon. On Jan. 1, 1886, Theebaw's dominions were annexed to the British empire by proclamation of the Viceroy of India (the Earl of Dufferin). After the annexation there was a considerable amount of scattered fighting with dacoits and others, but the country is now comparatively quiet, is being opened up to commerce, and is rapidly advancing in prosperity. In 1897 Burma was constituted a province, and placed under a lieutenant-governor instead of a chief-commissioner.

Burmeister, Hermann (bür-mis'ter), a German scientific writer, born in Stralsund, Jan. 15, 1807; distinguished himself as a geologist and zoölogist in his native country, and settled permanently in the Argentine Republic, where he continued his investigations. "Manual of Entomology" (1832-1844); "History of Creation" (1843); and "The Fossils of Horses Found among the South American Pampas" (1875), are among his books. He died in Buenos Ayres, Argentine Republic, May 2, 1892.

Burnard

Burmeister, Richard, a German-American musical composer; born in Hamburg, Germany, Dec. 7, 1860; received an academical education in Hamburg; studied with Franz Liszt, and in Rome, Budapest, and Weimar; made concert tours in Europe in 1883-1885 and in the winter of 1893; was at the head of the piano department of Peabody Institute, Baltimore, Md., in 1885-1897; and settled in New York in the latter year. He made concert tours all over the United States and was director of the Scharwenka Conservatory, New York, in 1897-1899. He composed "The Sisters" (a dramatic tone poem), numerous songs, and piano, violin and orchestra pieces; and arranged Liszt's "Concerto Pathétique," originally for two pianos, for the piano and orchestra.

Burnaby, Frederick Gustavus, an English soldier and traveler; born in Bedford, England, March 3, 1842; a son of the Rev. G. A. Burnaby. He was educated at Bedford and Harrow, and entered the Royal Horse Guards in his 18th year as cornet. In 1861 he became lieutenant, in 1866 captain, major in 1879, lieutenant-colonel in 1880, and finally, in 1881, he was appointed colonel, a rank which he held till his death four years later. In 1875 he made his famous ride to Khiva—a journey that presented great difficulties. During the ride, which he undertook partly because he had learned that the Russian government kept Europeans out of Central Asia, he suffered severely from the intense cold prevailing at the time when he crossed the steppes. In 1876 he rode through Asiatic Turkey and Persia. Of both these journeys he published narratives, namely, "Ride to Khiva" (1876, 11th ed. 1877, new ed. 1884), and "On Horseback through Asia Minor" (1877). On Jan. 17, 1885, while serving as lieutenant-colonel of the Royal Horse Guards in the Egyptian campaign, he was killed at the battle of Abu-Klea.

Burnand, Francis Cowley, an English author and dramatist, born Nov. 29, 1836; was educated at Eton and Trinity College, Cambridge. He has produced a large number of pieces, chiefly extravaganzas and burlesques; several dramas; and some very successful comedies. He joined Henry J.



FRANCIS C. BURNAND.

Burne-Jones

Byron in starting "Fun," but left that paper for "Punch," then edited by Mark Lemon, in 1863. His first contribution to "Punch" was "Mokeanna," a burlesque on sensational romance writing; soon after appeared "How, When, and Where," followed by "Happy Thoughts," which in book form had an extended sale. Later, he continued the "Happy Thoughts" series, and wrote a series of burlesques of popular novelists, that on Ouida's style, "Strapmore," being, perhaps, the happiest. He was editor of "Punch" in 1880-1906. He wrote the libretto for Sullivan's "Chieftain" (1894).

Burne-Jones, Sir Edward, an English painter, born in Birmingham, Aug. 28, 1833; was educated at Exeter College, Oxford, where he formed a lifelong friendship with William Morris. In 1857 he studied in London under Rossetti, who encouraged and guided him and exerted a powerful influence over his early work. From the first Burne-Jones' subjects were poetical and romantic, and his treatment of them imaginative and idealistic, while his coloring was singularly pure and beautiful. Most of his earlier works were done in water-color, among them "Merlin and Vivien," "The Wine of Circe," and "Love Among the Ruins." Not until 1870 did he become known as a painter in oils, in which field his style and subjects were inspired chiefly by the early Italian Renaissance. Among his later pictures are "The Days of Creation," "Venus' Mirror," "Chant d'Amour," "The Golden Stairs," "The Tree of Forgiveness," "King Cophetua," "The Legend of the Briar Rose," "The Brazen Tower," "The Bottom of the Sea," etc. His skill in stained glass is shown by the windows of Christ Church, Oxford. He was one of the founders of the New Gallery, and was made a baronet in 1894. He died in London, July 17, 1898.

Burnes, Sir Alexander, a Scotch explorer, born in Montrose, May 16, 1805. He, early in life, went to India, and, after his arrival, volunteered to explore the N. W. frontier of that country and descend the Indus to the sea. He afterward traveled to Kabul, and over the Hindu Kush to Khoondooz, Balkh, and Bokhara, and then through Persia to Bushire. The information he had thus collected was of inestimable value to his government. In 1839 he was appointed commercial resident of Kabul for the English Government, and, on Nov. 3, 1841, was murdered by an Afghan mob. He was the author of "Travels in Bokhara."

Burnet, the English name for *poterium*, a genus of plants belonging to the order *rosacæ* (roseworts). It is also called salad burnet and lesser burnet. The common, or garden salad burnet (*poterium*

Burnet Saxifrage

sanguisorba) is a herbaceous plant one or two feet high, with pinnate leaves and dull purplish flowers. The leaves taste and smell like cucumber, and are eaten in salad. The muricated burnet, or salad burnet (*A. muricatum*), has larger fruit than the former, to which it is closely allied. It is not common. There are other species. The great burnet is *sanguisorba officinalis*.

Burnet, Gilbert, an English bishop, born in Edinburgh, Sept. 18, 1643. In 1664 he went to Holland, where he studied the Hebrew language, and, on his return, was ordained and presented to the living of Saltsoun. He subsequently became Bishop of Salisbury, and is known principally by his "History of the Reformation," and by that of "His Own Times." He was interred in the Church of St. James, Clerkenwell. Besides the above, he published an excellent treatise on "Pastoral Care," and several "Sermons." The "History of His Own Times" appeared in 1724, and is very entertaining, though far from being impartial. The Bishop possessed many virtues, although somewhat vain and credulous. He died in 1715.

Burnet, Jacob, an American jurist, born in Newark, N. J., Feb. 22, 1770. Admitted to the bar in 1796, he removed to Cincinnati, then a village with about 500 inhabitants, and was a member of the territorial government from 1799 till the establishment of a State Government in 1803. In 1821 he was appointed Judge of the Supreme Court of Ohio, and was elected United States Senator in 1828. Burnet was elected a member of the French Academy of Sciences upon the recommendation of Lafayette, and published in 1847 a volume of "Notes on the Northwestern Territory." He died in Cincinnati, May 10, 1853.

Burnet Moth, the name for the genus of hawkmoths, called *anthrocera*, or, by some, *zygæna*. *Anthrocera filipendulæ* is the six spot burnet moth. The six spots, which are on the superior wings, are red, while the rest of the wings are green. It is common in England in June. Its caterpillar, which feeds on the plantain, trefoil, dandelion, etc., is yellow, spotted with black. *A. loti* is the five spot burnet moth. It is less common. The caterpillar feeds on honeysuckle, bird's foot, trefoil, etc.

Burnet Saxifrage, a book name of *pimpinella*, a genus of umbelliferous plants, of which the common burnet saxifrage (*pimpinella saxifraga*) and the greater burnet saxifrage (*P. magna*) are species. The former is frequent, the latter inclining to rare. The root of the common species is acrid, and is used as a masticatory in toothache; also as an external application to remove freckles, and in gargles to dissolve viscid mucus.

Burnett, Frances Hodgson, an Anglo-American novelist, born in Manchester, England, Nov. 24, 1849. Her family removed to Tennessee in 1865. She early wrote stories. In 1873 Miss Hodgson married Dr. Burnett, and, in 1875, settled in Washington, where she has since resided.



FRANCES H. BURNETT.

After various short stories, she published as a serial in "Scribner's Magazine" "That Lass o' Lowrie's," which became very popular, was promptly issued in book form (1877), and was dramatized. It was followed by a number of

novels, among which are "Haworth's" (1879); "Louisiana" (1881); "Esmeralda," "A Fair Barbarian" (1882); "Through One Administration" (1883); "Little Lord Fauntleroy," a juvenile story, also dramatized (1887); "The Pretty Sister of José" (1889); "The One I Knew Best of All," an autobiography (1893); "A Lady of Quality" (1895); "His Grace of Osmonde," a sequel to the preceding; and a drama, "The First Gentleman of Europe," with George Fleming, represented in 1897. In 1898 she was granted a divorce from her husband, with the right to resume her maiden name.

Burnett, James, Lord Monboddo, a Scotch jurist, born in Kincardineshire in 1714. After studying at Aberdeen, he went to the University of Groningen, whence he returned in 1738, and commenced practice as an advocate at the Scottish bar. In 1767 he was made one of the Lords of Session. He distinguished himself by his writings as a metaphysician, having published a "Dissertation on the Origin and Progress of Language" (1771-1776, 3 vols. 4to), and "Ancient Metaphysics" (1778, etc., 3 vols. 4to.). His works contain a strange mixture of paradox and acute observation. He died in Edinburgh, May 26, 1799.

Burney, Charles, an English composer and writer on music; born in Shrewsbury, England, April 7, 1726; was educated at Chester. He studied music under the organist of the cathedral in Shrewsbury and in London. In 1751 he obtained the place of organist at Lynn Regis, in Norfolk. Here he commenced his "General History of Music." In 1760 he returned to London, at the request of the Duke of York, where

his compositions, and the musical skill of his eldest daughter, then eight years of age, excited admiration. In 1770 he visited France and Italy, and, two years afterward, the Netherlands and Germany, for the sake of his great work. In 1776 appeared the first volume of his "General History of Music" from the earliest ages, the second in 1782, and the third and fourth in 1789. He was the author also of several other valuable works, among them a "Memoir of Handel" and of most of the musical articles in Ree's "Cyclopædia." He died April 12, 1814.

Burney, Frances (Madame d'Arblay), an English novelist, daughter of Charles Burney; born in King's Lynn, Norfolk, June 13, 1752. After she had published "Evelina, or a Young Lady's Entrance Into the World" (1778), she became the favorite of the literary men of the day, especially Dr. Johnson. Her second novel, "Cecelia" (1782), was no less admired. In 1786 she was made Second Keeper of the Robes to Queen Charlotte, and in 1793 she was married to M. D'Arblay, a French army officer. Her other books are "Camilla" (1795), and "The Wanderer, or Female Difficulties" (1814). Her "Diary and Letters," edited by her niece (7 vols. 1842-1846), are affected, but entertaining. She also wrote memoirs of her father (1832). "Evelina" and "Cecilia" were published with introductions by Annie R. Ellis (London, 1881-1882). She died in Bath, Jan. 6, 1840.

Burnham, Clara Louise, an American story writer, born in Newton, Mass., May 25, 1854. She is the daughter of George F. Root, and has lived in Chicago since childhood. She has written several novels, including "Dearly Bought" (1884); "Next Door" (1886); "Young Maids and Old" (1888); "Miss Bagg's Secretary" (1892), and "Sweet Clover, a Romance of the White City" (1894). She has also written libretti for her father's cantatas.

Burnham, Daniel Hudson, an American architect, born in Henderson, N. Y., Sept. 4, 1846. He studied architecture in Chicago and designed notable structures there, including the Rookery, Calumet Club, the Temple, Masonic Temple, and the great Northern Hotel, as well as large buildings in other cities. He was Director of Works at the Chicago World's Fair.

Burnham, Sherburne Wesley, an American astronomer, born in Thetford, Vt., in 1838. He started life as a stenographer, and holds a post as such in the United States Circuit Court in Illinois. He took up astronomy as an amateur, and, in 1876, became connected with the Chicago Observatory, and later with the Lick Observatory, receiving also an appointment as Professor of Practical Astronomy at the University

Burning

of Chicago. He has made notable discoveries of double stars, having catalogued 1,274 new ones.

Burning, a mode of capital punishment formerly common in civilized countries. Women were formerly burned alive in England for treason, as men were for the crime against nature, and under Edward I. for arson. It was also the punishment during the 15th and 16th centuries for so-called heresy; the first person who thus suffered being Sir William Sawtre, priest of St. Osyth, London, Feb. 12, 1401. The cruel practice reached its consummation in Queen Mary's reign (1553-1558), during three years of which 277 persons, most of them religious reformers, were consumed at the stake.

In metal working, joining metals by melting their adjacent edges, or heating the adjacent edges and running into the intermediate space some molten metal of the same kind. It differs from soldering in this: In burning a heat is required sufficient to melt the original metal, and a flux is seldom used. In soldering, a lower heat is used and a more fusible metal employed, assisted by a flux.

In ceramics, the final heating of clay ware, which changes it from the dried or biscuited condition to the perfect ware. The glaze or enamel is applied to the baked ware, and is vitrified in the burning.

Burning Bush, in botany: (1) The artillery plant, *pilea serpyllifolia*, an urticaceous species; (2) *euonymus atropurpureus*, and *E. americanus*; (3) *dictamnus fraxinella*, a garden plant, which is said to give off so much essential oil that if a light be brought near it, it will ignite.

Burning Glass, a convex lens of large size and short focus, used for causing an intense heat by concentrating the sun's rays on a very small area. The larger the circular area of the lens and the smaller the area of the spot on which the concentrated rays fall, the greater is the effect produced. Concave mirrors have been used for similar purposes, and are also called burning glasses. Their power was known to Archimedes, and it is mythically stated that by their aid he burned a fleet in the harbor of Syracuse, 214 B. C. Their powers were increased by Settalla; Tschirnhausen, 1680; Buffon, 1747; and Parker and others more recently. The following experiments were made about 1800, with a lens or burning glass which cost \$3,500, and is said to have been the largest ever made. It was sold to Captain Mackenzie, who took it to China, and left it at Pekin.

SUBSTANCE FUSED.	WEIGHT.	TIME.
Pure Gold.....	20 grains	4 seconds
Silver	20 "	3 "
Copper.....	33 "	20 "
Platina.....	10 "	3 "

Burns

SUBSTANCE FUSED.	WEIGHT.	TIME.
Cast iron (a cube).....	10 grains	3 seconds
Steel	10 "	12 "
A topaz	3 "	45 "
An emerald	2 "	25 "
A crystal pebble.....	7 "	6 "
Flint	10 "	30 "
Cornelian	10 "	75 "
Pumice stone.....	10 "	24 "

Green wood takes fire instantaneously, water boils immediately, bones are calcined, and things not capable of melting at once become red hot, like iron.

Burnisher, a tool for smoothing or pressing down surfaces to close the pores or obliterate lines or marks. The engraver's burnisher is made of steel, elliptical in cross section, and coming to a dull point like a probe. Some burnishers are made of the canine teeth of dogs. Burnishers of bloodstone are used for putting gold leaf on china ware. Agate burnishers are used by bookbinders. The gilder's burnisher is of agate or porphyry.

Burnley, a parliamentary and municipal borough of England, in Lancashire, about 22 miles N. of Manchester. It presents a modern appearance, and is, generally speaking, well built, mostly of stone. The staple manufacture is cotton goods, and there are large cotton mills and several extensive foundries and machine shops, with collieries and other works, in the vicinity. Pop. (1901) 97,044.

Burnouf, Eugène (bür-nöf'), a French scholar, born in Paris, Aug. 12, 1801. He applied himself to the study of Oriental languages, particularly those of Persia and India. In 1826 he attracted the attention of men of learning throughout Europe by publishing, in conjunction with his friend Chr. Lassen, an "Essay on the Pali, or the Sacred Language of the Buddhists in Ceylon and the Eastern Peninsula." But his fame is chiefly due to his having, so to speak, restored to life an entire language, the Zend, or old Persian language, in which the Zoroastrian writings were composed. Burnouf also distinguished himself by his labors on Buddhism, publishing "Introduction to the History of Indian Buddhism." He died in Paris, May 28, 1852.

Burns, Alexander, a Canadian educator, born in Castletwellan, Ireland, Aug. 12, 1834. He went to Canada in 1847, and was graduated at Victoria College, Toronto, in 1861, joining the Methodist Church. From 1868 to 1878 he was President of Wesleyan Ladies' College, Hamilton, Ontario. He was tried for heresy by the Ontario Methodist Conference in 1882, but acquitted. He died May 22, 1900.

Burns, Anthony, a fugitive slave, born in Virginia in 1836; arrested in Boston in 1854, under the Fugitive Slave Law. An indignation meeting, in which Theodore Parker and Wendell Phillips participated,

was held in Faneuil Hall, while a premature and unsuccessful attempt to rescue Burns under the leadership of Thomas W. Higginson resulted in bloodshed and the death of one of the deputies. When the courts decided that the extradition was legal, Burns was escorted by a strong guard to a revenue cutter, and a riot was barely averted. Burns afterward regained his liberty, studied at Oberlin College, and became a Baptist minister in Canada. He died in St. Catherine, Canada, July 27, 1862.

Burns, John, an English labor organizer and Socialist leader, born in London in 1858. He was of humble birth and became a factory boy at the age of 10. He was an omnivorous reader and imbibed his Socialistic views from a French fellow employé. By working a year as engineer on the Niger river, he earned enough for a six months' tour of Europe. He constantly addressed audiences of workingmen, and was a persistent labor agitator. He was one of the leaders in the West End riot in London, February, 1887, and was imprisoned the same year for maintaining the right of public meeting in Trafalgar Square. As an arbitrator, he is respected by employers and employed. He has been thrice elected to the London County Council and has sat in the House of Commons since 1892.

Burns, Robert, Scotland's national poet; born in a clay-built cottage less than 2 miles S. of the town of Ayr, and not far from the river Doon, Jan. 25, 1759. His father, William Burness (for so the name was originally spelled), the son of a Kincardineshire farmer, and a worthy and intelligent man, at the time of the poet's birth occupied a few acres of land, and acted as gardener and overseer for a neighboring gentleman. His mother, Agnes Brown, belonged to Ayrshire. As a boy the poet received the greater part of his formal education from a young man named Murdoch, an excellent teacher whom his father and a few of the neighbors engaged to instruct their children. Being a great reader (as well as a genius), and fortunate in getting access to books, he was able to make up for some deficiencies under which he might otherwise have labored; and he acquired indeed a very fair English education, besides some knowledge of French. In 1766 the Burns family removed to the farm of Mount Oliphant in the parish of Ayr, and after a tenure of 11 years, to a larger and better farm, that of Lochlea in Tarbolton parish, where the head of the household died of consumption in 1784. A fresh removal now took place to the farm of Mossgiel in the vicinity of Mauchline. Except for some years of comparative prosperity at Lochlea the family had a constant struggle with poverty, and the poet was inured to hard farm work from his boyhood up; but although he is often

spoken of as the "Ayrshire plowman," he was never a "plowman" in the ordinary sense of the word, that is, a mere hired farm servant. Burns began rhyming at the age of 16 or 17, but he wrote nothing of much consequence till half a dozen years later. It was not till 1786 that he published anything, this being the year in which the first edition of his poems appeared, the famous Kilmarnock edition, price three shillings, a copy of which has recently fetched as much as £572. Some of the finest products of his genius had a place in this volume, such as "Halloween," "The Cotter's Saturday Night," "The Holy Fair," "The Twa Dogs," "Poor Mailie," "Address to the Deil," "The Farmer's Salutation to his Auld Mare," "To a Mouse," "To a Mountain Daisy," etc. "The Jolly Beggars," "Death and Doctor Hornbook," "The Brigs of Ayr," though not then published, belong to the same period. The book was published as much in the hope of raising money enough to enable the poet to pay his passage to the West Indies as with the intention of bringing his name before the public, Burns at this time having got himself into difficulties in connection with his future wife, Jean Armour, and being desirous of leaving the country. The Armour scandal was the second of the kind associated with Burns' name; a former affair of the same kind was the occasion of his verses entitled "The Poet's Welcome to his Illegitimate Child." It was shortly before his public appearance as an author that Burns' love affair with "Highland Mary" occurred, but very little is really known regarding this episode in his life. His poems were hailed with delight in his own quarter of Scotland, and from the approval of Prof. Dugald Stewart, Dr. Blair, and especially Dr. Blacklock he was led to seek the applause of a wider circle. Accordingly he now gave up thoughts of emigrating, and had a second edition containing additional pieces published at Edinburgh the following year (1787). By the time it appeared he had been the lion of Edinburgh society for a season, had secured the friendly interest of the Earl of Glencairn, Henry Mackenzie, and other persons of note in the metropolis (had also attracted the special notice of Walter Scott, then a lad), and had impressed all who came in contact with him by his extraordinary gifts and personality. He had also spent many a jovial night with company more congenial than grave professors and divines, and had acquired habits that were to leave their mark on his after-life.

More successful than many poets, his second edition produced him something like £500, if not considerably more. After some peregrinations through Scotland and part of England, taking him as far S. as Carlisle

and as far N. as Inverness, and after another visit to Edinburgh, leading to his high-flown correspondence with "Clarinda," he married Jean Armour—whom he had led into as great imprudence as before—and settled as a farmer at Ellisland, on the Nith, not far from Dumfries (1788). Fortune did not smile on him here; probably had he wooed her with more assiduity he would have received more of her favors. However that may be, having first united the occupation of exciseman with that of farmer, he finally gave up the latter calling altogether, and selling off his farm stock and other belongings, retired to Dumfries (1791). He continued his poetic career during the Dumfriesshire period, besides carrying on an extensive correspondence; and it is to this period that the great bulk of his songs belong, these being mostly contributed to Johnson's "Scots Musical Museum," or written for George Thomson's "Melodies of Scotland." Other poems written at this time were chiefly short pieces. One important poem, however, by many considered his masterpiece, belongs to the year 1790, namely the immortal "Tam o' Shanter," that inimitable intermixture of humor and diablerie, which first appeared in Captain Grose's "Antiquities of Scotland," (in connection with a plate of Alloway Kirk), the captain describing it as "a pretty tale wrote expressly for this work."

It must be admitted that in Burns' closing years, there are various things to be regretted. His wife had reason to complain of his unfaithfulness, Dumfries society began to look somewhat coldly on him, and he got himself into trouble with his superiors in the excise owing to intemperate language regarding politics and unconcealed sympathies with the early progress of the French Revolution, though for this he afterward made amends by joining the volunteers and writing patriotic verse. As a man of wit and humor as well as genius, a man whose brilliance shone all the more in the convivial circle, his society was naturally much sought after, and he allowed himself to be too often led away by unworthy or thoughtless associates. In short, he lived too fast for his constitution. By 1794 he was not the man he had been, and was afraid that he was "to suffer for the follies of his youth," as he expresses it. In a letter dated Jan. 1, 1795, he speaks of already feeling "the rigid fiber and stiffening joints of old age." Latterly he suffered much from rheumatism and rheumatic fever, and these ailments, aggravated by imprudent exposure to cold, and probably otherwise complicated, brought about his death. He died at the age of 37, on July 21, 1796, and was buried at Dumfries, receiving a public funeral. He left five sons and two illegitimate daughters. Two of the sons died quite young. The eldest,

Robert, who had something of his father's temperament, though nothing of his genius, held for a number of years a situation in the stamp-office, Somerset House, London, and died in Dumfries in 1857. The two others, after both attaining the rank of lieutenant-colonel in the East India Company's service, died respectively in 1865 and 1872. Mrs. Burns survived her husband for 38 years, dying in 1834, aged 68. Soon after she became a widow a public subscription was raised in her behalf, and to this fund were added the profits derived from Dr. Currie's edition of Burns' works (1800, 4 vols., with life of the poet), which was published expressly for the benefit of the widow and orphans.

In Burns we have perhaps the most remarkable instance among poets of variety and strength combined. Song, satire, narrative, description, dialogue, epistolary and didactic composition, all come within his range; while in turn he delights us with humor, tenderness, pathos, sublimity, homely morality, wit and wisdom applied to the affairs of daily life. What perhaps more than all else conciliates the favor of the reader is the abounding sympathy and kindly feeling of the poet, his tenderness for all things animate and even inanimate. No doubt in one or two cases (as in his unworthy attacks on the living Mrs. Riddell and on the dead Mrs. Oswald) he exhibits a rancor that cannot be overlooked, but such lapses are rare, though of course he was always ready to assail cant and hypocrisy and his own nature was free from duplicity.

As one factor connected with this poet's popularity, we may refer to the fact that—apart from some rather out-of-the-way Scottish vocables—he is always easily understood, indulges in no subtleties or profundities, and has always a more or less firm grasp on the realities of life. Yet it must be admitted that his poetry is very unequal, and that literature would have been but little the poorer if a good deal of what is included among his published writings had never seen the light. Generally speaking, his purely English poems are only of mediocre value, especially when he is simply following the models of the time and writing rather as the literary man than as the poet, and handling some theme that does not really touch his heart. Burns shows his greatest strength when, wielding his native vernacular with unsurpassable mastery, he sets before us some aspect of Scottish life and character, the manners and customs of his native district, ideas, feelings, or individual portraiture drawn from the rural or village life with which his own life was so closely interwoven. It has frequently been pointed out that Burns' verse is apt to be found defective when judged by a strictly poetic standard. His language

may be picturesque, felicitous, and expressive, it may be terse, forcible, and graphic; but true poetic beauty, artistic perfection in the use of words, need hardly be looked for in Burns' verse. Nor did Burns show much originality in choice of subjects or methods of treatment. As a writer he struck out no new path for himself. Steeped as he was in the later vernacular literature of Scotland, he was content to work on the lines laid down by Scottish authors before his day; and having an intense admiration for the writings of such immediate predecessors as Robert Fergusson and Allan Ramsay, he was proud to follow in their steps, and eager to outstrip them, which, being a man of far higher genius, he easily accomplished. Burns' "Holy Fair" and "Cotter's Saturday Night," for instance, were undoubtedly suggested by Fergusson's "Leith Races and Farmer's Ingle"; and sundry of his epistles, elegies, etc., had also their prototypes among the printed pieces of Fergusson, Ramsay, or Hamilton of Gilbertfield. Burns' favorite forms of stanza, too, were all old favorites with Scottish writers. So also in many of his songs, scraps and snatches of older ditties are interwoven and blended with materials of his own in such a way that it is impossible to say what is Burns' and what belongs to singers of an earlier day. But he has left us many inimitable songs that are unquestionably of his own mint, and that range over the whole lyric field—perfervidly amatory, softly sentimental, melancholy and pathetic; or gay and light-hearted, arch and waggish, martial and patriotic; at one time sounding the praises of friendship, love, or liquor; at another tremulous with tenderness, or breathing the spirit of manly independence. His epigrams are not very brilliant efforts in this line, and are apt to remind us of Dugald Stewart's remark regarding the poet's politics, that "they smacked of the smithy." A certain class of humorous effusions at which Burns was an adept, and of which he produced a good many, were intended only for private circulation, and are only here referred to by way of completing this brief account of a man of many moods. He left a considerable number of letters, of which many are remarkable in various respects, and all are valuable and interesting to the student of literature, for the light they throw upon the life and character of the writer. On the whole they are lacking in spontaneity and naturalness, and are too often marred by high-flown language and overstrained sentiment. Some of them are formal literary compositions rather than letters, and a certain number betray too plainly the influence of Sterne. In the "Clarinda" correspondence we have a somewhat extravagant and fantastic series of amatory epistles written to a lady (Mrs. M'Lehose) who was living as a grass-

widow in Edinburgh, and with whom the poet became intimate when detained there for a time. In his letters to Mrs. Dunlop, a lady of good position and much older than himself, he appears perhaps at his best as a letter-writer. Of Burns the man little need here be added. His private character has perhaps been brought too much before the light of day by his biographers and critics. If some have painted it in too dark colors, others, it may be, have gone as far in the opposite direction. "The poor inhabitant below" was well aware of his own faults and follies; and probably he would have been a less interesting figure to most of his own fellow-countrymen, and to many others besides, if he had been less of a sinner and more of a saint. Burns has left a sketch of his early life in his autobiographical letter to Dr. Moore, written in 1787.

Burns and Scalds, injuries produced by the application of excessive heat to the human body. They are generally dangerous in proportion to the extent of surface they cover, and a widespread scald may cause serious consequences on account of the nervous shock. Congestion of the brain, pneumonia, inflammation of the bowels, or lock jaw may result from an extensive burn. Hence the treatment requires to be both local and constitutional. If there is shivering or exhaustion, hot brandy and water may be given with good effect, and if there is much pain, a sedative solution of opium. The local treatment consists in dredging the burn with fine wheat flour, and then wrapping it up in cotton wool. An application of equal quantities of olive oil and lime water, called carron oil, is much recommended by some, the part being afterward covered by cotton wool. The main thing is to keep the air from the injured part, and, therefore, when a blister forms, although it may be pricked, the loose skin should not be removed.

Burnside, Ambrose Everett, an American military officer, born in Liberty, Ind., May 23, 1824; served an apprenticeship to a tailor, but received a nomination to West Point, where he graduated in 1847. He left the army as First Lieutenant in 1852, but returned as Colonel of Volunteers in 1861, commanded a brigade at Bull Run, and, in February, 1862, captured Roanoke Island. Having rendered important services at South Mountain and Antietam, he, in November, reluctantly superseded General McClellan. On December 13, he crossed the Rappahannock, and attacked General Lee near Fredericksburg, but was repulsed with a loss of over 10,000 men, and was soon after transferred to the Department of Ohio. In November, 1863, he successfully held Knoxville against a superior force and, in 1864 he led a corps, under General Grant, through the battles of the Wilderness and

Cold Harbor. Resigning in April, 1865, he was elected Governor of Rhode Island (1866-1868), and United States Senator in 1875 and 1881. He died in Bristol, R. I., Sept. 13, 1881.

Burnside, Helen Marion, an English artist and poet, born in Bromley Hall in 1844. She published a book of poems in 1864, which made her widely known. From 1880 to 1889 she was designer to the Royal School of Art Needlework. She has published "The Lost Letter," "Tales for Children," and many occasional contributions in prose and verse to leading magazines.

Burnt Ear, a disease in grain caused by a fungus, *uredo carbo*, which covers the seed coat with a black dust, while leaving the interior apparently uninjured, but abortive.

Burnt Offering, one of the sacrifices divinely enjoined on the Hebrew Church and nation. It is called, in their language, *olah*, from the root *alah* = to ascend, because, being wholly consumed, all but the refuse ashes was regarded as ascending in the smoke to God. In the New Testament it is called *holokautōma*, meaning a whole burnt offering, an offering wholly burnt. In the Vulgate it is called *holocaustum*, which has the same meaning. Stated burnt offerings were presented daily, every Sabbath, at the new moon, at the three great festivals, on the day of atonement, and at the feast of trumpets. Private ones might be presented at any time.

Burr, Aaron, an American statesman, and third Vice-President of the United States, born in Newark, N. J., Feb. 5, 1756. His father was the President of Princeton College, and his mother the daughter of Jonathan Edwards. Both of his parents died before their son had reached the age of three years. He entered Princeton College at the age of 12 and graduated at 16, having won for himself during his college career the reputation of a youth of fine natural parts and studious application. While in his 20th year, before he had completed his preparation for the bar, to which he had determined to devote himself, he joined, in 1775, the American army, under Washing-



AARON BURR.

ton, at Cambridge. His ardor in behalf of the Revolutionary cause was such that he was induced to join Arnold as a volunteer in the expedition against Quebec. After his arrival there he was appointed aide-de-camp to Montgomery, and was by the side of that officer when he fell. Subsequently, in 1776, he was received by General Washington as one of his military family, but was soon cast off in consequence of his debauchery. He never forgave Washington this act. Burr's military talents, however, secured for him the post of Lieutenant-Colonel in 1777, which he retained until 1779, when he was obliged to relinquish it in consequence of ill health. Upon Burr's retirement from military life he resumed the study of law, and commenced its practice in Albany in 1782, but soon removed to New York, where he early acquired a prominent position as a great lawyer. In 1789 he was made attorney-general of New York. From 1791 to 1797 he was a member of the United States Senate, where he was distinguished as a leader of the Republican Party. In 1800 he was a candidate for the Presidency, and received the same number of votes as Thomas Jefferson (79), and the choice was thus left to the decision of Congress, which, on the 36th ballot, elected Jefferson as President and Burr as Vice-President. In 1804 was fought the famous duel between Alexander Hamilton and Burr, in which the former was killed and the latter forever lost in the public esteem. In 1807 he was apprehended, taken to Richmond, Va., and tried on a charge of a treasonable design upon Mexico; he was, however, after a long trial acquitted. His public life was now at an end, as his country had no faith in his integrity; he, however, resumed the practice of law, but lived in comparative obscurity until his death on Staten Island, Sept. 14, 1836. See also BLENNERHASSET, HARMAN.

Burr, Edward, an American military officer; born in Booneville, Mo., May 19, 1859; was a student in Washington University in 1874-1878, and at the United States Military Academy in 1878-1882, and was graduated at the latter and assigned to the corps of engineers with the rank of 2d lieutenant in the latter year. He was promoted 1st lieutenant in 1883, and captain in 1894; and as lieutenant-colonel of volunteers commanded the battalion of engineers in the campaign against Santiago de Cuba in June-July, 1898. He was a member of the American Society of Civil Engineers.

Burr, Enoch Fitch, an American mathematical and religious writer, born in Green's Farms, Fairfield co., Conn., Oct. 21, 1818. He was graduated from Yale in 1839, and became pastor of the Congregational Church in Lyme, Conn., in 1850. After 1868 he

was a lecturer at Amherst College. Chief works: "A Treatise on the Application of the Calculus to the Theory of Neptune," "A Song of the Sea," and "Aleph, the Chaldean." He died in 1907.

Burr, George Lincoln, an American historian, born in Oramel, N. Y., Jan. 30, 1857. He was graduated at Cornell in 1881 and entered its faculty in 1888, being Professor of Ancient and Mediæval History there. He has written "The Literature of Witchcraft," and works on superstition and persecution. He was Expert in History to the Venezuelan Boundary Commission (1896-1897).

Burr, William Hubert, an American educator; born in Waterloo, Conn., July 14, 1851; was graduated at Rensselaer Polytechnic Institute in 1872; was employed by the Wrought Iron Bridge Co., of New York city and later on the water supply and sewerage system of Newark, N. J.; was Assistant Professor, and later Professor of Rational and Technical Mechanics at Rensselaer Polytechnic Institute in 1876-1884; became assistant engineer of the Phoenix Bridge Co., in 1884, and subsequently its general manager; was Professor of Engineering in the Lawrence Scientific School of Harvard University in 1892-1893; consulting engineer to the New York city department of public works in 1893-1895, of parks and of docks in 1895-1897; and later of bridges. He was the author of "The Stresses in Bridge and Roof Trusses"; "Arched Ribs and Suspension Bridges"; "Elasticity of the Materials of Engineering"; "The Theory of Masonry Arches"; etc.

Burrard Inlet, an inlet of British Columbia, forming a fine harbor and having Vancouver, the terminus of the Canadian Pacific railway, on its N. shore.

Burrill, Thomas Jonathan, an American naturalist; born in Pittsfield, Mass., April 25, 1839; was graduated at the Illinois State Normal University in 1865; became Professor of Botany and Horticulture there in 1868, and its vice-president in 1882; was dean of the Department of Natural Sciences in 1877-1894, and acting president in 1891-1894. He has published numerous scientific papers including "The Bacteria" and "Uredineæ, or Parasitic Fungi, of Illinois."

Burritt, Elihu, an American author, called the "Learned Blacksmith," born in New Britain, Conn., Dec. 8, 1811. He was a blacksmith, linguist, lecturer, reformer and a noted advocate of peace. His books include "Sparks from the Anvil" (1848); "Olive Leaves" (1853); and "Chips from Many Blocks" (1878). See Charles Northend's "Life of Elihu Burritt" (New York, 1879). He died in New Britain, March 7, 1879.

Burritt College, a co-educational institution, in Spencer, Tenn.; organized in 1848, under the auspices of the Christian Church; has preparatory, collegiate, and professional departments; grounds and buildings valued at about \$25,000; scientific apparatus, \$1,000; volumes in library, over 3,000; professors and instructors, 10; average number of students, 225; ordinary income, over \$16,000.

Burroughs, George, an American clergyman, born in 1650; was executed for witchcraft, at Salem, Mass., Aug. 19, 1692. He was graduated at Harvard in 1670, and preached in Salem in 1680. He was accused of bewitching Mary Wolcott and others by wicked arts and condemned on the evidence of the afflicted persons. At his execution he repeated without mistake the Lord's Prayer, which a witch was said to be unable to do. Cotton Mather witnessed his execution.

Burroughs, George Stockton, an American educator; born in Waterloo, N. Y., Jan. 6, 1855; was graduated at Princeton University in 1873, and at its Theological Seminary in 1877; removed to New England in 1880; and served in the ministry of the Presbyterian Church in Fairfield and New Britain, Conn.; and at Amherst College; was Professor of Biblical Literature in 1886-1892; president of Wabash College, Crawfordsville, Ind., in 1892-1899; and became Professor of Old Testament Language and Literature in Oberlin Theological Seminary in 1899. He died Oct. 22, 1901.

Burroughs, John, an American essayist and descriptive writer; born in Roxbury, N. Y., April 3, 1837. He taught school for about eight years, was for a time a journalist and then became a clerk in the Treasury Department and subsequently a national bank examiner. He settled on a farm in New York State and has since devoted himself to fruit culture, nature study and literature. Many of his papers were written in his bark covered study to which he has given the name "Riverby," on the banks of the Hudson. The personal element is very marked in his writings, and the charm of his easy familiar style has done much to popularize the study of nature. His books on rural themes include, "Wake Robin" (1871); "Winter Sunshine" (1875); "Birds and Poets" (1877); "Locusts and Wild Honey" (1879); "Pepacton; Notes of a Walker" (1881); "Fresh Fields" (1884); "Signs and Seasons" (1886); and "Sharp Eyes" (1888); "Indoor Papers." He has also written "Notes on Walt Whitman" (1867); "Whitman: a Study" (1897); "The Light of Day"; and "Squirrels and Other Fur Bearers."

Burrowing Owl, an owl, the *athene cuniculoria*. In the West Indies these birds dig burrows for themselves, in which they form their nests and deposit their eggs, while in the western part of the United States they occupy the holes of the prairie dogs jointly with the dogs.

Burrows, William, an American naval officer, born near Philadelphia, Pa., Oct. 6, 1785. He served in the war with Tripoli and commanded the sloop "Enterprise" in its successful action with the British brig "Boxer" off the coast of Maine. Both Burrows and the British commander were killed in the fight, Sept. 5, 1813, and they were buried side by side at Portland. Congress struck a medal in honor of the victory and its hero.

Bursary, an endowment in one of the Scotch universities, corresponding to an exhibition in an English university, and intended for the support of a student during his ordinary course, and before he has taken a degree in the faculty in which he holds the bursary. This circumstance, according to the usage prevailing in Scotland, distinguishes bursaries from scholarships and fellowships, both of which are bestowed after the student has taken a degree. Each of the four universities of Scotland has a greater or smaller number of bursaries. Of late years most bursaries are awarded after competitive examination, and only a few are now given by the patrons for special reasons.

Burschenschaft, name of an association of the students in Germany, formed in 1815, which had for its object the political regeneration of Germany.

Burslem, a town of England, in Staffordshire, in the center of "The Potteries." Here is the Wedgwood Memorial Institute, comprising a free library, a museum, and a school of art, erected in honor of Josiah Wedgwood, who was born at Burslem in 1730. Burslem has extensive manufactures of china and earthenware, in which trade and coal mining the inhabitants are chiefly employed. Pop. (1891) 30,862.

Burt, Thomas, an English labor leader, born in Northumberland, Nov. 12, 1837. He began work in the coal mines at 10 years of age. In 1865 he began to take an interest in the labor movement and soon became prominent as a Trades Unionist. He was President of the Trades Union Congress in 1891. Since 1874 he has had a seat in Parliament as a Liberal.

Burton, Sir Frederick William, an Irish artist, born in Limerick in 1816, and received his education in Dublin. He was elected to the Royal Hibernian Academy in 1837, and in 1842 exhibited at the London Royal Academy. He is best known for his work as Director of the National Gallery in

London, to which post he was chosen in 1874, and which he held for 20 years. He died in London, March 15, 1900.

Burton, Richard, an American poet and journalist; born in Hartford, Conn., March 14, 1859. He graduated from Trinity College, Hartford, and took a degree at Johns Hopkins University. His published poems are "Dumb in June" (1895), and "Memorial Day" (1897).

Burton, Sir Richard Francis, an English traveler, linguist, and author; born in Barham House, Herfordshire, March 19, 1821. He was educated at Oxford, and matriculated there with the intention of entering the church; but in deference to his own urgent request, his father, Lieutenant-Colonel Burton, obtained a commission for him in the East India Company's service. He joined the army in 1842, served for some years in Sind, under Sir C. Napier, explored the Neilgherry Hills, published an important work on Sind, and acquired a complete knowledge of the Persian, Afghan, Hindustanee, and Arabic languages. Returning to England in 1851, he soon afterward set out to explore Arabia, disguised as an Afghan pilgrim, and published on his return a "Personal Narrative of a Pilgrimage to El-Medinah and Mecca" as the result of this daring adventure. His next expedition was into the Somali country in East Africa, from whence he proceeded to the Crimea, where he was chief of the staff of General Beatson, and organized the irregular cavalry. After peace was proclaimed, Burton set out in 1856 along with Captain Speke to explore the lake region of Central Africa. The expedition was absent three years, and during that time the great Lake Tanganyika was discovered by Burton. Subsequently he made a journey in the Western States of North America, and published an account of the Mormon settlement at Utah, in his "City of the Saints." In 1861 he married, and he received the same year an appointment as consul at Fernando Po. While fulfilling his duties here he explored the Bight of Biafra, visited the Kamerun mountains, and conducted a dangerous mission to the King of Dahomey. Afterward he was transferred to the consulate of Santos in Brazil, and here he explored his own province, visited the Argentine Republic, crossed the continent to Chile and Peru, returned home after exploring the Pacific coast, and published his "Explorations of the Highlands of Brazil." He was now (1871) made consul of Damascus, but was soon recalled; and in the following year, after a journey to Iceland, an account of which he wrote, he was appointed consul at

Trieste. While occupying this position he led two expeditions into Midian (1876-1878); and in company with Commander Cameron he conducted an expedition into the gold-producing country behind the Gold Coast. He remained English consul at Trieste until his death. In his latter years his services to geographical science were acknowledged by the gold medals of the French and English geographical societies, while in 1886 his services to his country were tardily recognized by the honor of knighthood. Besides the books of travel already mentioned, he was the author of many others, such as: "The Lake Region of Central Africa" (1860); "Abeokuta, or an Exploration of the Kamerun Mountains" (1863); "Narrative of a Mission to the King of Dahomey" (1864); "The Nile Basin" (1869); "Vikram and the Vampire" (1869); "Two Trips to Gorilla Land" (1875); "Ultima Thule, or a Summer in Iceland" (1875); and "The Gold Mines of Midian" (1878). He died in Trieste, Oct. 20, 1890.

Burton, Robert, an English writer; born in Lindley, Leicestershire, Feb. 8, 1577. Obtaining two church livings, he resided at Christ Church, Oxford. Here he wrote the "Anatomy of Melancholy" (published about 1621); a vast storehouse of shrewd comment, apt and learned quotation, humor, and erudition, from which Milton, Sterne, and others did not scruple to borrow. The work mirrors his own mind and temperament. He died in Oxford (?) Jan. 25, 1640.

Burton, William Evans, an English comedian and writer, born in London, Sept. 24, 1804; received a classical education, intending to adopt the ministry as a profession. In 1822 he took charge of a printing establishment and edited a magazine. His first appearance on the stage was at the Haymarket in 1832. He was very successful both in Great Britain and the United States; and built the National Theater in Philadelphia, and owned another in New York. He compiled the "Cyclopædia of Wit and Humor." He died in New York, Feb. 10, 1860.

Burton-on-Trent, a town of England in the counties of Stafford and Derby, 22 miles E. of Stafford, and 128 N. N. W. of London. It is famous, all the world over, for its ale. Brewing is conducted here on the most extensive scale; and the India pale ale, made by the great firms of Bass and Allsopp, bears a noted reputation both at home and abroad, more especially in India, its greatest market. Pop. (1901) 50,386.

Buru (bur-ö'), or **Boeroe**, an island of the Malay Archipelago, in the Residency of Amboyna, from which it lies about 40 miles to the W. Area, with the small island of

Amblau, 3,360 square miles; population variously estimated at from 10,000 to 50,000. The marshy coast lands are notoriously unhealthful, but lofty mountains rise in the interior, one peak (Tomahoe) attaining an altitude of 10,320 feet. A dense natural forest covers most of the country, and only a very small portion has been brought under cultivation. The soil is rich, and vegetation everywhere luxuriant; but the only important article of export is cajuput oil.

Bury, a municipal and parliamentary borough of England, in Lancashire, 8 miles N. N. W. of Manchester, well situated on rising ground between the Irwell and the Roche. The staple manufacture is cotton, and there are also large woolen factories, bleaching and printing works, dye works, foundries, etc. Sir Robert Peel was born near Bury in 1788, and a bronze statue of him adorns the town. Pop. (1901) 58,028.

Bury, Richard de, or **RICHARD AUNGERVILLE**, an English prelate and writer, born in 1281. He was made Bishop of Durham in 1333. His principal work, "Philobiblon," was intended to serve as a handbook to the library which he founded in connection with Durham College at Oxford (afterward suppressed). It gives an interesting account of how he collected his library, describes the state of learning in England and France, and closes with an explanation of the rules for the management of his library, which were founded on those adopted for the library of the Sorbonne. He died in 1345.

Bury St. Edmund's, or **St. Edmundsbury**, a parliamentary and municipal borough in Suffolk, England, well built and delightfully situated on the Larke, 26 miles from Ipswich. Agricultural implements are manufactured, and there is a large trade in agricultural produce. Bury St. Edmund's is an ancient place, and derived its name from St. Edmund, a King of the East Angles, slain by the heathen Danes and buried here. It contains the remains of an abbey, once the most wealthy and magnificent in Great Britain. Pop. (1901) 16,255.

Burying Beetles, the English name for the beetles of the genus *necrophorus*. They belong to the family *silphidæ*. Some are beautiful, having two orange colored bands across the elytra. They receive their name from a practice they have of burying the carcasses of moles, mice or other small quadrupeds to afford nutriment to their larvæ.

Busaco (bö-sä'kō), a ridge (1,826 feet) on the N. side of the river Mondego, in the Portuguese Province of Beira, 16 miles N. N. E. of Coimbra. Here Wellington,

Busby

with 40,000 British and Portuguese troops, repulsed the attack of Massena with 65,000 French, Sept. 27, 1810.

Busby, Richard, an English educator, born at Lutton, Lincolnshire, Sept. 22, 1606. Educated at Westminster School, and Christ Church, Oxford, he was, in 1640, appointed headmaster of Westminster School, the duties of which office he continued to discharge until his death, April 6, 1695. He is the type of pedagogues alike for learning, assiduity, and unsparing application of the birch; none the less for his own loyalty and piety, and the grateful affection of his pupils. He was a most successful teacher, and at one time could point to no less than 16 occupants of the bench of bishops who had been educated in his school. Among his pupils were Dryden, Locke, South, Atterbury, Philip Henry, and Bishop Hooper. He published several works, but they were chiefly for school use, and left money to found lectureships and to educate poor boys in his native place.

Busenbaum, Hermann (bö'sen-boum), a German theologian, born in Westphalia, in 1600. His "Medulla Theologiæ Moralis" (1645) became a standard authority in Jesuit seminaries, though several of its propositions were condemned by the Popes, and it has gone through more than 50 editions (one in 2 vols., Louvain, 1848). On the occasion of Damien's attempt on the life of Louis XV. in 1757, it was publicly burned as containing a justification of regicide. "When the end is lawful, the means also are lawful," is perhaps its most famous maxim. He died in Münster, Jan. 31, 1668.

Bush, a perennial ligneous plant (usually with several stems issuing from its root), which in its normal or natural state of growth does not attain a girth of more than six inches, and in consequence does not furnish timber. The same as a shrub.

Bush, George, an American clergyman and Bible commentator, born in Norwich, Vt., June 12, 1796; graduated from Dartmouth in 1818, and studied theology at Princeton, N. J., from 1820 to 1822. In 1831 he became Professor of Hebrew and Oriental Literature in the University of New York. Among his works are "Life of Mohammed" (1832); "Hebrew Grammar" (1835); "Bible Commentaries" (1840). He died in Rochester, N. Y., Sept. 19, 1859.

Bush Antelope, also called BUSH BUCK, and BUSH GOAT, names common to a number of species of ANTELOPE (q. v.), natives chiefly of the Southern and Western parts of Africa. According to some naturalists, they form a distinct genus (*cephalolophus*). They are animals of more compact form, shorter limbs, and greater strength, but

Bushnell

much less agility, than the true or typical antelopes. They are remarkable for the arched form of the back. They have short, straight, or slightly curved horns, situated far back, and often peculiar to the male sex, with usually a long tuft of hair between them. They have no tear pits, but, instead of them, a naked glandular furrow, formed of two series of pores, on each cheek. They frequent jungles, thick forests and beds of reeds, and, when pursued, seek to escape by diving into a thicket. The commonest species is the duyker (*C. mergens*), living in pairs in the bushy districts of South Africa.

Bush Creepers, the English name of the *uncotillinae*, a sub-family of the *sylviidæ*. These birds have sharply conical bills and long, pointed wings. They are usually diminutive in size, active in habits, have a twittering note, and build their nests in thickets, solitary bushes, or trees. They are found in the warmer parts of both hemispheres, some of them, however, being migratory.

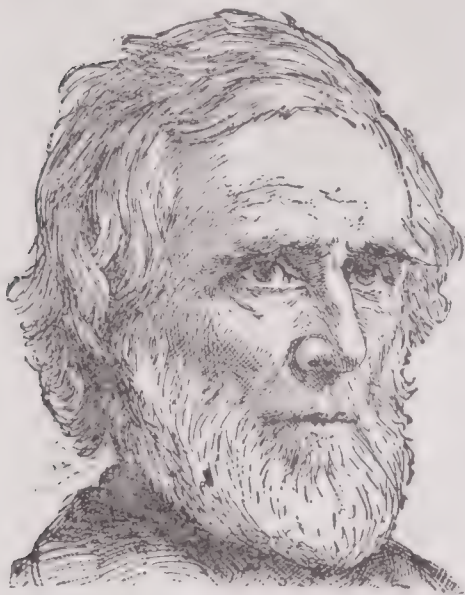
Bushel, a measure of capacity used for corn; or what is called dry measure. It contains 32 quarts, 8 gallons, or 4 pecks.

Bushire, or **Abushehr** ("father of cities," also variously written Bushahr; in Persian, Bendershehr), a principal port of Persia, on a sandy peninsula on the E. shore of the Persian Gulf, in the Province of Fars. The climate is most unwholesome, and the streets are narrow, ill paved, and dirty. The district is liable to earthquakes and the simoon, and is deficient in water. It is the land terminus of the Indo-European telegraph line, and a chief station of the British Indian Steam Navigation Company. The chief exports are opium, tobacco, raw cotton, woolen goods, fruits, perfumery, silk, and horses; the imports, cotton and woolen goods, sugar, metals, indigo, tea, spices, chinaware, and glass. Bricks stamped with cuneiform characters have been found in the vicinity, at Rishire, which is believed to have been an Elamite settlement. Pop. 27,000, chiefly Persians, Arabs, and Armenians.

Bushmen, a nomadic race of Africa. They are a thin, wiry people, poor and debased near the coast, but greatly improved further inland. They recognize no king or chief, build no houses, have no cattle or goats, do not till the soil, and wear skins for clothing. Their language has a rough, clicking sound, and they resemble the Hottentots.

Bushnell, Horace, an American clergyman, born near Litchfield, Conn., in 1802. He was settled over a Congregational Church in Hartford until 1853. His numerous works on religion, theology, and morals, and other topics, comprise "Christian Nurture,"

"God in Christ," "Christ in Theology," "The Vicarious Sacrifice," "Nature and the Supernatural," "Moral Uses of Dark



HORACE BUSHNELL.

Things," "Forgiveness and Law," "The Age of Homespun," "Moral Tendencies and Results of Human History," "The Character of Jesus," "Work and Play," "Christ and His Salvation," "Politics the Law of God," "Woman Suf-

frage." See "Life and Letters," edited by his daughter, Mrs. Mary Cheney. He died in Hartford, Conn., Feb. 17, 1876.

Bushrangers, in Australia, originally convicts from the English penal stations who took to the bush and became robbers. The thickly wooded mountainous districts afforded them protection, and they soon established a reign of terror. They became so strong that the government had to adopt the most stringent measures to suppress them.

Bushshrike, the name of a sub-family of *formicariidæ*, all American. They haunt the interiors, and their song is especially vociferous.

Busiris, a town of ancient Egypt, in the Delta, the chief place where the rites of Isis were celebrated. The name is also given as that of a mythical Egyptian King.

Bussi, or **Bussy d'Amboise**, **Louis de Clermont de**, one of the favorites of the Duc d'Anjou, brother of Henry III., King of France. During the massacre of St. Bartholomew, having joined the assassins, he murdered with his own hand his relative, Antoine de Clermont, with whom he had a lawsuit for the marquise of R  nel. He afterward commanded at Angers, where his exactions rendered him most unpopular; and having long interrupted the tranquility of Paris by private brawls and combats, in which he set at naught the terrors of the Bastille and the authority of the King, he became so odious to Henry III. by frequent acts of presumption that he gave information to Charles de Chambres, Comte de Montsoreau, of an intrigue which Bussi carried on with his wife. The secret had been revealed to the King by his brother, d'Anjou, to whom Bussi had jestingly written in one of his letters that he "had the

game of the mighty master in his toils." Montsoreau compelled the wretched adulteress to write a letter with her own hand, making an assignation in the Ch  teau de Constanci  res, where the injured husband awaited Bussi with a numerous ambuscade of armed men, and, in spite of a most courageous resistance, put him to death in 1579.

Bussu Palm (*manicaria saccifera*), a palm growing in the tidal swamps of the Amazon. The stem is only 10 to 15 feet high; but the immense, undivided, coarsely serrate leaves are often 35 feet in length by 4 or 5 in width. The leaves make excellent and durable thatch. The spathe is made into bags, caps, and coarse cloth.

Bussy-Rabutin (b  s  r  b-  tan'), **Roger, Count of**, a French soldier and man of letters, born in Epiry in 1618. In the army he rose rapidly, under Cond   and Turenne, to the rank of lieutenant-general; but a quarrel with Turenne caused him to withdraw from active service. He incurred the enmity of the King by writing some satirical verses on the intercourse between Louis XIV. and La Valli  re, and was imprisoned for a year in the Bastille. After his release he retired to his estates. He was the father of Madame de Sevign  . He wrote "Memoirs," "Letters," and an "Amorous History of the Gauls." He died in 1693.

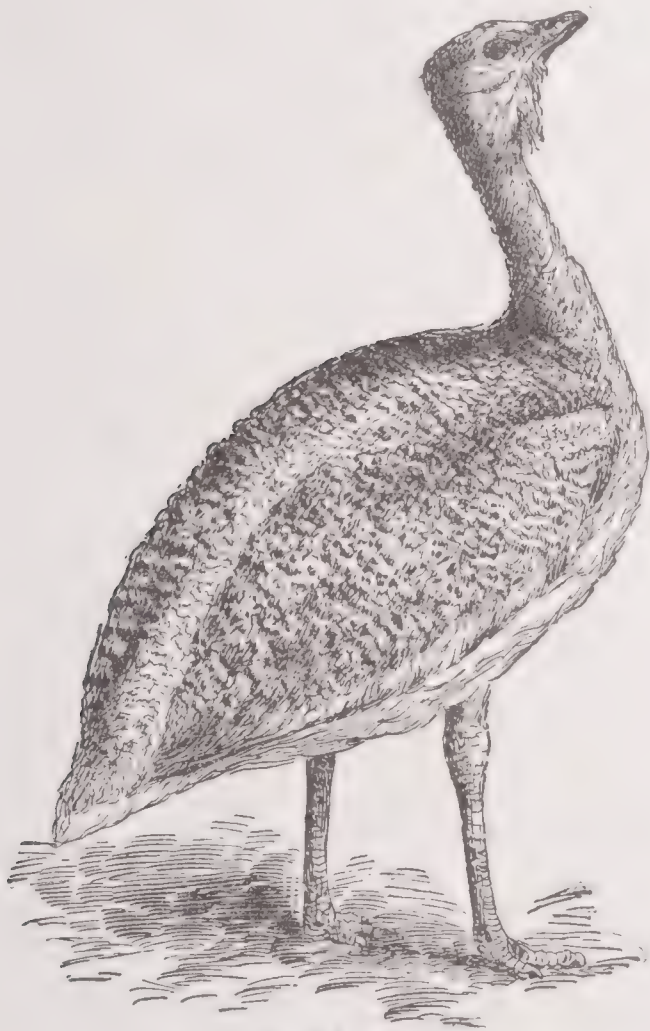
Bust, in sculpture, the representation of that portion of the human figure which comprises the head and the upper part of the body. During the literary period of Greece the portrait busts of the learned formed an important branch of art, and in this way we come to possess faithful likenesses of Socrates, Plato, Demosthenes, etc., in which the artists show great power of expressing the character of those represented. The number of busts belonging to the time of the Roman Empire is very considerable, but those of the Roman poets and men of letters have not been preserved in nearly so large numbers as those of the Greeks. The first bust that can be depended upon as giving a correct likeness is that of Scipio Africanus the Elder.

Bustamante, **Anastasio**, a Mexican statesman and revolutionist, born in Jiquilpan, Michoacan, July 27, 1780. In 1808 he joined the Spanish army, and, for a time, fought against the party of the revolutionists, but in 1821 he acted with Iturbide. He was made Vice-President and commander of the army, in the administration of Guerrero, 1829. He afterward revolted and led the Centralist Party, and in 1830 became acting President of Mexico. In 1832 Santa Ana opposed him at the head of an army, and he was conquered and banished (1833). When the Centralist Party returned to power he was recalled, and in 1837 was elected President of Mexico. In 1842 he was obliged to retire

from the Presidency, and was succeeded by Santa Ana. He served in the Mexican army in the war with the United States, retiring from military service in 1848. He died in San Miguel de Allende, Feb. 6, 1853.

Bustamante, Carlos Maria, a Mexican statesman and historical writer, born in Mexico City in 1774. He studied law and in 1801 began its practice. In 1805 he became editor of the "Diario de Mejico." He held a command under Morelos in 1812, and was captured at Vera Cruz. He was released, and became a member of Congress and held other public offices. His works treat of various periods of Mexican history, and are of special value, as he was an eye witness of much that he describes. He published a history of the Mexican Revolution (1823-1832), and histories of the times of Iturbide and of Santa Ana. He died in Mexico City, Sept. 21, 1848.

Bustard, the name of a genus of European birds, the otis, which is the typical one of the family *otitidæ*. The great bustard (*O. tarda*), the little bustard (*O. tetrix*), and Macqueen's bustard (*O. macqueeni*) are the best known species. The



BUSTARD.

great bustard was formerly common in Wiltshire and in Norfolk, England. It has the plumage on the back of a bright yellow traversed by a number of black bars, the rest of the plumage being grayish. It runs and flies well. It is still common on parts of the European Continent. The little bus-

tard (*O. tetrix*) is a Mediterranean bird. It is brown dotted with black above, and beneath is whitish. The male has a black neck with two white collars.

Butcher Bird, one of the English names of the genus *lanius*. The species are so denominated because they cruelly impale on a thorn the small birds, small quadrupeds, insects, and worms on which they feed. They are also called shrikes.

Butcher's Broom (so called because the green shoots of the plant were formerly used by butchers to sweep their blocks), the English name of the *ruscus*, a genus of plants belonging to the order *liliaceæ* (lily-worts), and the section *asparagææ*. It has a rigid branched stem, very rigid and pungent, with ovate, acuminate leaflike expansion, with a solitary inconspicuous white flower on their upper surface. This is succeeded by a red berry almost as large as a cherry. The tender shoots are sometimes gathered by the poor in spring and eaten like asparagus.

Bute, an island of Scotland in the estuary of the Clyde, with an area of 30,000 acres, belonging principally to the Marquis of Bute. It is about 15 miles long, and the average breadth is $3\frac{1}{2}$ miles. In Kames Hill it rises to the height of 875 feet; it has several pretty lakes, the principal of which is Loch Fad, $2\frac{1}{4}$ miles long. Agriculture is in an advanced state, and there are about 20,000 acres under cultivation. The herring fishery is also a source of considerable profit. The only town is Rothesay, whose ancient castle is one of the interesting antiquities of the island. The climate of Bute is milder than that of almost any part of Scotland. The county of Bute comprises the islands of Bute, Arran, Great Cumbrae, Little Cumbrae, Inchmarnock, and Pladda, with a total area of 143,997 acres, but only a small part is under cultivation. Arran is about double the size of Bute, but the other islands belonging to the county are small. Pop. county (1901) 18,659.

Bute, John Stuart, Earl of, a British statesman, born in Scotland in 1713. He acquired great influence over Frederick, Prince of Wales, and was appointed chamberlain to his son, afterward George III., through whose favor he became Secretary of State, and ultimately, in 1762, Prime Minister. For a time Pitt and Newcastle alike had to give way to his influence, but, though possessing the full confidence of the King, he was unpopular with the people, and in 1763 he suddenly resigned his office, and retired from public affairs to spend his leisure in literary and scientific pursuits, particularly in botany. He died in 1792.

Bute, John Patrick Crichton-Stuart, 3d Marquis of, born at Mountstuart,

Butea

Sept. 12, 1847. He was educated at Harrow and Oxford. In 1872 he married a daughter of Lord Howard. He was Mayor of Cardiff in 1891-1892, and after the latter year was Lord-Lieutenant of Buteshire. From 1892 to 1898 he was Lord Rector of St. Andrew's University. He was the author of "Early Days of Sir William Wallace," "The Burning of the Barns of Ayr," and "Altus of St. Columba." He owned some 117,000 acres of landed property. In 1868 he joined the Roman Catholic Church and some years later published a translation of the Roman "Breviary." He died Oct. 9, 1900.

Butea (named after John, Earl of Bute, a munificent patron of botany), a genus of papilionaceous plants, consisting of trees and scandent shrubs. *B. frondosa* (downy branched butea) is a large tree called in India *pullus*, whence the name Plassy, the locality of the celebrated battle on June 23, 1757, which laid the foundation of the British Indian Empire. It has large axillary and terminal racemes of deep red, downy flowers, which dye cotton cloth, previously impregnated with a solution of alum or of alum and tartar, a fine yellow color. They are used also as a discutient to indolent tumors. The gum lac of commerce comes from the same tree.

Butler, Alban, an English hagiographer, born at Appletree, Northampton, in 1710. He was educated at Douai, and became professor there; was for some time chaplain to the Duke of Norfolk, and at his death (May 15, 1773) was head of the English College at St. Omer. His great work is the "Lives of the Saints" (4 vols., London, 1756-1759). His nephew, CHARLES BUTLER (1750-1832), was known as a lawyer and author on legal and theological subjects.

Butler, Benjamin Franklin, an American lawyer and soldier, born in Deerfield, N. H., Nov. 5, 1818; studied law, and was admitted to the bar in 1841, and became distinguished as a criminal lawyer and politician. He was a member of the State Legislature in 1853, of the State Senate in 1859-1860, and a delegate to the Democratic National Convention of 1860, which met at Charleston and adjourned to Baltimore. He supported the nomination of John C. Breckenridge, which rendered him so unpopular in the North that he was defeated for Governor of Massachusetts in that year. Butler had risen to the rank of Brigadier-General of militia; and, at the outbreak of the Civil War, he marched with the 8th Massachusetts Regiment, and, after a check at Big Bethel, was appointed to the command of Baltimore and of Eastern Virginia, with his headquarters at Fort Monroe. In February, 1862, he commanded the military forces sent from Boston to Ship Island, near the mouth of the Mis-

Butler

issippi; and, after New Orleans had surrendered to the naval forces under Farragut, he held military possession of the city. Relieved of his command, he acted under Gen. Grant in his operations against Petersburg and Richmond in 1865. Returning to Massachusetts at the end of the war, he took an active part in politics as an extreme radical, advocated the impeachment of President Johnson, and in 1866-1875 was a member of Congress. In 1877 and 1879 he was defeated as candidate for Governor of Massachusetts, but in 1882 was elected by a large majority. In 1884 he ran for the Presidency as the candidate of the Greenback and Anti-Monopolist Parties, but was defeated, carrying no State. He published "The Autobiography and Personal Reminiscences of Maj.-Gen. Benjamin F. Butler" (1892). He died in Washington, D. C., Jan. 11, 1893.

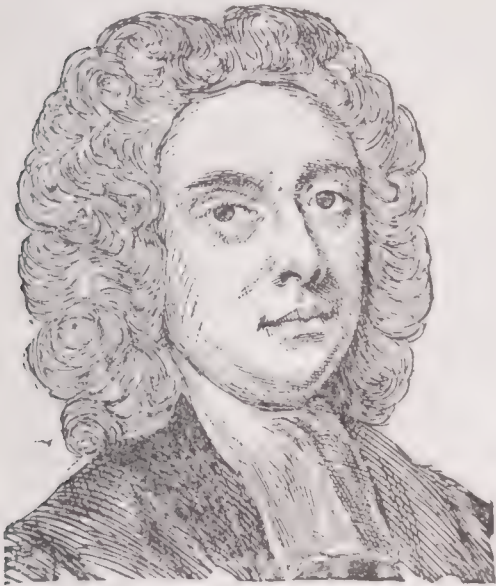
Butler, Benjamin Franklin, an American lawyer, born in Kinderhook Landing, N. Y., Dec. 17, 1795. He was a lineal descendant of Oliver Cromwell. He studied law under Martin Van Buren, whose partner he subsequently became. From 1821 to 1825 he was district-attorney of Albany county. He was elected to the Assembly in 1828, and from 1834 to 1838 was United States Attorney-General. He was also acting Secretary of War during part of Jackson's administration. He died in Paris, France, Nov. 8, 1858.

Butler, James. See ORMONDE.

Butler, John, a royalist leader in the American Revolution, born in Connecticut. He became a leading resident of Tryon county, N. Y.; commanded the Indians in the Niagara campaign (1759) and in the Montreal expedition (1760). At the outbreak of the Revolution he sided with the Tories and became Deputy Superintendent of Indian Affairs. In 1776 he organized a band of marauders, chiefly Indians, and fought the battle of Oriskany (1777); in July, 1778, he commanded at the brutal Wyoming massacre. In 1780 he took part in Sir John Johnson's raid on the Mohawk settlements. At the end of the war he fled to Canada, and was appointed Indian agent. He died in Niagara in 1794.

Butler, Joseph, an English theologian and moralist, born in Wantage, May 18, 1692. His father was a Presbyterian, and sent him to the Dissenting Academy at Gloucester, but he soon conformed to the Church of England, studied at Oxford, and in 1718 became preacher at the Rolls. In 1724 he was appointed rector of Stanhope, and two years afterward settled there, renouncing his Rolls preachingship. Through the influence of Bishop Secker, his fellow student and friend, he became chaplain to Lord Chancellor Talbot, and clerk of the

closet to Queen Caroline. In 1738 he was raised to the See of Bristol, soon after made Dean of St. Paul's, and in 1750 was trans-



BISHOP BUTLER.

lated to Durham. His health soon failed him, and he only held his see two years. Butler's great work is the "Analogy of Religion, Natural and Revealed, to the Constitution and Course of Nature." It was published in 1736. Its

admirable argument had been foreshadowed in his volume of "Sermons," published 10 years earlier. He died in Bath, June 16, 1752.

Butler, Matthew Calbraith, an American army officer, born near Greenville, S. C., March 8, 1836; received a classical education at the academy at Edgefield, and entered the South Carolina College in October, 1854; left the institution before graduating, and studied law at Stonelands, near Edgefield Court-house; was admitted to the bar in December, 1857; practiced at Edgefield Court-house; was elected to the Legislature of South Carolina in 1860; entered the Confederate service as captain of cavalry in the Hampton Legion in June, 1861, and became a Major-General through the regular grades; lost his right leg at the battle of Brandy Station on June 9, 1863; was elected to the Legislature of South Carolina in 1866; candidate for Lieutenant-Governor in 1870; was United States Senator in 1877-1895; a Major-General of Volunteers in the war with Spain, 1898; and one of the American Commissioners to supervise the evacuation of Cuba. He died April 14, 1909.

Butler, Nicholas Murray, an American educator; born in Elizabeth, N. J., April 2, 1862; was graduated at Columbia University in 1882; took a special course in Berlin and Paris in 1884-1885; and was then called to Columbia University, where he was an assistant in philosophy in 1885-1886, tutor in 1886-1889, adjunct professor in 1889-1890, and dean of the faculty of philosophy in 1890-1902. He received the degree of LL. D. from Syracuse University in 1898. Dr. Butler was a founder and the first president (1886-1891) of the New York College for the Training of Teachers, now a part of Columbia University, and as a member of the New Jersey State Board

of Education (1887-1895) he introduced manual training into the public school system of that State. On Jan. 6, 1902, he was unanimously elected president of Columbia University to succeed Seth Low, then mayor-elect of New York city. His induction into office on April 19 following was the occasion of a gathering of well-known educators seldom equalled, besides the President of the United States, the governor of New York, the mayor of the city, and Lord Kelvin, the distinguished scientist. The program included addresses by Dean Van Amringe, in behalf of the faculty; Robert F. Cutting, in behalf of the alumni; President Eliot, of Harvard University; President Hadley, of Yale University; President Patton, of Princeton University; President Harper, of Chicago University, and Dr. William T. Harris, United States Commissioner of Education; and the President of the United States. Dr. Butler was also editor of "The Educational Review," "The Teachers' Professional Library," "The Great Educators Series," "The Columbia University Contributions to Philosophy and Education," and the "Monographs on Education in the United States," which formed a part of the exhibit of the United States Bureau of Education at the Paris Exposition of 1900.

Butler, Samuel, an English satirist; born in Strensham, Worcestershire, in February, 1612. Little is known of his life except what Anthony-a-Wood relates. He was educated at Oxford or Cambridge, occupied his leisure in studying music and painting, became a man of wide and curious learning, and gained his living as secretary and clerk to aristocratic personages. His famous poem, "Hudibras," secured instant favor with the king and the public; yet after the appearance of the first part in 1663, he spent 17 years in poverty and obscurity. The second and third divisions of "Hudibras" appeared in 1664 and 1678. He died in London, Sept. 25, 1680.

Butler, William, an American army officer, born in Prince William county, Va., in 1759. He served in the Revolution in Pulaski's corps; afterward, under Pickens, Lee, and Greene; won fame as commander of the Mounted Rangers; and, after the war, became (1796) Major-General of militia. He was a member of the Convention which adopted the Federal Constitution; helped frame the South Carolina Constitution; was a member of Congress (1801-1811); and commanded the South Carolina troops in 1812. He died in Columbia, S. C., Nov. 15, 1821.

Butler, William Allen, an American lawyer and man of letters, born in Albany, N. Y., Feb. 20, 1825. He was graduated at the New York University in 1843 and be-

Butler

gan the practice of law. He was author of "Nothing to Wear," a satirical poem; "Mrs. Limber's Raffle," "Oberammergau," etc. He died Sept. 9, 1902.

Butler, Sir William Francis, a British army officer, born in Suirville, Tipperary, in 1838; was educated at Dublin, and, joining the army, was ensign of the 69th Regiment in 1858, became captain in 1872, and Lieutenant-Colonel in 1880. He served on the Red River expedition, was sent on a special mission to the Saskatchewan (1870-1871), served on the Ashanti expedition (1873), as staff officer in Natal (1879), and took a prominent part under Lord Wolseley in the Sudan campaign (1884-1885). He has published "The Great Lone Land" (1872); "Wild North Land" (1873); "Akimfoo" (1875); "Far Out" (1880), etc. In 1877 he married Miss ELIZABETH SOUTHERDEN THOMPSON, a distinguished painter of battle scenes, born at Lausanne about 1843. She spent some years in Italy and studied art in Florence. She has exhibited "Scotland Forever!" "Evicted," "Dawn of Waterloo" and many other effective pictures. He died June 7, 1910.

Butler, William Orlando, an American army officer and politician, born in Kentucky in 1793. He served in the War of 1812 and in the Mexican War, and became a Major-General in 1846. He was the unsuccessful Democratic candidate for Vice-President in 1848. He died in Carrollton, Ky., Aug. 6, 1880.

Butler, Zebulon, an American military officer, born in Lyme, Conn., in 1731. He served in the Revolutionary War and commanded the garrison at Wyoming Valley at the time of the massacre of July 3, 1778. He died in Wilkesbarre, Pa., July 28, 1795.

Butlerage, an ancient hereditary duty belonging to the crown. It was the right of taking two tuns of wine from every ship importing 20 tuns or more into England. The proceeds were given to the King's butler, whence the name butlerage. It was called also prisage of wines.

Butler College, a co-educational institution, in Indianapolis, Ind.; chartered in 1850 under the auspices of the Disciples of Christ and the name of the Northwestern Christian University, and located at Irvington, Ind.; name changed to Butler University in 1877, and to Butler College in 1896, when it became a part of the University of Indianapolis. It has grounds and buildings valued at about \$250,000; endowment, over \$400,000; ordinary income, about \$30,000; faculty, 25; average number of students, 500; graduates, over 650.

Butomus, flowering rush, formerly called also water gladiole, or grassy rush. A genus of plants, the typical one of the order *butomaceæ*. It has nine stamina, a very

Butter

unusual number, and six capsules. It is a highly ornamental plant, with the leaves, which are all radical, two or three feet long, and an umbel of many rose colored flowers.

Butt, Isaac, an Irish patriot; the first to make political use of the phrase "Home Rule;" was the son of a Protestant rector, and was born in County Donegal, Sept. 16, 1813. Educated at Raphoe and at Trinity College, Dublin, he gained a brilliant reputation for his accomplished scholarship. In 1852 he was elected to Parliament as a Liberal Conservative for Youghal, for which constituency he sat until 1865. He defended Smith O'Brien and others in the State trials of 1848, and, with equal fearlessness and self-devotion, all the Fenian prisoners between the years 1865 and 1869. In 1871 he was elected for the city of Limerick to lead the Home Rule Party, but soon found that he could not control them. He died May 5, 1879.

Butte, a French word used in the United States for an abrupt, and usually isolated, eminence, sometimes appearing in the form of a lofty turret. They occur in picturesque grandeur along the banks of the Columbia river, in Oregon, and in the neighborhood of Butte, Mont.

Butte, a city and county-seat of Silverbow co., Mont.; on the Great Northern, the Northern Pacific, the Union Pacific, and other railroads. It is the largest mining town in the world, employing over 10,000 persons in this industry alone, which is principally confined to copper mining, although there are valuable gold and silver mines. The Anaconda copper mines are located here. The city is the trade and jobbing center for Southern and Western Montana; has an annual trade of \$4,000,000; and has an extensive trolley system; gas and electric lights; 2 National banks; public library; about a dozen daily and weekly periodicals, and a property valuation of \$27,000,000. Pop. (1890) 10,723; (1900) 30,470; (1910) 39,165.

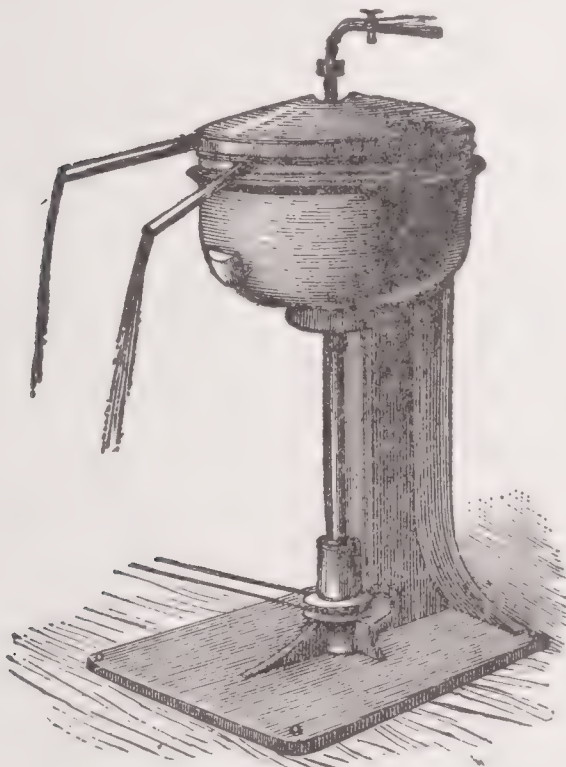
Butter, a fatty substance obtained from milk. Although occasionally made from the milk of goats, buffaloes, etc., it is commonly made from cow's milk. It was used by the ancients as a fuel or as an ointment or hair dressing, but is now used almost wholly as a food. The composition of cow's milk shows wide variations, but an average analysis is as follows: Fat, 3.65 per cent.; casein, 2.88 per cent.; albumen, .53 per cent.; sugar, 4.81 per cent.; salt, .71 per cent.; water, 87.42 per cent.

As here seen, the amount of fat is between 3 per cent. and 4 per cent., and this fat, when separated from most of the other ingredients, forms butter. When of good quality butter has a peculiar but delicate odor (aroma) and a pleasant flavor. The

Butter

characters of aroma and flavor differ, however, very much, according to the conditions and methods of manufacture, and they also differ widely with the locality where the butter is made, depending largely upon the taste of the consumer. For example, the people of European countries, in general, are fond of a very mildly flavored butter, and such is found in their markets. In the United States there is a demand for a stronger flavor, and this is produced; while in certain tropical countries a very strong flavor — amounting to a rancid taste — is desired, and hence this is characteristic of much of the butter used in the tropics. The method by which these variations in aroma and taste are procured will be best understood from an account of the mode of manufacture.

When the milk is first drawn, the fat is uniformly distributed through it in extremely minute, clear globules, which float freely in the liquid milk. These globules are not, as was formerly believed, little sacs containing oil, but are, apparently, simply drops of a semi-solid oil, held in suspension by physical forces, the milk being thus an emulsion. Ordinarily, even when the fat



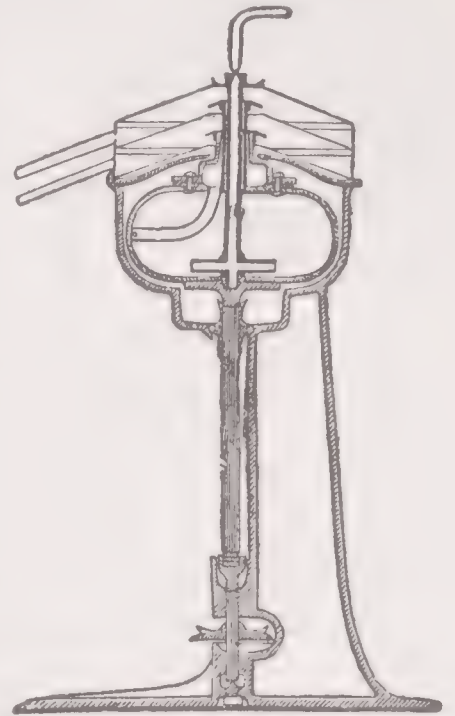
LAVAL SEPARATOR — EXTERIOR.

globules touch each other, they do not adhere, being kept apart, probably, by forces of surface tension. The fat is lighter than the liquids and, if the milk is allowed to stand, the fat slowly rises to the surface as cream, which may then be easily skimmed from the top. Butter makers in recent years have found it more and more of an advantage to hasten this separation of the cream from the milk by the use of centrifugal force. Machines are now in common use in which the milk is passed through a very rapidly rotating drum which develops such an amount of centrifugal

Butter

force as to separate the cream from the milk very rapidly. These machines, called separators, have come into very wide use in recent years, and the old method of setting the cream and then skimming it is gradually disappearing.

After the cream is thus separated from the rest of the milk, it is allowed to undergo a process of ripening, which, more than any other factor, determines the flavor and aroma of the butter to be produced from this ripened cream. For this purpose it is placed in vats, or vessels, for a period varying from 12 hours to 2 days. The temperature is carefully regulated according to the length of the ripening and the season of the year, a temperature of about 65° F. being very commonly used. This temperature induces a fermentation, caused by the growth of bacteria in the cream. The bacteria were not in the milk when first secreted from the cow, but have come from a variety of external sources, the air, the milk vessels, dirt, etc., and multiply very rapidly during the ripening.



LAVAL SEPARATOR —
INTERIOR.

While the bacteria are growing, they cause decomposition in some of the ingredients of the cream. They render it sour by producing lactic acid, and they fill it with other products of their chemical action, which have various flavors and odors. The taste and aroma of the resulting butter come from these products of bacterial growth which develop in the cream during the ripening. There are, however, many species of bacteria that may be found at different times in the cream, and it makes a great difference in the character of the butter whether the species which produce the ripening are the proper ones or not. Some species of bacteria, if abundant in the ripening cream, produce very badly flavored butter, while others produce delicious flavors. Commonly the butter maker has no means of regulating the species of bacteria, nor of getting rid of injurious kinds if they happen to be present. Bacteriologists have been at work to discover a way of remedying this defect, and, in recent years, butter makers have been learning to inoculate the cream artifi-

cially, with the proper species of bacteria, in much the same way as a brewer inoculates his malt with yeast. To do this, he first generally heats the cream to a moderate temperature (155° F.) for the purpose of destroying most of the bacteria already present, and then puts into it a mass of bacteria probably procured from a bacteriologist. Several such artificial ripeners are now on the markets, and the result of their use has been greater uniformity, and, generally, an improved product. In Denmark, the country that stands at the head of the butter making countries of Europe this method of ripening cream has been almost universally adopted. It has also been used considerably in North Germany, and, to a less extent, in the United States. Other butter making countries have not yet adopted it. But whether the cream is thus artificially inoculated or not, its ripening is always brought about by bacteria, and upon their action its flavor and aroma are chiefly dependent. The market price of butter is largely based upon its flavor, and, since this is dependent upon the character of the ripening, it follows that the price is determined more by the character of the ripening than by any other one factor.

After ripening, the cream is churned, a process consisting of simply shaking the cream to and fro, somewhat violently. The types of churns are endless, but they are all designed merely to keep the cream in constant agitation. As the cream is thus churned the fat globules are continually shaken into contact with each other. There is no rupturing of sacs around the fat, as was formerly supposed, but the churning simply shakes the globules together, and, if the temperature is right, they stick to each other. If the temperature is too low, they will not stick to each other, and if it is too high, they will melt into a soft oil. As the churning continues these masses of fused globules constantly increase in size, by simple accretion. When they reach the size of small shot the churning is commonly stopped. These rounded balls of fat, granules, as they are called, may now be readily removed from the liquid, which is known as buttermilk, while the granules are the butter.

In some processes of butter making the butter is removed immediately from the milk, without the previous separation and ripening of the cream. This is done by means of a machine called the extractor, which is a centrifugal separator much like the one referred to before, but with a sort of churn attached to it. In the use of this extractor the milk is poured into the machine, and the butter and skimmed milk soon flow out in two steady streams. Since, however, in this process, the cream

is not ripened, the butter made from it is practically tasteless, and does not meet the public demand. For this reason these machines are little used.

After the churning, the treatment of the butter is simple. It is worked, or kneaded, until practically all the butter milk is removed; then, commonly, a certain quantity of salt is added to it and thoroughly worked into it. The amount of salt differs widely with the locality. In many European countries there is a demand for unsalted butter, and this demand is beginning to be met in the United States. In other places a small amount of salt is added, less than 2 per cent., while in other localities a larger amount of salt is demanded. In the United States, for example, a much larger quantity of salt is put in the butter than would be tolerated in most European countries. Six per cent. is a very common proportion of salt in American butter. Moreover, when it is desired to preserve the butter for some time, this large amount of salt is necessary, since fresh or slightly salted butter will not keep for any length of time. After salting the butter is put up in various forms for the markets. It is molded into pound or half pound lumps; it is placed in tubs, jars or cans; indeed, it is put up in any way demanded by particular markets. Butter may be kept in very good condition for several months. But to be thus preserved it must be well salted, it must be kept cold, with both air and light excluded as much as possible. Still, with the best preservation, the delicate fresh taste of the butter is sure to disappear after a short time, and butter of several months' keeping, though perfectly sweet, fails to have the peculiar flavor of freshly made butter.

In former years all the butter was made in small quantities, upon individual farms; but the tendency to concentration has affected this as well as other industries. To-day a larger and larger proportion of it is being made in butter factories, or creameries, as they are called in the United States. These factories receive the milk and cream from many neighboring farms, and make the butter in very large quantities, one factory in Vermont reaching 20,000 pounds per day. In such large institutions the whole process can, of course, be more carefully controlled than on individual farms, and the butter is generally better and more uniform in character. The temperature of the cream can be regulated by means of steam and ice, and the mixture of large amounts of cream from various sources tends to produce more uniformity in the butter than when it is made from the cream of a single farm. The creameries are increasing in number every year and they seem destined to absorb into themselves all the butter making industry.

BUTTERFLIES AND MOTHS.



Large Pine Moth
(*Lasio campa pini*)



Nonne (Nun) Moth
(*Lymantria monacha*)



Morpho Butterfly
(*Morpho achilles*; var. *Neoptolemus*)



Pine Hawk Moth
(*Sphinx pinastri*)



Pepper-and-Salt Moth
(*Amphidasys betularia*)



Missippus Butterfly
(*Diadema misippus*) female



(*Anaea phantes*)



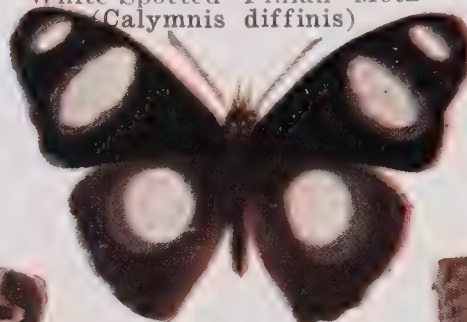
Chrysippus Butterfly
(*Danaus chrysippus*)



Black-Veined White Butterfly
(*Pieris crataegi*)



White-Spotted Pinian Moth
(*Calymnis diffinis*)



Missippus Butterfly
(*Diadema misippus*) male



Gipsy Moth
(*Porthetria dispar*)



Common Tiger Moth
(*Euprepia caja*)



Red Underwing Moth
(*Catocala nupta*)



(*Dasychira pudibunda*)



Mottled Umber Moth
(*Hibernia defoliaria*)



Amphrisus Butterfly
(*Ornithoptera amphrisus*)



Tail-winged Butterfly
(*Leptocircus curius*)

The great butter making countries of the world are the United States, Denmark, Sweden, Russia, Northern France, Germany, England and Ireland, and, in recent years, Australia must be added to the list. England imports large quantities from Canada, the United States, and Denmark, as well as from Australia. The United States is an exporting country. The Southern countries make much less butter and consume less than the Northern countries. In the South, oils, such as olive oil, take, to a considerable extent, the place of butter, and, among the poorer classes, butter is an almost unknown article of diet.

The term butter has been occasionally applied to other substances. Certain vegetable oils which are solid at ordinary temperatures, such as palm oil, cocoanut oil, nutmeg oil, etc., are frequently called vegetable butter, and the name mineral butter has sometimes been applied to substances which are wholly different in nature. The word butter has also been used in the names which have been given to various brands of oleomargarine products, *e. g.*, butterine, etc.

H. W. CONN.

Butter Bur (*petasites vulgâris*), a composite plant, with large rhubarb-like leaves and purplish flowers, growing by the side of streams; allied to colt's foot.

Buttercup, the popular name of two or three species of the ranunculus, namely, *R. acris*, *R. bulbosus*, and *R. repens*. They are common plants with brilliant yellow flowers.

Butterfield, Daniel, an American soldier, born in Utica, N. Y., Oct. 18, 1831. At the outbreak of the Civil War he was Colonel of the 12th New York Militia. He served in the Peninsular campaign, and under Pope and McClellan in 1862. At Fredericksburg he commanded the 5th Corps, and at Chancellorsville and Gettysburg was chief of staff. He served as chief of staff to Hooker at Lookout Mountain, and Ringgold, and Pea Vine Creek; and commanded a division at Buzzard's Roost, Resaca, Dallas, New Hope Church, Kenesaw, Lost Mountain, and other battles. He was brevetted Major-General in the regular army. He resigned in 1869, and became chief of the United States sub-treasury in New York city. He was author of "Camp and Outpost Duty" (1862). He died in Cold Spring, N. Y., July 17, 1901.

Butterfield, William, an English architect; born Sept. 7, 1814. He first attained distinction by the introduction of color into ecclesiastical buildings with the aid of bricks and mosaic. Among the structures designed by him are St. Augustine's College at Canterbury; Keble College, Oxford, and the Cathedral at Melbourne. He died in London, Feb. 25, 1900.

Butterfly, the popular name of a group of lepidopterous insects. The *Lepidoptera* (Gr. *lepis*, *lepidos*, a scale; *pteron*, a wing) have four wings, covered with a large number of minute scales arranged like the tiles of a roof. Their mouth, unlike that of beetles and other orders of insects, is formed for suction, consisting chiefly of a long proboscis, which may be coiled up spirally when not in use. They undergo a complete metamorphosis through the four stages of egg, larva, pupa, and imago or perfect insect. Like other insects their body consists of 13 segments, the first forming the head, the next three the thorax, and the remaining nine the abdomen. The head bears two projecting organs known as antennæ, which are jointed, thread-like organs, abruptly clubbed at the extremities in butterflies, whence these are classed as a sub-order *Rhopalocera*; in moths (*Heterocera*), constituting the rest of the order, the antennæ present greater variety of form (see MOTH). Just below the points whence the antennæ originate, there is in the whole order a many-faceted compound eye, but the ocelli or simple eyes found in the moths are wanting in the butterflies. The thorax is formed of three segments, known as the prothorax, the mesothorax, and the metathorax. Each bears on its under side a pair of legs, and the two latter in addition carry a pair of wings. In many butterflies the fore legs are imperfect. The wings are covered with an enormous number of very minute scales, which take very different forms in different species. Each scale is attached by a small stalk to a pit in the wing-membrane; and it is partly to the pigments contained in some of the cells of these scales, and partly to refraction at their edges, that the brilliant coloring of butterflies is due. The abdomen consists of nine rings, bearing the spiracles or breathing-openings on their sides; and in the last abdominal segment the anus and sexual organs are found. The two great divisions of lepidopterous insects, butterflies and moths, are chiefly distinguished by the character of the antennæ. Butterflies, moreover, are usually diurnal in their flight, while moths are nocturnal or crepuscular; and moths when resting do not elevate their wings as the butterflies do—a very noticeable distinction.

The eggs of butterflies are often of striking shape and coloration. They are laid either singly or in groups on a suitable food-plant, and when mature they produce the larvæ or caterpillars, which begin at once to feed on the leaves of the plant. The caterpillar, like the perfect insect, consists of 13 segments, of which the first is the head, bearing antennæ. The antennæ are, however, very short, and the compound eyes are replaced by three simple ones. The mouth of the caterpillar is mandibulate,

Butterfly

that is, formed for biting, and not haustellate, or formed for suction, as in the perfect insect or imago. The next three segments each bear a pair of horny legs, representing those of the perfect insect; but on several of the posterior segments we find also fleshy legs, called pro-legs, of variable number. A caterpillar has thus more than 6 legs, 16 being the normal number. As caterpillars grow with incessant feeding they moult or shed their skin in order to renew it, and this process may take place several times before they enter on the pupa or chrysalis stage of existence. The pupæ of butterflies differ from those of moths in being angular and gilded, whence the name chrysalis (Gr. *chrysos*, gold); some spin a slight cocoon, but more are either simply suspended by the tail or have also a silken girdle round the middle. In the pupa state practically no movement is possible, but within the outer covering the parts of the coming butterfly can be distinguished. When the perfect insect emerges from the chrysalis, its wings are small; and in order to allow them to grow and harden it rests for some hours with the wings hanging downwards.

Butterflies have many enemies in each of the four states, and among them we find many notable cases of protective resemblance or mimicry. Butterflies are arranged in five families. Of these the *Nymphalidæ* have only four perfect legs in both males and females, and in them the chrysalis has no girdle. To this group belong many of the best known of British butterflies, such as the common fritillaries, painted ladies, peacock butterflies, admirals, tortoiseshells, etc. The *Erycinidæ*, having four perfect legs in the males, but six in the females, are a small family represented in Great Britain by only one species, *Nemobius lucina*, the Duke of Burgundy butterfly. The third family, *Lycænidæ*, has also six perfect legs in the female, but in it the chrysalis is always suspended. Here belong many familiar small species, such as the purple hairstreak (*Thecla quercus*), etc. In the *Papilionidæ* there are six perfect legs in both males and females, and the chrysalis is suspended by the tail and girdled; while the *Hesperiidæ*, though agreeing with the last-mentioned family in the first character, have the pupa attached by threads or wrapped in a loose cocoon. To the former of these belong the common swallow-tail (*Papilio machaon*), the brimstones, whites, clouded-yellows, etc.; and the *Hesperiidæ* are represented in Great Britain only by two or three species, of which the commonest is the grizzled skipper (*Hesperia malvæ*). See accompanying illustrations.

Butternut

Butterfly Fish, a name for a fish, the ocellated blenny (*blennius ocellaris*). It has the dorsal fin bilobate. Its anterior lobe is elevated and marked with a round and black spot, surrounded with a white circle and a black one. It is found on the English coast.

Butterfly Orchid, a common book name for two varieties of orchids, viz.: (1) *Habenaria chlorantha*; (2) *H. bifolia*.

Butterfly Plant, the name of an orchid (*oncidium papilio*) brought from Trinidad. It is so called because its large yellow and red blossoms, poised on slender footstalks so as to vibrate with every breath of wind that blows, resemble butterflies hovering on the wing. It is also applied to the Indian butterfly plant, *phalænopsis amabilis*, of Lindley, not of Blume, which is another orchid. It is a very beautiful epiphyte.

Butterfly Weed, or PLEURISY ROOT (*asclepias tuberosa*), a plant common in the United States, of which the root has medicinal repute, the infusion being used as a diaphoretic and expectorant.

Butterine, a substance prepared in imitation of butter, from animal or vegetable fats. The fat is first freed from all impurities, and by heat converted into oleine. The oleine is then transferred to a churn containing a small quantity of milk, and churned into butterine. Lastly, it is colored in imitation of butter. Freshly prepared, it is sweet and palatable, and when spread on bread or cold toast is but slightly inferior to a fair quality of butter. The process has attained such perfection in the matter of manufacture in the United States that it takes an expert to distinguish it from genuine butter, and laws have been passed compelling tradesmen to label each package containing it so that none can be deceived. See OLEOMARGARINE.

Buttermilk, the residue of cream after the butter has been removed by churning. It forms a wholesome and agreeable as well as a nourishing drink in hot weather. It possesses the slightly acid taste from the acidity developed in ripening the cream. In composition it retains the ash ingredients, casein, and sugar of ordinary milk, while, on account of small particles of butter being left in it, it is not devoid of fatty matter. When the whole milk is churned, the resulting buttermilk is inferior both in taste and quality. In the country districts of both Ireland and Scotland it is commonly taken with porridge or potatoes. Buttermilk is light and digestible, and is used as a beverage in the treatment of certain diseases.

Butternut, the fruit of *juglans cineræa*, or white walnut, an American tree, so called from the oil it contains. The tree bears a resemblance in its general appearance to the

black walnut, but the wood is not so dark in color. The same name is given to the nut of *caryocar butyracēum* and *C. nucifērūm* of South America, also known as suwarrow, or suwarra nut.

Butter Tree, a name of several trees yielding oily or fatty substances somewhat resembling butter.

Butterwort, *pinguicūla vulgāris*, order *lentibulariaceæ*, a plant growing in bogs or soft grounds in Europe, Canada, etc. The leaves are covered with soft, pellucid, glandular hairs, which secrete a glutinous liquor that catches small insects. The edges of the leaf roll over on the insect and retain it, and the insect thus retained serves as food for the plant. In the N. of Sweden the leaves are employed to curdle milk.

Butterworth, Hezekiah, an American story writer, born in Warren, R. I., Dec. 22, 1839. From 1871 he was on the staff of the "Youth's Companion." Author of popular juvenile stories and travels, including "Zig-Zag Journeys"; "Songs of History: Poems and Ballads upon Important Episodes in American History," and "The Wampum Belt, or the Fairest Page of History." He died Sept. 5, 1905.

Buttmann, Philip Karl, a German philologist, born in 1764. He spent most of his life at Berlin, where he taught in the Joachimsthal University. His best known works are his "Greek Grammar" and "Lexilogus for Homer and Hesiod." He died in 1829.

Button, a small circular disk or knob of mother of pearl, horn, metal, or other material, with a shank or perforations through its center for attachment to an object, and made to fit into a hole formed in another one for its reception, the two fastening the objects together. Its chief use is to unite portions of a dress together. The ancient method of fastening dresses was by means of pins, brooches, buckles and tie-strings. Buttons of brass are found on dresses of the 16th century. Gilt buttons were first made in 1768, and those of papier mâché in 1778.

Buttons of vegetable ivory are now all but universally used for tweed coats and vests. The palm fruit which yields it is called corozo nut. It is not unlike true ivory but softer, and is easily turned and dyed. These buttons are often mottled with some stain to suit the common patterns of tweed stuffs. Mother of pearl buttons are formed of the beautiful substance of which the large flat shell of the pearl oyster consists, and this has long been a favorite material for buttons. Small cylinders are first cut out of the shells with a tubular saw. These are then split into discs, which are shaped by a steel tool, drilled with holes, and finally polished with rotten stone

and soft soap, or by a more recent method with ground charcoal and turpentine. Shirt studs as well as flat and globular buttons with metal shanks are also made of this substance.

Among other animal substances used for buttons are ivory, bone, horn, and hoof. From this last so called horn buttons were some years ago made in enormous numbers by pressing them in heated dies in which the design was cut. There are many kinds of composition buttons. Glass buttons are made in great variety. For pinched buttons small rods of colored glass are heated at the ends, and pressed into shape by means of a pair of rather long hand pliers, on the ends of which are a die and its counterpart, likewise kept hot. Other kinds are cut out of colored sheet glass, which is coated on the back with tin amalgam like a mirror. Along with other varieties, some beautiful glass buttons are made in Bohemia, either partly or wholly of aventurine glass; and of this gold spangled material artistically inwrought with other colors, studs and solitaires still more remarkable for their beauty and minute patterns are made at Venice.

Porcelain buttons were a few years ago nearly all of French manufacture, but they are now made principally at Prague. The plastic clay is pressed into molds of plaster of Paris in the same way as small objects are usually produced in earthenware. Some are plain and others are painted or printed with patterns. More or less expensive buttons are made of ornamental stone, such as agate, jasper, and marble. Occasionally they are formed of amber, jade, or of still more costly materials, as pearls and gems. In recent years, improved methods and machines have been introduced for the shaping as well as for the polishing and finishing of bone, corozo, and wood buttons. Machinery is used in Germany for the manufacture of composition buttons, and there is an American machine for performing automatically all the operations in manufacturing covered buttons. In England, Birmingham is the seat of the button trade, which, however, is much more largely developed in France. But both countries are now suffering in the competition in the markets of the world with Germany, where labor is cheap and very skillfully applied. In the United States, buttons are principally made in New York and Philadelphia.

Buttonwood, a name often given to the North American plane (*platānus occidentālis*).

Buttresses, in architecture, especially Gothic, projections on the outside of the walls of an edifice, extending from the bottom to the top, or nearly, and intended to give additional support to the walls and prevent them from spreading under the

weight of the roof. Flying buttresses, of a somewhat arched form, often spring from the top of the ordinary buttresses, leaning inward so as to abut against and support a higher portion of the building, such as the wall of a clear story, thus receiving part of the pressure from the weight of the roof of the central pile.

Buttz, Henry Anson, an American educator, born in Middle Smithfield, Penn., April 18, 1835. He was graduated at Princeton in 1858, and entered the Methodist ministry in 1858. He has been President of Drew Theological Seminary since 1880, and has written much on polemics, exegetics and hermeneutics.

Butyl, an organic monad, fatty radical, having the formula $(C_4H_9)'$; also called quartyl, or tetryl, from its containing four carbon atoms. See ALCOHOL.

Butyric Acid, an acid obtained from butter; it also occurs in perspiration, cod liver oil, etc. Butyric acid is a colorless liquid, having a smell like that of rancid butter; its taste is acrid and biting, with a sweetish after taste.

Butyric Ether, a substance obtained from butyric acid with the flavor of pine apples, used in flavoring confectionery, as an ingredient in perfumes, etc.

Butz, Kaspar, a German-American versifier, born in Hagen, Westphalia, Oct. 23, 1825. He was a prominent political journalist in his native land in the stirring days of 1848, but was forced to flee to the United States. Here he became a noted (Chicago) newspaper man, and produced pleasing verse, collected in "A German-American's Poems" (1879), and "Grandfather Songs" (1887). He died at Des Moines, Ia., Oct. 17, 1885.

Buxbaumia (named after John Christian Buxbaum, a German who published a botanical work on Asia Minor in 1728), a genus of mosses containing a solitary species (*B. aphylla*), so like a fungus that it might be easily mistaken for one. Buxbaumia is by some made the type of an order *buxbaumiaceæ*.

Buxton, a town in Derbyshire, England, 37 miles N. W. of Derby, and 25 S. S. E. of Manchester. Buxton has long been famous for its calcareous springs, the waters being taken for indigestion, gout, rheumatism, and nervous and cutaneous diseases. Much of the splendor of Buxton is due to the Dukes of Devonshire, one of whom, in 1780, at the cost of £120,000, erected an immense three-storied pile of buildings called the Crescent. Near Buxton is the Diamond Hill, famous for its crystals; and Poole's Hole, a gas-lit stalactite cavern 770 yards long. Mary, Queen of Scots, was at Buxton when in the custody of the Earl of Shrewsbury. Pop. (1901) 10,181.

Buxton, Sir Thomas Fowell, an English philanthropist, born April 1, 1786; educated at Trinity College, Dublin. In 1811 he joined the firm of Truman, Hanbury & Co., brewers, and took an active share in the business. The Spitalfields distress, in 1816, was the occasion of his turning his attention to philanthropic efforts, and, along with his sister-in-law, the celebrated Mrs. Fry, he made inquiries which directed public attention to the system of prison discipline. In 1818 he was elected to Parliament for Weymouth, and was long the able coadjutor of Wilberforce in his efforts for the abolition of slavery. He was created a baronet in 1840, and died Feb. 19, 1845.

Buxtorf, Johann, a German Orientalist, born in Kamen, Dec. 25, 1564, and became professor at Basel. His chief work is "Lexicon Chaldaicum Talmudicum et Rabbinicum." He died in Basel, Sept. 13, 1629. His son, JOHANN, born in Basel, Aug. 13, 1599, was equally eminent as a Hebrew scholar, and succeeded to his father's chair. He died Aug. 16, 1664.

Buys-Ballot, Christoph, a Danish meteorologist, born in Kloetingen, Zealand, Oct. 10, 1817, studied at Utrecht, where he became Professor of Mathematics (1847) and of Experimental Physics (1870), and, in 1854, Director of the Royal Meteorological Institute. He was one of the initiators of the new system, under which, by daily synoptical weather reports, and by simultaneous observations by land and by sea, materials are collected for forecasting changes. His own observations have resulted in the determination of a general law of storms, known as the Buys-Ballot law. The inventor of the aeroklinoscope, and of a system of weather signals, he was largely instrumental in bringing about an international uniformity in meteorological observations. His works include "Changements périodiques de la Température" (Utrecht, 1847), and, in English, "Suggestions on a Uniform System of Meteorological Observations" (1872-1873). He died in Utrecht, Feb. 2, 1890.

Buyukdereh, a town on the European shore of the Bosphorus, a few miles from Constantinople. It is famous for its scenery, and is a favorite residence of the Christian ambassadors.

Buzzard, the English name of the buteo, a genus of birds, and especially of three species. These are:

1. The turkey buzzard (*cathartes aura*). This genus is more a carrion vulture than a raptorial bird, like some of the other genera described below. They are natives of our Southern States, where they are very useful as scavengers, and are so much appreciated in this regard that in most of

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the States they are protected by law. In consequence they grow quite tame, and in some places may be considered almost a domesticated fowl. They are about the size of a common turkey, and the species gets its name from a distant resemblance between the two. They are of a dirty black color, and are from 25 to 36 inches long, having an immense span of wing (proportionate), being remarkable for their powerful and graceful flight. Its nest is a mere hollow in the ground with a rampart of loose, dead branches around it. These birds may be seen by hundreds in one locality, hovering



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over and lighting upon the carcass of a dead animal. They are rarely found N. of Pennsylvania. After the terrible disaster in Galveston, Tex., in 1900, there was an entire disappearance from that city of these useful birds.

2. The brown buzzard (*buteo vulgaris*), called also the glead, glade, glade, kite or puttock. The male is deep brown above, the margins of the feathers paler, the under parts yellowish white with brown spots, the face with brown and pale bands. The female is deep brown above and below, with whitish streaks on the throat, and spots of the same color on the breast. It feeds on small mammalia, birds, lizards, worms and

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insects. It makes its nest in trees and ledges of rock.

3. The rough legged buzzard (*buteo lagopus*), which is feathered to the toes.

Buzzard's Bay, a bay indenting the S. E. coast of Massachusetts; partly formed by the Elizabeth Islands. Its shores afford many summer resorts. Upon the bay New Bedford is situated.

Byblos, an ancient maritime city of Phœnicia, now called Jebail, a little N. of Beyrout. It was the chief seat of the worship of Adonis or Thammuz.

Byers, Samuel Hawkins Marshall, an American historical and descriptive writer, born in 1838. During the Civil War he served in the Union army. He was taken prisoner; and while in prison in Columbia, S. C., wrote the famous song "Sherman's March to the Sea." He was consul at Zürich, Switzerland, from 1869 to 1884, and Consul-General to Italy in 1885. Among his works are "Switzerland" (1875); "History of Switzerland" (1886); "Military History of Iowa" (1888).

Bye Wash, in engineering, a channel to divert past a reservoir water or streams which would otherwise flow into it, and which are impure or otherwise undesirable. The outlet of water from a dam; a waste. Called also a by-lead and a diversion cut.

By-Law, a private law; the local or subordinate law of a city, town, private corporation or other organization. The power to make by-laws is usually conferred by express terms of the charter creating the corporation; though, when not expressly granted, it is given by implication, and it is incidental to the very existence of a corporation. The Constitution of the United States and Acts of Congress made in conformity to it, the Constitution of the State in which a corporation is located, and all acts of the Legislature constitutionally made, together with the common law as there accepted, are of superior force to any by-law; and such by-law, when contrary to either of them, is void, whether the charter authorizes the making of such by-law, or not; because no legislature can grant power larger than it possesses.

Byng, George, Viscount Torrington, an English admiral, born at Wrotham, Kent, in 1663, and entered the navy at the age of 15. In 1688 he recommended himself to William of Orange, and for his gallant conduct at the sea-fight of Malaga was knighted by Queen Anne. In 1718 he commanded the English fleet sent to Sicily for the protection of the neutrality of Italy, and on July 31st utterly destroyed the Spanish fleet off Messina. In 1721 he was created Viscount Torrington. He died Jan. 17, 1733.

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Byng, John, a British admiral, born in 1704, entered the navy in 1727, and served under his father, Admiral George Byng. He was sent to relieve Minorca, blockaded by a French fleet, but failed, it was thought, through hesitation in engaging the enemy. The public odium of the failure was such that the ministry allowed Byng, who was condemned by a court-martial, to be shot, at Portsmouth, March 14, 1757.

Bynner, Edwin Lassetter, an American novelist, born in Brooklyn, N. Y., in 1842; was librarian of the Boston Law Library. He was the author of short stories, and of several novels, including, "Tritons" (Boston, 1878); "Agnes Surriage" (1886); "Penelope's Suitors" (London, 1887). He died in Boston, Mass., in 1893.

Byr, Robert, pseudonym of KARL ROBERT EMERICH VON BAYER, a German novelist, born at Bregenz, April 15, 1835. He is a very popular and exceedingly prolific story teller, and his volume-a-year since 1862 has had a wide circulation. Among his best known novels are "The Struggle for Life," "Masks," "A Secret Dispatch," "The Road to Fortune," "Meadow Maidenhair," "The Ironworm."

Byrd, or Birde, William, an English composer, born in Lincoln, in 1538, studied under Tallis; became organist of Lincoln in 1563; was appointed a gentleman of Queen Elizabeth's Chapel Royal in 1569. The composer of the first English madrigals (1588), he wrote much sacred music, including the well-known canon, "Non Nobis, Domine!" as well as largely for the virginal. He died in London, July 4, 1623.

Byrgius, Justus, or Jost Bürgi, inventor of various astronomical instruments, born in Lichtensteig, St. Gall, Switzerland, in 1552. In 1579 he entered the service of the learned Landgrave of Hesse, Wilhelm IV., and in 1604 that of the Emperor Rudolf II. His first work was a celestial globe, in which the stars were placed according to his own observations. He died in 1633. Many of his reputed discoveries and inventions are questioned, such as those of logarithms and the proportional compasses.

Byrom, John, an English poet and stenographer, born near Manchester, Feb. 29, 1692. He was educated at Merchant Taylors' School and Trinity College, Cambridge, and for some time studied medicine, but his chief means of livelihood for many years, till he inherited the family estates in 1740, was teaching shorthand on a system invented by himself. He was on friendly terms with many of the eminent men of his time. His earliest writings were a few papers to the "Spectator;" his poems (collected in 1773) were chiefly humorous and satirical, and show remarkable facility in rhyming. He died Sept. 26, 1763.

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Byron, George Gordon Noel, Lord Byron, an English peer and poet of elevated genius; born in London, Jan. 22, 1788. He was the grandson of Admiral John Byron, and son of the admiral's only son, Capt. John Byron, of the Guards, notorious for his gallantries and reckless dissipation. By the eccentricity and misconduct of the old Lord Byron, and of the captain his nephew, the reputation of the family of Byron, so ancient and honorable in English history, had been considerably tarnished. The former was tried by his peers for killing his relation, Mr. Chaworth, in a combat with swords after a tavern dispute under circumstances so equivocal that he was indicted for murder, and made a very narrow escape from the penalty attendant upon manslaughter—an escape which did not prevent him from being consigned by public opinion to a life of seclusion and obscurity. Captain Byron, the poet's father, was so dissipated that he obtained the name of the Mad Jack Byron. He was one of the handsomest men of his day, but so immersed in all the fashionable vices, that at length to be seen in his company was deemed discreditable. In his 27th year he was united in marriage to Amelia, Marchioness of Carmarthen, daughter of the Earl of Holderness. This ceremony the ill-fated lady did not survive more than two years, when he took, for a second wife, Miss Catherine Gordon, heiress of Gight in Aberdeenshire, whose fortune he quickly all but dissipated, leaving her a widow in 1791, with a son, the subject of this article, then only three years of age. Previous to the death of her husband, having been deserted by him, Mrs. Byron retired with her infant son to her native place, Aberdeen, where she lived in seclusion. The circumstances attendant on the childhood of Byron seem to have operated materially in the formation of his very striking character. His mother was a woman of capricious temper, who at one time treated him with injudicious indulgence, at another with less excusable harshness, and some of the waywardness for which he was subsequently noted is undoubtedly to be traced to her unfortunate influence. Being of a sensitive nature, a slight malformation in both of his feet was felt by him as a galling defect, and his mother is even said to have taunted him with this deformity. To strengthen his constitution he was sent to various places in the country, including the neighborhood of Ballater and the famous Lochnagar, where both scenery and legend combined to foster the poetical tendencies of the boy. From 1794 to 1798 he attended the grammar-school of Aberdeen, where he was more distinguished by his great occasional exertions, in order to make up for the intervals of absence rendered

necessary by his delicacy of health, than by his general application. In all boyish sports, however, the ardor of his temperament enabled him to surmount his natural disadvantages. In 1798 the death of his grand-uncle, without issue, gave him the titles and estates of the family; on which, being then 10 years of age, he was removed from the immediate care of his mother, and placed under the guardianship of the Earl of Carlisle, who had married the sister of the late Lord Byron, a lady of considerable poetical abilities. On this change the youthful lord was placed at Harrow, where he distinguished himself more by his love of manly sports, and by his undaunted spirit, than by attention to his studies, or submission to school discipline; but although in a subsequent part of his life he indulged in some animadversions upon the tendency of the system in public schools, he always cherished an affectionate remembrance of Harrow, and of its master, Dr. Drury. While yet at school he fell deeply in love with Miss Chaworth, the daughter and heiress of a gentleman who had fallen by the hand of his grand-uncle, whom he met with on his occasional visits to Newstead. This lady, to whom he very beautifully alludes in a well-known poetical "Dream," although some interviews and billets seem to have passed between them, ultimately married another and more mature suitor. This disappointment exceedingly wounded the ardent spirit of the youthful lover. When between 16 and 17, he was entered at Trinity College, Cambridge; and here, as at Harrow, his dislike of discipline subjected him to much merited reproof, which he repaid with sarcasm and satire; and among other practical jokes, kept a bear, which, he observed, he was training up for a degree. At 19 he quit the university and took up his residence at the family seat of Newstead Abbey, where he employed himself chiefly in amusement, and especially in aquatic sports and swimming. In 1807, while still at Newstead, he arranged his early productions, which he caused to be printed at Newark, under the title of "Hours of Idleness, by George Noel Gordon Lord Byron, a Minor." These poems, although exhibiting some indication of the future poet, also betrayed several marks of juvenility and imitation, which induced the Edinburgh reviewers to indulge in an attack, much less distinguished for wit or acumen, than for unreasonable causticity and ill-nature. The ridicule produced by this critique roused the anger of the poet, who took revenge in his celebrated satire of "English Bards and Scotch Reviewers" (1809). The spirit of resentment is seldom very just; and the anger, rather than the judgment of Byron, guided his pen on this occasion. It happened, too, singularly enough, that, owing to party and other

predilections a number of the persons satirized in this poem, no long time after, were numbered among the friends of the author; for which reason, after it had passed through four editions, he suppressed it. It is unpleasant to relate that, about this time, Byron fell into a career of dissipation too prevalent among the youthful possessors of rank and fortune, when altogether uncontrolled. Thus his fortune became deeply involved before he had attained legal maturity, and his constitution much impaired by the excesses in which he spent it. This course of life, however, could not last, and in 1809 he determined to travel. Accordingly, in company with his fellow-collegian, John Cam Hobhouse, afterwards Lord Broughton, he embarked at Falmouth for Lisbon, and proceeded through the S. provinces of Spain to the Mediterranean. His subsequent peregrinations in Greece, Turkey, etc., need not be detailed here, having been rendered so famous by his fine poem of "Childe Harold's Pilgrimage." He returned home in June, 1811, after an absence of two years, and had not long arrived before he was summoned to Newstead, in consequence of the dangerous illness of his mother, who breathed her last before he could reach her.

In 1812 Byron gave to the world the first two cantos of "Childe Harold's Pilgrimage." This assumption of the character of a wayward libertine, satiated by an over-cultivation of pleasure into misanthropy, tedium, and listlessness, and that in such a manner that the application would necessarily be made to himself afforded proof both of the perverted feeling and of the originality of Byron. There was, however, a boldness in the repulsive personification, and a force and an energy in the mode of supporting it, so indicative of great powers, that it at once produced a strong impression. Eulogy now flowed in from all quarters. Even the readers who disapproved of the misanthropy and somber views of human nature displayed in this extraordinary production, confessed its genius. Thus the feelings of admiration became general, and the strong current of fashion turning directly in his favor, his acquaintance was widely, not to say universally, courted; and his first entry on the stage of public life may be dated from this era. Nor were the manners, person, and conversation of Byron of a nature to dissipate the charm with which his talents had invested him. Although easy and affable in his general manners, the latent reserve of conscious genius was always observable; added to which, the associations connected with his identification with his own "Childe Harold" excited a mysterious and undefinable curiosity. Even his physiognomy was eminently calculated to keep up the interest which he otherwise inspired; the predomi-

nating expression of his fine features being that of deep and habitual thought, although, when engaged in interesting discussion, they as forcibly exhibited gaiety, indignation, and satire. Thus in the imitative world of fashion the enthusiastic looked on him to admire, the serious to admonish, and the soft with a desire to console. The latter sympathy he excited too powerfully in certain quarters, and a course of noxious intrigue was the consequence. It is more gratifying to observe that, in the midst of all this license, he was capable of delicate and generous actions, of which a number of well-authenticated instances are on record. The quick and scrutinizing glance which he had cast on Eastern character and manners was now manifested in the "Giaour," "The Bride of Abydos," "The Corsair," "Lara," and the "Siege of Corinth," which followed one another in quick succession, in the course of the two years 1813 and 1814. For Parliamentary duties he seems to have had a decided distaste, and it was not until his return from the Continent that he ventured to speak. He made his maiden speech in February, 1812, from the opposition bench, against the frame-work bill, and was argumentative and lively, if not very original. Having now become a character whose support might be of considerable consequence, he was congratulated accordingly. Another time he addressed the house in support of Catholic emancipation, and a third and last time on presenting a petition from Major Cartwright.

On Jan. 2, 1815, Byron married Anna Isabella, the only daughter of Sir Ralph Milbanke. Their married life had not lasted long when it was disturbed by pecuniary embarrassments, in consequence of which it was settled that Lady Byron, who had presented his lordship with a daughter on Dec. 10, should return to her parents until better arrangements could be made. From this visit Lady Byron ultimately refused to return, and a formal separation ensued. The real reason of Lady Byron's separation from her husband is still uncertain; for the reason which Mrs. Stowe laid before the public in 1869, alleging it to be the real one as stated by Lady Byron herself, seems inconsistent with the circumstances of the case, and with Lady Byron's own conduct. This rupture produced a considerable sensation in the world of fashion, and the most contradictory rumors prevailed, in the midst of which Byron left England, with an expressed resolution never to return. He visited France, the field of Waterloo and Brussels, the banks of the Rhine, Switzerland, and the North of Italy, and for some time took up his abode at Venice. Here he was joined by Mr. Hobhouse, who accompanied him on a visit to Rome, where he completed his third canto of "Childe Har-

old." Not long after appeared the "Prisoner of Chillon, a Dream, and other Poems"; and in 1817 "Manfred," a tragedy, and the "Lament of Tasso." In one of his excursions from Italy he resided for some time at Abydos, and thence proceeded to Tenedos and the Island of Scio, where he stayed three months, during which time he visited every classical scene, and frequently slept in the peasants' cottages, to whom his liberality made him a welcome guest. He also visited several other islands, and at length repaired to Athens, where he sketched many of the scenes of the fourth and last canto of "Childe Harold," which poem was published in 1818, and sustained the high reputation of the author. In the same year appeared the jeu d'esprit of "Beppo," in the mixed and pointed manner of the Italian style of poetical humor, and marked by a tone of loose morality, which ripened into licentiousness in "Don Juan." In 1819 was published the romantic tale of "Mazeppa," and the same year was marked by the commencement of "Don Juan," which his bookseller, Mr. Murray, declined openly to publish. Of this celebrated production it is as vain to deny the profligacy as the genius. In 1820 was published "Marino Faliero, Doge of Venice," a tragedy, written with an avowed attention to the exploded system of the dramatic unities, which too frequently subtracts from the interest all that it gives to more cold and classical qualities; nor did this effort of Byron's prove an exception. The next year he addressed a letter to W. Lisle Bowles, in defense of the poetical character of Pope which had been rated very low in that writer's life of him. This dispute arose out of a disposition, in certain critics, to ground poetical character exclusively on a tendency to deal with the primary associations connected with natural objects and affections, rather than on the more complex and factitious combinations produced by art and cultivation. This school not infrequently pushes its theory to an extreme, as in the case of Pope, whom Byron, on the other hand, may have somewhat hyperbolically exalted. In the same year appeared the drama of "Sardanapalus," indisputably the finest of his tragic offspring; "The Two Foscari," a tragedy; and "Cain," a mystery. The last is a production of much power, but marked by the same rashness of speculation and recklessness of moral effect which disfigure many of the author's productions.

After leaving Venice Byron resided for some time at Ravenna, then at Pisa, and lastly at Genoa. At Ravenna he became intimate with the Countess Guiccioli, a married lady; and when he removed to Pisa she followed him. Here they both lived together openly in the Lanfranchi Palace. It was at Pisa that in 1822, in conjunction

with Leigh Hunt, who, on invitation, had become his guest, and Percy Bysshe Shelley, the periodical publication called "The Liberal" was commenced, which, principally owing to the unhappy fate of Shelley (who perished by the upsetting of a boat in the Mediterranean), extended only to four numbers. In this work first appeared "The Vision of Judgment," caused by the singularly ill-judged performance, under the same title, of Southey. The publisher was prosecuted, and fined £100. "Heaven and Earth," a mystery, also appeared in "The Liberal." It is founded on the supposed intercourses between angels and the daughters of earth before the flood, and possesses great force and beauty. The later cantos of "Don Juan," with "Werner," a tragedy, and the "Deformed Transformed," a fragment, bring up the rear of Byron's performances. In the autumn of 1822 he quitted Pisa, and wintered at Genoa, and then began to indulge those feelings, in regard to the efforts of the Greeks to throw off the Mohammedan yoke, which determined him to lend them the aid of his person, purse, and influence. It would also appear by some noble verses which have been printed since his death, that a secret consciousness of his career of action having too long been unworthy of him, induced him to seek a nobler species of distinction than one of mere self-engrossment and successful gallantry. It is unnecessary to dwell upon the general tendency of powerful minds, at a particular stage of existence, to break from the enthrallments of pleasure and the senses, because it has been the great theme of allegory ever since allegory was invented. In addition to being satiated with the usual enjoyments of a dissipated man of rank, and disgusted with the sameness of commonplace life, many circumstances contributed to render Byron an enthusiast for Greece. In common with many more, the associations connected with its illustrious history doubtless served to stimulate his concern for its modern degradation; but in him these feelings were quickened by an acquaintance with its grand and beautiful scenery, its various races of wild and picturesque manners, and by the personal interest which he had already excited there. Whatever may have been the exact combination of motive, in August, 1823, he embarked, accompanied by five or six friends, in a British vessel, which he had hired for the purpose and arrived at the commencement of the third campaign. He established himself some time in Cephalonia, and dispatched his friends, Messrs. Trelawney and Hamilton Brown, with a letter to the Greek government. The result of their information induced him to advance £12,000 for the relief of Missolonghi. The dissensions among the Greeks gave him great pain, and involved him in considerable

difficulties. At length he sailed from Argostoli with two Ionian vessels, and, taking considerable specie on board, proceeded to Missolonghi, where, after considerable hazard and danger, and the loss of one of his vessels, he finally arrived, and was received with every mark of honor Grecian gratitude could devise. His influence was immediately exerted in the mitigation of the ferocity with which the war was waged on the part of the Greeks; but it was much more difficult to produce union among their leaders. He immediately began to form a brigade of Suliotes, 500 of whom were taken into his pay, with a view to an expedition against Lepanto; but such was the disorderly and unsettled temper of these troops, that he was obliged to postpone it. This unexpected disappointment preyed on his spirits, and Feb. 15, he was attacked with a severe fit of epilepsy. He had, subsequently, other attacks, but at length the violence of the disorder began to yield to the skill of his physician, and he was recommended to remove for a while from the flat, marshy, and unhealthy site of Missolonghi, to Zante. This step, with his usual tenacity, he refused to take. "I cannot quit Greece (he wrote to a friend) while there is a chance of my being even of supposed utility. There is a stake worth millions such as I am, and while I can stand at all I must stand by the cause. While I say this, I am aware of the difficulties, dissensions, and defects of the Greeks themselves; but allowance must be made for them by all reasonable people." On the expedition against Lepanto being given up, other projects were proposed with reference both to military operations and to congresses for uniting Eastern and Western Greece; but, unhappily, the fatal moment was at hand which was to deprive the Greek cause of its firm and energetic friend. On April 9 Byron, while riding out, got extremely wet; and, scarcely recovered from the effects of his former disorder, a fever ensued, which, it is thought, might have yielded to copious bleeding in the first instance, but which, owing either to his own objection or the inaccurate opinion of the physician of the nature of the disease, was destined to prove fatal on the evening of April 19, 1824. During his illness some fine traits of humanity and feeling for his attendants were exhibited by Byron, and nearly his last words, previous to sinking into the lethargy which ended in death, were, "My wife, my child, my sister!—you know all—you must say all." His utterance then failed him, as it had previously done in referring to the same near connections. Thus, in his 37th year, prematurely died this extraordinary genius, to the deep affliction of the people whose cause he had espoused, who decreed every possible public testimony of their sorrow. Nor was

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his death a subject of less regret to many who looked for a nobler recompense in the maturity of his life for the faults of its commencement and subsequent progress. Many of his errors were evidently the result of a too early release from all discipline and control, and the neglect which family circumstances had thrown round him. In other respects, the vices and failings of Byron, undeniable, it is true, were much magnified by the peculiarity of his genius and character, which attracted an intensity of observation to all which concerned him. The disposition of the public at once to admire and condemn, accompanied as it was with an involuntary tendency to confound the character of the poet with some of the most romantic creations of his imagination, however it might annoy him in the first instance, in the sequel too obviously nurtured a degree of personal vanity, which formed one of the greatest weaknesses of his character. Commonplace censure produces little effect when coupled with great admiration, and still less is effected by the virulence of party attack, or by direct personal hostility. The morals of Byron are altogether indefensible; but it is certain that they were mixed up with great humanity, benevolence, and generosity. It was evident, too, from his death, and many other circumstances, that, whatever his pride and resentment at being so decisively abandoned, he nurtured the natural feelings of a husband and father deep in his bosom. In respect to several disputed points of his conduct, the "Memoirs," by himself (which he gave to Moore to raise a loan from Murray, the bookseller, and which that gentleman, at the instance of his family, thought proper to destroy), would doubtless have given much information to the world. The body of Byron was taken to England, and lay in state in London. It was subsequently interred near his own seat of Newstead Abbey, where a plain marble slab merely records his name and title, date of death, and age. Besides his only legitimate child and heiress, Byron left another daughter in Italy, to whom he bequeathed £5,000, on the condition of her not marrying an Englishman. The successor to his estate and title was his cousin, Capt. George Anson Byron, of the navy.

Byron, Henry James, an English dramatist; born in Manchester, in January, 1834; entered the Middle Temple in 1858; and was for many years a prolific and popular writer of burlesques and extravaganzas. He wrote extensively for periodicals, was the first editor of "Fun," and leased several theaters, where he produced more ambitious plays, in which he himself occasionally appeared. These were less comedies than domestic dramas, enlivened by the

Byzantine Empire

smart dialogue and brisk incidents of farce. The best was "Cyril's Success" (1868); the most successful, "Our Boys," which had an unprecedented run in London from Jan. 16, 1875, to April 18, 1879. He died in London, April 11, 1884.

Byron, John, a British admiral and circumnavigator, grandfather of the poet, Lord Byron, born in Newstead, Nov. 8, 1723. He sailed with Lord Anson in his voyage round the world, and endured fearful sufferings; and on his return to England published a highly interesting narrative of his five years' absence. In 1764 he commanded an expedition to the South Sea, and made important discoveries. During the course of his professional career, Byron was so singularly unlucky in meeting adverse gales and dangerous storms, that throughout the entire British navy he acquired the nickname of "Foul-Weather Jack." He died April 10, 1786.

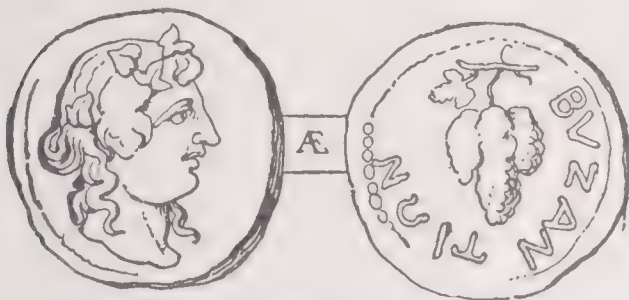
Byssus, a name given to the hair or threadlike substance (called also beard), with which the different kinds of sea mussels fasten themselves to the rocks. The *pinna nobilis*, particularly, is distinguished by the length and the silky fineness of its beard, from which cloths, gloves and stockings are still manufactured (mainly as curiosities) in Sicily and Calabria.

Byttneria, or **Büttneria** (named after DAVID SIGISMOND AUGUSTUS BÜTTNER, Professor of Botany at Göttingen, who published a botanical work in 1750), a genus of plants constituting the typical one of the order *byttneriaceæ*. The species are curious rather than ornamental herbaceous plants.

Byttneriaceæ, or **Buttneriaceæ**, an order of plants placed by Lindley under his 28th or malval alliance. They resemble the *sterculiads*, to which they are allied in having two celled anthers, and in other respects, but differ in having a part of the stamens sterile and small petals bagged at the base. The species mostly come from the West Indies, a few are East Indian or Australian, and one is from Persia. Lindley estimated the known species at 400.

Byzantine Empire, also known as the Eastern Roman Empire, comprehended at first in Asia the country on this side of the Euphrates, the coasts of the Black Sea, and Asia Minor; in Africa, Egypt; and in Europe, all the countries from the Hellespont to the Adriatic and the Danube. This survived the Western Empire 1,000 years, and was even increased by the addition of Italy and the coasts of the Mediterranean. It commenced in 395, when Theodosius divided the Roman empire between his two sons Arcadius and Honorius. The Eastern Empire fell to the elder, Arcadius. Of the Western Empire, which had been ceded to Valentinian, Theodosius seized upon West

Illyria (423). The Greeks fought with success against the King of the Persians, Varanes. The kingdom of Armenia, thrown into confusion by internal dissensions, and claimed at the same time by the Romans and the Persians, became a bone of contention between the two nations (440). Attila laid waste the dominions of Theodosius, and obliged him to pay tribute (447). After the death of her brother Pulcheria was acknowledged empress (450). She gave her hand to the senator Marcian, and raised him to the throne. His wisdom and valor averted the attacks of the Huns from the frontiers, but he did not support the Western Empire in its wars against the Huns and the Vandals with sufficient energy. Pulcheria died before him in 453.



BYZANTINE COIN.

Leo I. (457), a prince praised by contemporary authors, was chosen successor of Marcian. His expeditions against the Vandals (467) were unsuccessful. His grandson Leo II. succeeded, but survived only a few months, when Zeno, the father of Leo, who had previously been appointed his colleague, became sole emperor (474). The government of this weak emperor, who was hated by his subjects, was disturbed by rebellions and internal disorders of the empire. The Goths depopulated the provinces till their king Theodoric turned his arms against Italy (489). Ariadne, widow of Zeno, raised the minister Anastasius, whom she married, to the throne (491). The forces of the empire could not offer an effectual resistance to the Persians and the Bulgarians along the Danube. To prevent their incursions into the peninsula of Constantinople, Anastasius built the "long wall," as it is called. After the death of Anastasius the soldiers proclaimed Justin emperor (518). Notwithstanding his low birth he maintained possession of the throne. Religious persecutions, which he undertook at the instigation of the clergy, and various crimes, into which he was seduced by his nephew Justinian, disgrace his reign. After his early death, in 527, he was succeeded by the same Justinian, to whom, though he deserves not the name of "The Great," many virtues of a ruler cannot be denied. He was renowned as a legislator, and his reign was distinguished by the victories of his general Belisarius; but how unable he was to revive the strength of his empire, was proved by its rapid decay

after his death. Justin II., his successor (565), was an avaricious, cruel, weak prince, governed by his wife. The Longobardi (Lombards) tore from him part of Italy (568). His war with Persia, for the possession of Armenia (570), was unsuccessful; the Avari plundered the provinces on the Danube, and the violence of his grief at these misfortunes deprived him of reason. Tiberius, his minister, a man of merit, was declared Cæsar, and the general, Justinian, conducted the war against Persia with success. The Greeks now allied themselves, for the first time, with the Turks. Against his successor, Tiberius II. (578), the Empress Sophia and the General Justinian conspired in vain. From the Avari the emperor purchased peace; from the Persians it was extorted by his General Mauritius or Maurice (582), who, after the death of Tiberius in the same year, was declared his successor. Mauritius, under other circumstances, would have made an excellent monarch, but, for the times, he wanted prudence and resolution. He was indebted for the tranquillity of the E. frontiers to the gratitude of King Chosroes II., whom, in 591, he restored to the throne from which he had been deposed by his subjects. Nevertheless, the war against the Avari was unsuccessful, through the errors of Commentiolus. The army was discontented, and was irritated now by untimely severity and parsimony, and now by timid indulgence. They finally proclaimed Phocas, one of their officers, emperor. Mauritius was taken in his flight and put to death (602). The vices of Phocas and his incapacity for government produced the greatest disorder in the empire. Heraclius, son of the governor of Africa, took up arms, conquered Constantinople, and caused Phocas to be executed (610). He distinguished himself only in the short period of the Persian war. During the first 12 years of his reign the Avari, and other nations of the Danube, plundered the European provinces, and the Persians conquered the coasts of Syria and Egypt. Having finally succeeded in pacifying the Avari, he marched against the Persians (622), and defeated them; but during this time the Avari, who had renewed the war, made an unsuccessful attack on Constantinople in 626. Taking advantage of an insurrection of the subjects of Chosroes, he penetrated into the center of Persia. By the peace concluded with Siroes (628), he recovered the lost provinces and the holy cross. But the Arabians, who now became powerful under Mohammed and the caliphs, conquered Phœnicia, the countries on the Euphrates, Judea, Syria, and all Egypt (635-641). Among his descendants there was not one able prince. He was succeeded by his son Constantine III., probably in conjunction with his stepbrother Heraclionas (641). The former soon died, and

the latter lost his crown in a rebellion, and was mutilated. After him Constans, son of Constantine, obtained the throne (642). His sanguinary spirit of persecution, and the murder of his brother Theodosius (650), made him odious to the nation. The Arabians, pursuing their conquests, took from him part of Africa, Cyprus, and Rhodes, and defeated him even at sea (653). Internal disturbances obliged him to make peace. After this he left Constantinople, and in 663 began an unsuccessful war against the Lombards in Italy. He died in Syracuse in 668. Constantine IV., Pogonatus, son of Constans, vanquished his Syracusan competitor Mezentius, and, in the beginning of his reign, shared the government with his brothers Tiberius and Heraclius. During the early part of his reign the Arabians inundated all Africa and Sicily, penetrated through Asia Minor into Thrace, and attacked Constantinople, for several successive years, by sea. Nevertheless, he made peace with them on favorable terms. But on the other hand, the Bulgarians obliged him to pay a tribute (680). Justinian II., his son, who succeeded him in 685, weakened the power of the Maronites, but fought without success against the Bulgarians and against the Arabians. Leontius dethroned this cruel prince, and after mutilating, banished him to the Tauric Chersonese (695). Leontius was dethroned by Apsimar, or Tiberius III. (698), who was dethroned by Trebelius, King of the Bulgarians, who restored Justinian (705); but Philippicus Bardanes rebelled anew. With Justinian II. the face of Heraclius was extinguished. The only care of Philippicus was the spreading of Monothelism, while the Arabians wasted Asia Minor and Thrace. Philippicus reigned from 711 to 713, when he was deposed by Anastasius, who at the end of three years, retired to a monastery, the army sent out against the Arabians having revolted against him, and proclaimed their leader, Theodosius, emperor. This prince, known as Theodosius III., after a reign of only 14 months, was compelled in his turn to yield the throne to Leo the Isaurian, general of the army of the East, who refused to recognize him, and marched against Constantinople (May, 717). Leo repelled the Arabians from Constantinople, which they had attacked for almost two years, and suppressed the rebellion excited by Basilus and the former Emperor Anastasius. From 726 the abolition of the worship of images absorbed his attention, and the Italian provinces were allowed to become a prey to the Lombards, who thus put an end to the exarchate of Ravenna (728), while the Arabians plundered the E. provinces. After his death (741), his son Constantine V. ascended the throne—a courageous, active, and noble prince. He vanquished his rebellious brother-in-law Artabasdu, wrested

from the Arabians part of Syria and Armenia, and overcame at last the Bulgarians, against whom he had been long unsuccessful. He died (775), and was succeeded by his son Leo IV., who fought successfully against the Arabians, and this latter by his son Constantine VI. (780), whose imperious mother, Irene, his guardian and associate in the government, raised a powerful party by the restoration of the worship of images. He endeavored in vain to free himself from the dependence on her and her favorite, Stauratius, and died in 797, after having had his eyes put out. The war against the Arabians and Bulgarians was long continued; against the first it was unsuccessful. The design of the empress to marry Charlemagne excited the discontent of the patricians, who placed one of their own order, Nicephorus, upon the throne (802). Irene died in a monastery. Nicephorus became tributary to the Arabians, and fell in the war against the Bulgarians (811). Staturatius, his son, was deprived of the crown by Michael I., and he, in turn, by Leo V. (813). Leo was dethroned and put to death by Michael II. (820). During the reign of the latter the Arabians conquered Sicily, Lower Italy, Crete, and other countries. He prohibited the worship of images, as did also his son Theophilus (829–842). Theodora, widow of Theophilus and guardian of his son Michael III., put a stop to the dispute about the images (842). During a cruel persecution of the Paulicians, considered to be an offshoot of the Manichæans, the Arabians devastated the Asiatic provinces. The dissolute and extravagant Michael confined his mother in a monastery. The government was administered in his name by Bardas, his uncle, and after the death of Bardas by Basil, by whom Michael was put to death (867). Basil I., who came to the throne in 867, was not altogether a contemptible monarch. He died 886. The reign of his learned son, Leo VI. (the Philosopher), was not very happy. He died 911. His son, Constantine VII., Porphyrogenitus (“born in the purple”), a minor when he succeeded his father, was placed under the guardianship of his colleague, Alexander, and after Alexander’s death, in 912, under that of his mother Zoe. Romanus Lecapenus, his general, obliged him, in 919, to share the throne with him and his children, Constantine VIII. and Stephanus. Constantine subsequently took sole possession of it again, and reigned mildly, but weakly. His son, Romanus II., succeeded him in 959, and fought successfully against the Arabians. To him succeeded, in 963, his general Nicephorus II. (Phocas), who was put to death by his own general, John Zimisce (969), who carried on a successful war against the Russians. Basil II., son of Romanus, succeeded this good prince in

976. He vanquished the Bulgarians and the Arabians. His brother, Constantine IX. (1025), was not equal to him. Romanus III. became emperor (1028) by a marriage with Zoe, daughter of Constantine. This dissolute but able princess caused her husband to be executed, and successively raised to the throne Michael IV. (1034), Michael V. (1041), and Constantine X. (1042). Russians and Arabians meanwhile devastated the empire. Her sister Theodora succeeded her on the throne (1054). Her successor, Michael VI. (1056), was dethroned by Isaac Comnenus in 1057, who became a monk (1059). His successor, Constantine XI., Ducas, fought successfully against the Uzes. Eudocia, his wife, guardian of his sons, Michael, Andronicus, and Constantine, was intrusted with the administration (1067), married Romanus IV., and brought him the crown. He carried on an unsuccessful war against the Turks, who kept him for some time prisoner. Michael VII., son of Constantine, deprived him of the throne (1071). Michael was dethroned by Nicephorus III. (1078), and the latter by Alexius I., Comnenus (1081). Under his reign the Crusades commenced. His son, John II., came to the throne (1118), and fought with great success against the Turks and other barbarians. The reign of his son, Manuel I., who succeeded him (1143), was also not unfortunate. His son, Alexius II., succeeded (1180), and was dethroned by his guardian, Andronicus (1183), as was the latter by Isaac (1185). After a reign disturbed from without and within, Isaac was dethroned by his brother, Alexius III. (1195). The Crusaders restored him and his son, Alexius IV.; but the seditious Constantinopolitans proclaimed Alexius V., Ducas Murzuphlus, emperor, who put Alexius IV. to death. At the same time Isaac II. died. During the last reigns the Kings of Sicily had made many conquests on the coasts of the Adriatic. The Latins now forced their way to Constantinople (1204), conquered the city and retained it, together with most of the European territories of the empire. Baldwin, Count of Flanders, was made emperor; Boniface, Marquis of Montferrat, obtained Thessalonica as a kingdom, and the Venetians acquired a large extent of territory. In Attalia, Rhodes, Philadelphia, Corinth, and Epirus, independent sovereigns arose. Theodore Lascaris seized on the Asiatic provinces, in 1206 made Nice (Nicæa) the capital of the empire, and was at first more powerful than Baldwin. In 1204 a descendant of the Comneni, named Alexius, established a principality at Trebizond, in which his great-grandson John took the title of emperor. Neither Baldwin nor his successors were able to secure the tottering throne. He himself died in captivity among the Bulgarians (1206). He was followed first by

Henry, his brother, then by Peter, brother-in-law of Henry (1217), and then by Robert of Courtenay, son of Peter, who succeeded in 1219, but was not crowned till 1221. With the exception of Constantinople, all the remaining Byzantine territory, including Thessalonica, was conquered by John, Emperor of Nice. Baldwin II., brother of Robert, succeeded and reigned under the guardianship of his colleague, John of Brienne, King of Jerusalem, till 1237, after which he was sole ruler till 1261. In that year Michael Palæologus, King of Nice, conquered Constantinople, and Baldwin died in the West, a private person. The sovereigns of Nice up to this period were Theodore Lascaris (1206); John Ducas Vatatzes, a good monarch and successful warrior (1222); Theodore II., his son (1254); John Lascaris (1259), who was deprived of the crown by Michael Palæologus in December, 1259, who himself received the crown Jan. 1, 1260. In 1261 Michael took Constantinople from the Latins. He labored to unite himself with the Latin Church, but his son, Andronicus II. (1282), renounced the connection. Internal disturbances and foreign wars, particularly with the Turks, threw the exhausted empire into confusion. Andronicus III., his grandson, obliged him to divide the throne, and at length wrested it entirely from him (1328). He waged war unsuccessfully against the Turks, and died in 1341. His son, John Palæologus, was obliged to share the throne with his guardian, John Cantacuzene, during the first years of his reign. The son of the latter, Matthew, was also made emperor. But John Cantacuzene resigned the crown, and Matthew was compelled to abdicate (1355), when John Palæologus, the son of Andronicus III., became sole emperor. Under his reign the Turks first obtained a firm footing in Europe, and conquered Gallipoli (1357). The family of Palæologus from this time were gradually deprived of their European territories, partly by revolt, partly by the Turks. The Sultan Amurath took Adrianople (1361). Bajazet conquered almost all the European provinces except Constantinople, and obliged John to pay him tribute. The latter was, some time after, driven out by his own son, Andronicus, who was succeeded by his second son, Manuel (1391). Bajazet besieged Constantinople, defeated an army of Western warriors under Sigismund, King of Hungary, near Nicopolis (1396), and Manuel was obliged to place John, son of Andronicus, on the throne. Timur's invasion of the Turkish provinces saved Constantinople for this time (1402). Manuel then recovered his throne, and regained some of the lost provinces from the contending sons of Bajazet. To him succeeded his son John, Palæologus II. (1425), whom Amurath II. stripped of all his territories except Constantinople,

and laid under tribute (1444). To the Emperor John succeeded his brother Constantine Palæologus. With the assistance of his general, Justinian, a Genoese, he withstood the superior forces of the enemy with fruitless courage, and fell in the defense of Constantinople, by the conquest of which (May 29, 1453) Mohammed II. put an end to the Greek or Byzantine empire.

Byzantine Literature.—The Greek literature of the period of the Byzantine empire is almost entirely destitute of originality, and derives importance almost entirely from the mass of valuable historical material embodied in it. Among the historians proper the more notable are Procopius of Cæsarea; Agathias, who wrote an account of Justinian's reign; Nicephorus Gregoras; Anna Comnena, daughter of the Emperor Alexius I., author of a highly laudatory life of her father; Pachymerus; George Codinus; Constantine VII., Porphyrogenitus, from whom we have many works on history, law, politics, and science; John Cantacuzenus, emperor and historian; and at the very end of the period, M. Ducas. Poetry, in the proper sense of the word, can scarcely be said to have existed at all. Theodorus Prodromus, who flourished late in the 12th century, is the chief of the versifiers, among his works being a long romance having Rhodanthe and Dosikles as its heroine and hero, some dramas, historical poems, epistles, etc. Georgius of Pisidia, early in the 7th century, wrote war poems; Nicetas Eugenianus, a contemporary of Prodromus, wrote a work in imitation of the latter's romance; and among other writers of verse were Theodosius, of the latter half of the 10th century, Tzetzes and Joannes Pediasimus, the latter two being better known as annotators of the Greek classical writers. Manuel Philes of Ephesus (about 1280–1330) has left many dramas; and we have hymns from Germanus, a patriarch of Constantinople; Theodorus Studites; Porphyrogenitus; Cosmas, an 8th century writer; Joannes Damascenus (John of Damascus); and Theophanes Ho Graptos. Among writers of grammatical and similar works the most notable are Tzetzes (about 1180), who annotated Homer, Hesiod, Æschylus, and especially Aristophanes; Eustathius, Archbishop of Myra in Lycia in 1174, best known for his commentary on Homer; Manuel Moschopulus, a 13th century scholiast; Joannes Pediasimus, of the latter part of the 14th century, chiefly known for his scholia on Hesiod's poems; and Demetrius Triclinius, a scholiast contemporary with Pediasimus. Of the lexicographers Suidas, who lived during the 10th century, is much the most important; but the works of Photius in this department are also of value. Joannes Doxopater, in the later part of the 11th century, wrote on rhetoric; and in the department of philosophy we

find the names of Michael Bellus the younger (about 1018–1105), who also wrote historical and other works, and Joannes Italus. The theologians include Joannes Damascenus, already mentioned, author of *Sacra Parallela*, a collection of passages from the fathers; and Nicephorus Callistus, a 14th century writer on ecclesiastical history.

Byzantine Art.—The style which prevailed in the Byzantine empire, and which arose after Constantine the Great had made Byzantium the capital of the Roman empire (A. D. 330), and had ornamented that city, which was renamed after him, with all the treasures of Grecian art. One of the chief influences in Byzantine art was Christianity, and to a certain extent Byzantine art may be recognized as the endeavor to give expression to the new elements which Christianity had brought into the life of men. The tendency toward Oriental luxuriance and splendor of ornament now quite supplanted the simplicity of ancient taste. Richness of material and decoration was the aim of the artist rather than purity of conception. Yet the classical ideals of art, and in particular the traditions of technical processes and methods carried to Byzantine by the artists of the Western Empire, held their ground long enough, and produced work pure and powerful enough to kindle new artistic life which began in Italy with Cimabue and Giotto.

With regard to sculpture the statues no longer displayed the freedom and dignity of ancient art. The true proportion of parts, the correctness of the outlines, and in general the severe beauty of the naked figure, or of simple drapery in Greek art, were neglected for extravagant costume and ornamentation and petty details. Yet in the best period of Byzantine art, from the 6th to the 11th century, there is considerable spiritual dignity in the general conception of the figures. But sculpture was of second-rate importance at Byzantine, the taste of those times inclining more to mosaic work with the costliness and brilliant colors of its stones. The first germ of a Christian style of art was developed in the Byzantine pictures. The artists, who appear to have seldom employed the living model, and had nothing real and material before them, but were obliged to find, in their own imaginations conceptions of the external appearance of sacred persons, such as the mother of Christ or the apostles, could give but feeble renderings of their ideas. In this way they did not even aim at accuracy of representation, but were contented with stiff general outlines, lavishing their labor on ornamental parts.

Byzantine architecture may be said to have assumed its distinctive features in the Church of St. Sophia, built by Justinian in the 6th century, and still existing as

the chief mosque in Constantinople. It is more especially the style associated with the Greek Church as distinguished from the Roman. The leading forms of the Byzantine style are the round arch, the circle, and in particular the dome. The last is the most conspicuous and characteristic object in Byzantine buildings, and the free and full employment of it was arrived at when by the use of pendentives the architects were enabled to place it on a square apartment instead of a circular or polygonal. In this style of building incrustation, the incrustation of brick with more precious materials, was largely in use. It depended much on color and surface ornament for its effect, and with this intent mosaics wrought on grounds of gold or of positive color are profusely introduced, while colored marbles and stones of various kinds are greatly made use of. The capitals are of peculiar and original design, the most characteristic being square and tapering downward, and they are very varied in their decorations. Byzantine architecture may be divided into an older and a newer (or Neo-Byzantine) style. The most distinctive feature of the latter is that the dome is raised on a perpendicular circular or polygonal piece of masonry (technically the drum) containing windows for lighting the interior, while in the older style the light was admitted by openings in the dome itself.

Byzantine Historians, numerous historians proper, and chroniclers who lived in the Byzantine empire between the 4th and 15th centuries A. D., and wrote its history. The most celebrated was Procopius, of Cæsarea.

Byzantium, the name of the city of Constantinople before its name was changed by Constantine the Great. It was founded by a colony of Greeks from Megara, who, under a leader named Byzas, settled on what seemed a favorable spot at the entrance to the Thracian Bosphorus, in 658 B. C. The city, which was built by the first colonists, was named after their leader. Other colonists followed from different quarters, espe-

cially from Miletus, and Byzantium was already a flourishing town when it was taken and sacked by the Persians, in the reign of Darius, the son of Hystaspes. After the retreat of the Persians (479 B. C.) Byzantium soon recovered itself. During the Peloponnesian War it acknowledged for some time the supremacy of the Athenians, but afterward fell away. Alcibiades recovered it for Athens (409), but it was taken by Lysander in 405. At a later period the Byzantines received support from Athens in their resistance against Philip of Macedon. The barbarian Thracians, who occupied the neighboring territory, and the Celts (Galatians), in their migrations to the East, often appeared to threaten the safety of the town; but in spite of this, chiefly owing to its favorable position for commerce, it continued to prosper, and survived the decay of most of the other Greek cities; and even under the Romans it was left free to manage its own affairs, and was allowed to demand dues from all ships passing through the Bosphorus, only part of these being claimed by the Romans. At the end of the 2d century of the Christian era Byzantium, unfortunately for itself, sided with Pescennius Niger against Septimius Severus. By the latter it was besieged for three years, and when at last it was forced to surrender, Severus ordered its walls to be razed to the ground, deprived the city of its privileges, and placed it under the jurisdiction of the Perinthians. For a time the prosperity of the city was annihilated, until a new and more brilliant era began for it under Constantine the Great. Its early form of government was that of an aristocracy, which passed into an oligarchy. In 390 B. C. it received from Thrasybulus a democratical constitution, closely resembling that of the Athenians. Byzantium was the great entrepôt for the grain trade between the countries bordering on the Black Sea and those bordering on the Ægean. In its immediate neighborhood excellent wine was grown, and the surrounding seas abounded in tunny fish. In addition to that the Byzantines carried on a large trade with neighboring countries, exporting slaves, hides, honey, etc. See CONSTANTINOPLE.



c, the third letter of the English alphabet and in others derived from the Latin. "In English," says Ben Jonson, "it might well have been spared, for it has no peculiar sound." It has the simple power of *k* before *a*, *o*, *u*, and most of the consonants; and the power of *s* before *e*, *i*, *y*. In combination with *h* it forms the digraph *ch*, which in genuine English words is usually pronounced as in *child*, *chin* (a sound that might be written *tsh*); otherwise it may be pronounced like *k*, as in *chord*, *architect*; or even as *sh*, as in *machine*. In various Scotch words, such as *loch*, and also in German, *ch* has a peculiar guttural sound. In Latin *c* seems to have had originally the sound of *g* hard, but in the classical period it had the sound of *k*, and this even before *e* and *i* (*Cicero* = *Kikero*). In the Anglo-Saxon alphabet it also had this sound, and the change of pronunciation in such words as *chin* = Anglo-Saxon *cin* (pronounced *kin*), *child* = Anglo-Saxon *cild* (pronounced *kild*), is similar to what has taken place in Italian as compared with Latin, the Italian *c* before *e* and *i* being pronounced as *ch* in *child*. In Spanish, again, before *e* and *i* it has the sound of English *th* in *thin*. It does not occur alone as a final consonant in purely English words, but often along with *k*, as in *thick*, etc. On Roman coins and medals it stands for various personal names, as *Cæsar*, *Caius*, *Cassius*, etc.; or for names of offices, as *censor*, *consul*; also for *civitas*, *colonia*, *cohors*, etc. See ABBREVIATIONS.

C, as an initial is used:

1. In chronology: Chiefly for Christ, as *B. C.* = (Before Christ).

In the ambiguous letters *A. C.*, *C* may be (1) Christ, and *A. C.* = After Christ. Or it may be (2) Christum, and *A. C.* = ante-Christum, before Christ; or (3) Christi, and *A. C.* = Anno Christi, the year of Christ.

2. In Music: For counter-tenor, or contralto.

3. In university degrees: For Civil, as *D. C. L.* = Doctor of Civil Law.

C, as a symbol is used:

1. In numerals: for 100. Thus *CII* =

102, *CC* = 200, *CCC* = 300, *CCCC* = 400. *C* is in this case the initial of Lat. *centum* = 100.

2. In chemistry: For the element carbon, of which it is also the initial letter.

3. In music:

(1) For the first note of the diatonic scale, corresponding to *do* of the Italians.

(2) For the natural major mode, that in which no sharps or flats are employed.

(3) For common or four-crotchet time.

4. In Biblical criticism: For the Ephraem manuscript of the Greek New Testament, *A* being the Alexandrian manuscript, *B* the Vatican manuscript, *D* the manuscript of Beza, and the Hebrew letter *Aleph*, the Sinaitic manuscript.

Caaba, or **Kaaba**, the Mohammedan temple at Mecca, especially a small oratory within, adored by Mohammedans as containing the black stone said to have been given by an angel to Abraham on the occasion of building the original Caaba. The caaba is at the center of the mosque of Mecca, a building called by the Mohammedans *El-Haram*, *i. e.*, "The Inviolable."

The caaba walls are of gray Mecca stone in large blocks of different sizes, roughly joined together. This "Holy House" is a massive structure, 18 paces in length, 14 in breadth, and from 35 to 40 feet in height. Over it is draped a *keswa* or curtain of rich black silk, which is renewed every year. This dark veil is so arranged as to leave visible the revered black stone that is eagerly visited and kissed by millions of devotees; for this particular spot is the objective point of the vast throngs of pilgrims who yearly flock to Mecca, in obedience to their prophet's commands, from all parts of the Mohammedan world. At another corner of the structure is a gray stone considered to be of less sanctity than the heaven-descended black stone, but approached with reverence by the faithful who touch not their lips but their fingers to its surface. The veil that shrouds the caaba is relieved by inscriptions from the Koran in bright letterings. Sir Richard Burton visited Mecca, disguised as a Muslim pilgrim, and at great risk obtained a good view of the sacred structure which

Caaing Whale

is supposed to be accessible to Mohammedans only. It was entirely rebuilt in A. D. 1627.

Caaing Whale (*Globicephalus melas*), one of the Cetacea, in the dolphin family, belonging to a genus common in all seas, and oftener stranded than any other whale. The skull is broad and depressed; snout and brain case are about equal in length; the front of the nose-like head is rounded by a cushion of fat in front of the blow-hole; there are about a dozen small conical teeth above and below; the fore limbs are very long (5 feet) and narrow, and situated far below; the dorsal fin is low and triangular; the tail is deeply forked. The smooth skin of the common species is of a uniform black color, except a white streak along the ventral surface. The total length varies from 16 to 24 feet, the maximum girth about 10 feet. The caaing whale is very gregarious, and vast shoals of 50 to 100 sometimes impetuously follow their leader ashore when alarmed and surrounded in a bay or fiord. Exciting scenes of this sort have been frequently witnessed on the Faroe Islands and elsewhere. It is recorded that 1,110 were killed in the winter of 1809-1810 at Hvalfiord, in Iceland. In temper the animals are mild compared with some of their allies. They feed chiefly on cuttle-fishes. Many names are given to these common cetaceans — *e. g.*, pilot-whale, black-fish, social whale, grindhval, etc. The common name is derived from the Scotch word *caa*, meaning "to drive." Several species are distinguished in different seas, but the characteristics are trivial and somewhat vague.

Cab, a covered public carriage having two or four wheels, and drawn by one horse. Cabs were first used for hire in London in 1823. In a hansom cab the driver's seat is behind, not in front. Also the covered part at the rear end of a locomotive which protects the engineer and fireman, and shields the levers, etc.

Cabal, in English history applied to the ministry under Charles II., which consisted of five men famous for their intrigues — Clifford, Ashley, Buckingham, Arlington, and Lauderdale, whose initial letters form this word (Burnet, "Own Times," 1672). The use of this word to signify a body of intriguers was not, however, derived from this circumstance, as some have supposed, for the word *cabale*, derived from *cabala* (see next article), was used in that sense in French before this time (for example, by Molière). "Never," says Hume, "was there a more dangerous ministry in England, nor one more noted for pernicious counsels. Ashley (more known as the Earl of Shaftesbury), bold, ambitious, eloquent, insinuating, subtle, united great industry with a sound judgment of business and of

Cabala

men. Buckingham, with the advantages of a graceful person, high rank, splendid fortune, and a lively wit, but without prudence or principle, sacrificing in turn honor to interest, interest to pleasure, and pleasure to caprice, dissipated his fortune and ruined his health by his riot and debauchery, and destroyed his character in public life by his want of secrecy and constancy. Lauderdale, tyrannical, ambitious, implacable, insolent, yet abject, had a great ascendancy over the king. Clifford, daring, impetuous, yet artful and eloquent, and Arlington, of moderate capacity, without courage or integrity, were secretly Catholics. Shaftesbury was at once a Deist and addicted to astrology; Lauderdale, a bigoted, and earlier, a furious Presbyterian."

Cabala, or **Cabbala** (that is, reception), a word used by the Jews to denote sometimes the traditions of their ancestors regarding the interpretation of the Scriptures; sometimes, and most commonly, their mystical philosophy. The opinions of scholars respecting the origin of the cabalistic philosophy are very various. The Jews derive the cabala from the most ancient times of their nation, nay, even from Adam himself. But cabalistic doctrines in reality seem to have had their origin about 200 years before Christ, and were derived from the mingling of Oriental ideas with those belonging to the Mosaic religion that was the result of the captivity. It was long before the cabala reached its full development, however, the chief landmarks in its history being the writings of Philo Judæus and the appearance of the books called the "Jezirah" and the "Sohar." The age of both is doubtful. The earliest probable date for the "Jezirah" is the beginning of our era. The earliest mention of the "Sohar" is in 1290, and the author is not supposed to have lived much before 1000. The cabala is divided into the symbolical and the real. The symbolical portion treats principally of letters, to which it gives mystical signification. The real, which is opposed to the symbolical, and comprehends doctrines, is divided into the theoretical and practical. The aim of the theoretical is to explain the Holy Scriptures according to the secret traditions, and to form therefrom a philosophical system of metaphysics, physics, and pneumatology. The practical portion, on the other hand, pretends to teach the art of performing miracles, and that merely by an artificial application of the divine names and sentences in the Sacred Scriptures. After the revival of science many scholars studied the cabala. The most famous modern cabalists are Henry More and Christian Knorr, the latter of whom published a compilation of the most important parts of the cabalistic writings in Latin (1677).

Caballero, Fernan (kā-bäl-yä'rō) (pseudonym of CECILIA BÖHL DE FABER), a Spanish novelist; born in Morges, Switzerland, Dec. 25, 1796. Not until 1849 did her first book, "The Sea-Gull," appear, forthwith establishing her fame as the creator of the modern Spanish realistic novel. A strictly Roman Catholic and extremely conservative tendency prevails in all her work. Her novels include "The Family of Alvareda," "A Summer Season at Bornos," "Clemencia," "Elia," "Tears," "Poor Dolores," "Lucas Garcia," and others. Besides several collections of short stories, she also published the first collection of Spanish fairy tales, under the title "Andalusian Popular Tales and Poems" (1859). She died in Seville, Spain, April 7, 1877.

Cabanel, Alexandre, a French historical painter, born in Montpellier, Sept. 28, 1823. His subjects are drawn from the Bible or from poetry and legend, and are almost without exception of a morbid and sensuous character. Thus from the Bible he takes the repulsive story of "Tamar," and also paints the "Sulamite Listening to the Voice of Her Lover." This latter picture is in the Wolfe collection, Metropolitan Museum of New York. From Roman legend he chooses the equally cruel story of "Lucretia and Tarquin;" from Dante, the "Deaths of Francisca and Paolo;" from Shakespeare, "Desdemona Weeping." Among his more pleasing pictures are "A Florentine Poet" and "The Birth of Venus." Cabanel also painted many portraits. He died in Paris, Jan. 23, 1889.

Cabanis, Pierre Jean Georges (kā-bä-nē'), a French physician and philosophical writer, born in Cosnac, 1757; attended Mirabeau in that great Frenchman's final illness, and wrote "Journal of the Illness and Death of Mirabeau" (1791); besides being the author of an interesting work on "Connections [*rapports*] between Man's Physical and Moral Constitutions [or Natures]" (new ed. 1866), which has proved an incentive to thought. He died near Meulan, May 5, 1808.

Cabbage (*Brassica oleracea*), a plant in general cultivation for culinary purposes, and for feeding cattle. The common cabbage is said to have been introduced into England by the Romans, but to have been little known in Scotland until brought by Cromwell's soldiers. The principal varieties are known to have existed at least as far back as the 16th century, but minor varieties are being constantly produced by selection and intercrossing. The varieties differ greatly from each other, and the ancestral wild cabbages yet admit of simple interpretation as terms of a continuous series of simple variations. The parent is of

highly vegetable character, as its habitat and habit alike show; and placed in more favorable conditions its growth becomes luxuriant. More normally, it is carried back into the stem, and this may accordingly become swollen and turnip-like, in which case we have the kohl-rabi, of which an extreme subterranean and almost turnip-like variety has also arisen, or may be, as in the Jersey cabbage, largely applied to the purpose of the growth of the stem, which may reach a height of 8 to 10 feet, and furnish not only walking sticks, but even spars for small thatched roofs, etc. The vegetative overplus may, however, also be applied to the formation of buds, which accordingly develop with peculiar exuberance, giving us Brussels sprouts. The most evolved and final variety is the cauliflower, in which the vegetative surplus becomes poured into the flowering head, of which the flowering is more or less checked; the inflorescence becoming a dense corymb instead of an open panicle, and the majority of the flowers aborting, so as to become incapable of producing seed. Let a specially vegetative cabbage repeat the excessive development of its leaf parenchyma, and we have the wrinkled and blistered savoy, of which the hardy constitution, but comparative coarseness, becomes also more intelligible. Again a specially vegetative cauliflower gives us an easily grown and hardy winter variety, Broccoli, from which, and not from the ordinary cauliflower, a sprouting variety arises in turn.

Cultivation.—The cabbage is biennial, consequently the main crop must be sown the autumn previous to that in which it is to be reaped. Field cabbages and the drum-head varieties that are used in gardens, being late in character, may be sown in July, or from the third week of that month to the second week of August. But the smaller and early sorts used in gardens should not be sown before the first week of August, nor later than the second week of that month. If the plants are reared earlier, they are apt to run to seed the following spring; and if, on the other hand, they are reared later, they will not acquire strength enough to withstand the cold of winter before it comes upon them. For successive crops to be used in the shape of young summer cabbages, one or two sowings may be made from the beginning of March to the beginning of April. Autumn-sown plants may be planted out in rows permanently as soon as they are strong enough. Additional plantations from the same sowing may be made in spring, to be followed by others, made at intervals, up till July, from spring-sown plants. Thus a close succession of usable cabbage may be obtained the year round. In the Northern parts of the United States, cabbages for the early summer mar-

ket are sown about September, kept under glass or frames during winter, and planted out in spring. For later markets, the seed is sown in beds as early as possible in spring (about March), and transplanted later. Cabbages are sometimes preserved for winter by inverting them and burying them in the ground. Cabbage coleworts may be obtained from any good early variety of cabbage. They are simply cabbages which are not permitted to form hearts, but are used while the leaves are yet green and the hearts more or less open. Three sowings should be made for the rearing of these: the first about the middle of June, the second about the same time in July, and the third about the last week of the latter month, or the first week of August. These sowings will provide crops of green cabbages from October till March or April, if the winter is not destructive, after which they begin to run to seed.

Cabbage Butterfly, a name given to several species of butterfly, especially *Pontia*, or *Pieris brassicæ*, a large white butterfly, the larvæ of which destroy cruciferous plants, particularly of the cabbage tribe.

Cabbage Flea, the name sometimes given to a small leaping beetle, the *Altica*, or *Halitica consobrina*, the larvæ of which destroy seedling cabbages, as those of the allied species, *A. nemorum*, do young turnips.

Cabbage Moth (*Mamestra brassicæ*), a species of moth, the caterpillar of which feeds on cabbage and turnip leaves, and is sometimes very destructive. The caterpillar is greenish-black, and changes to a chestnut chrysalis in autumn. The perfect insect is predominantly of a rich mottled-brown color, with beautiful markings. The winter chrysalids should be destroyed when turned up in digging; the voracious grubs should be picked away from the cabbages, and the stems may be very profitably protected by making a ring in the ground with spirit of tar, quicklime, or, best of all, gaslime.

Cabbage Rose, a species of rose (*Rosa centifolia*) of many varieties, supposed to have been cultivated from ancient times, and eminently fitted for the manufacture of rose water and attar from its fragrance. It has a large, rounded, and compact flower. Called also Provence rose.

Cabbage Tree, the English name for the palm genus *Areca*, and specially for the *A. oleracea*, the cabbage palm of the West Indies. It is so called because the bud at the top of its stem is like a cabbage, and the inner leaves, which form this bud are eaten like the vegetable now mentioned, though the removal of its bud for the sake of these leaves is the destruction of the magnificent tree. A garden named for *Kleinia nervifolia*, a composite plant. Aus-

tralia cabbage tree: A palm tree—the *Corypha australis*. Its leaves are made into hats, baskets, etc. Bastard cabbage tree: *Andira inermis*, a leguminous plant of the sub-order Cæsalpinieæ.

Cabbala. See CABALA.

Cabeiri, sacred priests or deified heroes, venerated by the ancients as the authors of religion and the founders of the human race. The multiplicity of names applied to the same character, the interchange of the names of the deities themselves with those of their priests, the oracular law which enjoined the preservation of ancient barbaric names, and thus led to a double nomenclature, sacred and profane, together with the profound secrecy of the rites, have involved the subject in great obscurity. Some have thought that the Eastern mythology and the Druidism of Western Europe contain traces of the Cabeiri. Herodotus (ii. 51) says that their worship was brought to Samothrace by the Pelasgi. Strabo (x. 472) says they are the same as the Corybantes. Others have identified them with the Titans, the Dii Magni, the Penates, the Dioscuri, etc. Some say there were six, three male and three female, children of Vulcan and Cabira, daughter of Proteus. Others make two, sons of Jupiter or Bacchus. In Samothrace four were venerated. In Egypt their temple was never entered by any but the priests. In Phœnicia, Rome (where, according to Pausanias, they had an altar in the Circus Maximus), and other countries of Europe and Asia, traces of their worship are found. But the mysteries (*Cabiria*) celebrated at Samothrace were the most famous. The mysteries of Isis, Ceres, Mithras, Trophonius, Bacchus, Rhea, Adonis, Osiris, and all the similar customs of Egypt, Greece, Hindustan and Britain, seem to be only varieties of the Samothracian rites, which were celebrated in the obscurity of night, and with most profound secrecy. Some tell us that after a previous probation the candidates for initiation were purified by water and blood, they then offered a sacrifice of a bull or ram, and were made to drink of two fountains, called *Lethe* (oblivion) and *Mnemosyne* (memory), to wash away the memory of their former guilt, and to enable them to remember the new instructions. They were then transported into a dark tower or cavern, where their ears were assailed by the most appalling sounds, the rushing of waters, the roar of thunder, dreadful yells, with occasional gleams of light flashing through the darkness, and displaying the most horrible phantoms, with a dead body exposed on a bier. Thus filled with terror, they were suddenly hurried into other scenes; light and cheerful music succeeded to darkness and the dismal sounds, the dead body

Cabell

revived, and the temple resounded with rejoicings. The hidden doctrines and secret rites were now communicated. Dances and orgies, in which the mystic *phallus*, corresponding to the lingam of the Hindus, was introduced, closed the ceremony. But all this is doubtful.

Cabell, William Lewis, an American lawyer; born in Danville, Va., Jan. 1, 1827; was graduated at the United States Military Academy in 1850; served as lieutenant in the 7th United States Infantry in 1850-1858; became captain and was on General Harney's staff in the Utah expedition in the latter year; was engaged in rebuilding old Fort Kearney in Nebraska in 1859, and in building Fort Cobb in 1860-1861; and resigned his commission in 1861. During the Civil War he served in the Confederate army; rose to the rank of Brigadier-General; was captured in Kansas in 1864, and held a prisoner of war till April 28, 1865. After the war he practised law in Fort Smith, Ark., and after 1872 in Dallas, Tex. He was mayor of the latter city four times.

Cabell, James Lawrence, an American sanitarian, born in Nelson county, Va., Aug. 26, 1813. He was graduated at the University of Virginia in 1833, where he later filled the chair of anatomy. During the Civil War he had charge of military hospitals for the Confederate Government. He devised measures to check the yellow fever epidemic at Memphis and was president of the National Board of Health from 1879 till his death, in Overton, Va., Aug. 13, 1889.

Cabell, William, an American statesman, born in Licking Hole, Va., March 13, 1730. He was a member of the House of Burgesses of Virginia upon the outbreak of the Revolution; took an active part in the affairs of the new nation, and before the adoption of the Federal Constitution, was presiding magistrate for the United States in Virginia. He died in Union Hill, Va., March 23, 1798.

Caber, the undressed stem of a tree, 20 or more feet long, used at Highland games as a trial of strength, being held upright by the smaller end and tossed so as to strike the ground with the other end and turn over.

Cabet, Etienne (kä-bā'), a French communist, born in Dijon, Jan. 2, 1788, and educated for the bar, but turned his attention to literature and politics. Under the Restoration he was one of the leaders of the Carbonari, and in 1831 was elected deputy for the department of Côte d'Or. Soon afterward he published a "History of the July Revolution" (1832), started a Radical Sunday paper, "Le Populaire" (1833), and on account of an article in this paper was sentenced to two years' imprison-

Cabinet

ment, but escaped to London. After the amnesty, in 1839, he returned to Paris, and published a "History of the French Revolution" (1840), bestowing great praise on the old Jacobins. He attracted far more notice by his "Journey in Icaria" (1840), a "philosophical and social romance," describing a communistic Utopia. The work obtained great popularity among the working classes of Paris. Cabet next proceeded to send an "Icarian colony" to the Red river in Texas, but the colonists who went out in 1848 found Texas anything but a Utopia. Their ill fortune did not deter Cabet from embarking at the head of a second band of colonists. On his arrival he learned that the Mormons had just been expelled from Nauvoo, Ill., and that their city was left deserted. The Icarians established themselves there in 1850. Cabet's efforts, however, were not successful. He was finally obliged to leave Nauvoo and retire to St. Louis, where he died Nov. 9, 1856.

Cabeza de Vaca, Alvar Nunez (kä-bā'thä dā vä'kä), a Spanish explorer, born in 1507(?). He was second in command in the ill-fated expedition of Pánfilo de Narvaez to Florida in 1528. After the loss of their commander, Cabeza de Vaca, with a few survivors, landed W. of the mouth of the Mississippi, and after eight years of wandering and captivity among the Indians, he reached a Spanish colony on the Pacific with three companions. He returned to Spain, and in 1540 was appointed Governor of La Plata. He explored Paraguay, but became unpopular with the colonists, and after a defeat by the Indians he was arrested on the charge of one of his subordinates, returned to Spain (1544), found guilty, and banished to Africa. Eight years later he was pardoned and made Judge of the Supreme Court at Seville. He has left an account of his travels and explorations in "Shipwrecks of Alvar Nuñez" and "Commentaries." He died about 1564.

Cabillonum. See CHALON-SUR-SAONE.

Cabinda, a Portuguese seaport and territory, N. of the mouth of the Kongo river, bounded by the Atlantic, the Kongo Free State, and the French Kongo territory. The town carries on a considerable trade, and its people are noted for their shipbuilding and other handicrafts. Pop. about 10,000.

Cabinet, a deliberative committee of the executive authority, consisting of the principal members of the Government. The cabinet of the President of the United States is composed of the heads of the several administrative departments of the Government. They are: 1. The Secretary of State, 2. The Secretary of the Treasury, 3. The Secretary of War, 4. The Secretary of the Navy, 5. The Secretary of the Interior, 6. The Postmaster-General, 7. The Attor-

ney-General. 8. The Secretary of Agriculture. 9. The Secretary of Commerce and Labor. They are appointed by the President, must be confirmed by the Senate, and generally hold office until their successors are appointed and confirmed. Contrary to foreign systems, the United States cabinet ministers do not have seats in Congress; there is no premier; and the President, not the ministers, is responsible for the acts of the Government. The salary of members of the cabinet is \$12,000 a year.

In Great Britain the cabinet is the body of ministers who carry on the government. It is an institution which has gradually grown out of the needs and exigencies of English political life, and is now an essential part of English polity. As the executive organ of Parliament, it is very elastic, and while subject to considerations of use and wont, its action can be suited to the exigencies of time and circumstance. The cabinet includes: The First Lord of the Treasury, the Lord Chancellor, the Lord President of the Council, the Lord Privy Seal, the five secretaries of state, the Chancellor of the Exchequer, and the First Lord of the Admiralty. Thus the minimum number of members is 11, although it has sometimes numbered 17.

Cabiri. See CABEIRI.

Cable is either a large rope or a chain of iron links. Rope cables are made of the best hemp or of wire, twisted into a mass of great compactness and strength. The circumference of hemp rope varies from about 3 inches to 26. A certain number of yarns are laid up left-handed to form a strand; three strands laid up right-handed make a hawser, and three hawsers laid up left-handed make a cable. The strength of a hemp cable of 18 inches circumference is about 60 tons, and for other dimensions the strength is taken to vary according to the cube of the diameter. Wire rope has within recent years largely taken the place of hemp for tow-line and hawsers on board ship. These usually consist of six strands, laid or spun around a hempen core, each strand consisting of six wires laid the contrary way around a smaller hempen core. The wires are galvanized or coated with a preservative composition. Wire ropes are usually housed on board ship by winding them round a special reel or drum. Hemp cables, moreover, have for long been almost wholly superseded by chain cables; the introduction of steam on board ship having brought in its train the powerful steam windlass wherewith to manipulate the heaviest chains and anchors required. Hempen and wire ropes are invariably used as tow-lines and for mooring vessels.

Chain cables are made in links, the length of each being generally about 6 diameters of the iron of which it is made, and the

breadth about $3\frac{1}{2}$ diameters. There are two distinct kinds of chain cables—the stud-link chain, which has a tie or stud welded from side to side, and the short-link or unstudded chain. The cables for use in the mercantile service are made in 15-fathom lengths, but in Government contracts chain cables are required to be made in $12\frac{1}{2}$ -fathom lengths, with one swivel in the middle of every alternate length, and one joining shackle in each length. Besides the ordinary links and joining shackles, there are end-links, splicing-tails, mooring-swivels, and bending-swivels. The sizes of chain cables are denoted by the thickness of rod iron selected for the links. The following table gives certain ascertained quantities concerning the cables in ordinary use:

Thickness of Iron.	Weight of Stay-pin.	Weight per Fathom.	Breaking Strain.
$\frac{1}{2}$ in.	$\frac{1}{2}$ oz.	$13\frac{1}{2}$ lb.	6 tons.
1 "	$3\frac{1}{2}$ "	54 "	24 "
$1\frac{1}{2}$ "	12 "	121 "	60 "
2 "	28 "	215 "	99 "
$2\frac{1}{4}$ "	40 "	272 "	126 "

Compared with the strength of hempen cable, 1 inch-diameter chain cable is equivalent to $10\frac{1}{2}$ inches circumference hemp; $1\frac{1}{4}$ inches, to $13\frac{1}{2}$ inches; $1\frac{1}{2}$ inches to 16 inches; $1\frac{3}{4}$ inches, to 18 inches, and 2 inches, to 24 inches.

In mechanical engineering, a cable is the wire rope used for the purpose of moving the kind of street cars commonly called cable cars or grip cars. A very serious phase of the cable system is in the fact that by far the greater per cent. of the initial power is required to simply haul the cable without cars attached, or when the cable is a little worn it is easily overloaded. The wire rope used for submarine telegraphy is also called a cable. In navigation the cable is a nautical measure of distance = 120 fathoms, or 720 feet, by which the distances of ships in a fleet are frequently estimated. This term is often misunderstood. In all marine charts a cable is deemed 607.56 feet, or one-tenth of a sea mile. In rope-making the cable varies from 100 to 115 fathoms; cablet, 120 fathoms; hawser-laid, 130 fathoms, as determined by the British Admiralty in 1830. According to Ure, a cable's length is 100 to 140 fathoms in the merchant service; in the Royal Navy four cables are employed, each of 100 fathoms, two cables being attached end to end. See SUBMARINE CABLE.

Cable, George Washington, an American novelist; born in New Orleans, La., Oct. 12, 1844; received a common school education; entered the volunteer service of the Confederate army in 1863 and served till the close of the war; when he obtained employment in a mercantile house; and was on the editorial staff of the New Orleans

"Picayune" in 1865-1879. His sketches of creole life in "Scribner's Monthly" proved so successful that in 1879 he turned his entire attention to literature. He has contributed numerous sketches to newspapers and magazines; and published "Old Creole Days" (1879); "The Grandissimes" (1889); "Madame Delphine" (1881); "Dr. Sevier" (1883); "The Creoles of Louisiana" (1884); "The Silent South" (1885); "John March, Southerner"; "Bonaventure"; "Strange, True Stories of Louisiana"; "The Busy Man's Bible"; "The Negro Question"; "Strong Hearts" (1899); etc. He prepared for the government reports on the condition of the inhabitants of the Têche country in Western Louisiana, etc.

Cabot, George, an American statesman; born in Salem, Mass., Dec. 3, 1751; educated at Harvard College. In 1791 he became United States Senator for Massachusetts, and proved a steadfast friend of the Washington administration. He yielded essential aid to Hamilton in perfecting his financial system. In 1814 he was chosen a delegate to the memorable Hartford Convention, and was elected president of that assembly. He died in Boston, April 18, 1823.

Cabot, John (It. GIOVANNI CABOTO), a Venetian pilot, the discoverer of the mainland of North America, settled as a merchant, probably as early as 1472, in Bristol, England, where he is supposed to have died about 1498. Under letters-patent from Henry VII., dated March 5, 1496, he set sail from Bristol in 1497, with two ships, accompanied by Lewis, Sebastian, and Sancto, his sons, and on June 24th sighted Cape Breton Island and Nova Scotia. Letters-patent were granted Feb. 3, 1498, for a second expedition, but whether any voyages were made under these is doubtful. However, they form the last authentic record of his career.

The same uncertainty exists as to the birthplace of his second son, SEBASTIAN, who, it now appears most probable, was born in Bristol in 1474. Sebastian's name is associated with that of his father in the charter of 1496, and in 1499 he appears to have sailed with two ships in search of a Northwest Passage, and followed the American coast from 60° to 30° N. lat.; but it has been considered doubtful whether this voyage also should not be assigned to his father. We hear no more of Sebastian till 1512, when he appears to have attained some fame in England as a cartographer, in which capacity he entered the service of Ferdinand V. of Spain in the same year. A contemplated voyage of discovery to the Northwest was frustrated by the death of the King in 1516; and the jealousy of the Regent, Cardinal Ximenes, impelled Cabot

to return to England in 1517. During this visit he appears to have been offered by Henry VIII., through Wolsey, the command of an expedition which, through either the cowardice or malice of Sir Thomas Perte, who was appointed his lieutenant, "tooke none effect;" but whether the expedition ever left England or not has been disputed. In 1519 Cabot returned to Spain, and was appointed pilot-major of the kingdom by Charles V., for whom, in 1526, he commanded an expedition which examined the coast of Brazil and La Plata, where he endeavored to plant colonies. The attempt ending in failure, he was imprisoned for a year in 1530, and banished for two years to Oran, in Africa. In 1533 he obtained his former post in Spain, but in 1547 he once more betook himself to England, where he was well received by Edward VI., who made him inspector of the navy and gave him a pension. To this monarch he seems to have explained the variation of the magnetic needle in several places, which he was among the first, if not the very first, to notice particularly. In 1553 he was the prime mover and director of the expedition of Merchant Adventurers which opened to England an important commerce with Russia. Of his famous map (1544), embodying the discoveries of his father and himself, one example exists, preserved in the Bibliothèque Nationale at Paris. He seems to have died in London in 1557.

Cabral, Pedro Alvarez, the discoverer (or second discoverer) of Brazil, a Portuguese, born about 1460. In 1500 he received command of a fleet bound for the East Indies, and sailed from Lisbon, but having taken a course too far to the West he was carried by the South American current to the coast of Brazil, of which he took possession in the name of Portugal. Continuing his voyage, he visited Mozambique, and at last reached India, where he made important commercial treaties with native princes, and then returned to Europe. He died about 1526.

Cabrera (kä-brā'rä), a small Spanish island, one of the Balearic Isles, used as a place for receiving convicts.

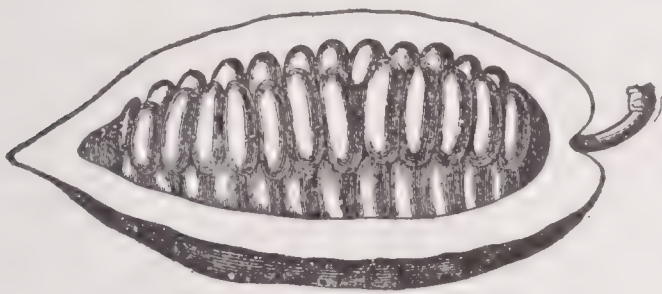
Cabrera, Don Ramon, a Carlist leader; born in Tortosa, Catalonia, Aug. 31, 1810. Intended for the Church, he had already received the minor orders, when the death of Ferdinand in 1833 gave the signal for civil war. Cabrera joined the partisans of Don Carlos. Defeated and severely wounded at Rancon, he soon reappeared at the head of a formidable force. In 1839 Don Carlos created him Count of Morella and Governor-General of Aragon, Valencia, and Murcia; but Marotto's treachery obliged him to act solely on the defensive, and in July, 1840, he was driven across the French frontier. In 1845 he strongly op-

Cabul

posed Don Carlos's abdication of his rights, and in 1848 renewed the struggle for absolutism in Spain; but the adventure proved a miserable failure, and early in 1849 he had to recross the Pyrenees. When Alfonso was proclaimed King of Spain in 1875, Cabrera published a manifesto advising the Carlists to submit to him, as a good son of the Church. He died in Wentworth, Eng., May 24, 1877.

Cabul, Cabool, or Kabul. See KABUL.

Cacao, or Cocoa, the chocolate tree (*Theobroma Cacao*), natural order *Byttneriaceæ*, and also the powder and beverage made with



CACAO FRUIT.

it obtained from the fruit of this tree. The tree is 16 to 18 feet high, a native of trop-



CACAO PLANT.

ical America, and much cultivated in the tropics of both hemispheres, especially in the West India Islands, Central and South

Caceres

America. Its fruit is contained in pointed, oval, ribbed pods 6 to 10 inches long, each inclosing 50 to 100 seeds in a white, sweetish pulp. These are very nutritive, containing 50 per cent. of fat, are of an agreeable flavor, and used, both in their fresh state and when dried, as an article of diet. Cocoa and chocolate are made from them, the former being a powder obtained by grinding the seeds, and often mixed with other substances when prepared for sale, the latter being this powder mixed with sugar and various flavoring matters and formed into solid cakes. The seeds when roasted and divested of their husks and crushed are known as cocoa nibs. The seeds yield also an oil called butter of cacao, used in pomatum and for making candles, soap, etc. The term cocoa is a corruption of cacao, but is more commonly used in commerce: cocoa nuts, however, are obtained from an entirely different tree.

Cacapon, or Great Cacapon, a river in West Virginia. It flows nearly N. W. through Hampshire and Morgan counties, and enters the Potomac about 5 miles from Berkeley Springs. Its length is about 140 miles.

Caccini, Giulio (kä-chē'nē), an Italian composer; born in Rome about 1546. He was styled the father of a new music, having been the first to write an opera for performance in a public theater. His works include "Daphne" and "Apollo's Battle with the Serpent." He died in Florence about 1615.

Caceres (kä'thā-rās), the second largest province of Spain, in the N. of Estremadura, owned chiefly by large proprietors, and mostly devoted to cattle-raising; the N. half is a good wine country. The area is over 8,000 square miles, and the population in 1900, 362,164. The capital, Cáceres, 45 miles N. of Merida by rail, is famous for its bacon and sausages, and has a bull-ring of granite, dye-works, and manufactures of woollens, crockery and rope. It was the *Castra Cæcilia* of the Romans, by whom it was founded in 74 B. C.; and here the allied forces defeated the rear-guard of the Duke of Berwick in 1706. Pop. (1900) 16,933.

Caceres, Andres Avelino, a Peruvian military officer and statesman; born in Ayacucho, Nov. 11, 1838. In the Chilean War (1879-1883), he was colonel, general, and, after the taking of Lima, Second Vice-President in the provisional government. The imprisonment of Calderon, the President, and the absence of the First Vice-President made him acting President of Peru. Afterward, by a general election, he was inaugurated President (1886). The country prospered greatly under his administration, and his successor in the presidency appointed him Minister to France and Spain. On the death of President Ber-

Cachalot

mudez in 1894, General Cáceres was proclaimed dictator, and, May 10th, was elected President. In 1895 he was overthrown in a revolution headed by ex-Dictator Pierola, who was elected President July 10.

Cachalot, a cetacean of the family *Balænidæ*. It is the *Physeter macrocephalus*, called also the sperm or spermaceti whale. The male is from 46 to 60, or even 70 feet long; the female from 30 to 35. It is black, becoming whitish below. The cachalots feed chiefly on squids or cuttle-fishes. They are gregarious, and go in what the fishermen call schools, sometimes with as many as 500 or 600 individuals. There are two kinds — female schools and schools of males not fully grown. With each female school are from one to three large bulls, or, as the whalers call them, schoolmasters. The cachalot inhabits the northern seas, but straggles through a great part of the ocean.

Cachao, or **Hanoi**, the largest city in the kingdom of Anam. It is in the province of Tonquin, on the Tonquin river, about 150 miles from its mouth. The river is navigable to this point for small vessels. The principal trade is silk and rice. Bullion, silk and lacquered work are the exports. It is an open port since 1873, when it passed into the hands of the French. Pop. about 150,000.

Cache, a hole in the ground or ice for hiding and preserving provisions which it is inconvenient to carry; used by settlers in the Western States and Arctic explorers.

Cache, the name of (1) a peak of the Rocky Mountains in Idaho, height 10,451 feet; (2) a fertile valley in the Wahsatch Mountains in Utah and Idaho. It is 60 miles long and 10 to 20 miles wide, and has an altitude of 5,000 feet. It is watered by the Bear river and has several villages, of which Logan is the largest; (3) a river in Arkansas, flowing N. W. about 150 miles into the White river near Clarendon, in Monroe county.

Cachet, **Lettre de** (kă-shā'), a name given especially to letters proceeding from and signed by the kings of France, and countersigned by a secretary of state. They were at first made use of occasionally as a means of delaying the course of justice, but they appear to have been rarely employed before the 17th century as warrant for the detention of private citizens, and for depriving them of their personal liberty. During the reign of Louis XIV. their use became frightfully common, and by means of them persons were imprisoned for life or for a long period on the most frivolous pretexts. They were abolished at the Revolution.

Cachexia, or **Cachexy**, a peculiarly bad or unhealthy state of the body, which occurs in certain malignant and formidable dis-

Cactaceæ

eases as cancer, tuberculosis (consumption), syphilis, intermittent fever (ague), excessive use of alcohol, etc., and is characterized by wasting of the body, pinched and anxious expression of countenance, sallow complexion, and great exhaustion.

Cacholong, a beautiful mineral, regarded as a variety of semi-opal. It is sometimes called pearl opal, or mother-of-pearl opal. It is generally of a milk-white color, rarely with a yellowish or reddish tinge.

Cachou, a sweetmeat in the form of a pill, made from the extract of licorice, cashew nut, gum, etc., used by smokers to sweeten the breath.

Cachuca (kă-chö'kă), a Spanish dance performed by a man and woman to a lively, graceful air in triple time and with a strongly marked accent.

Cacique, or **Cazique**, the designation given to the chiefs of Indian tribes in works relating to Central and South America. The word was formed by the Spaniards from a native Haitian word.

Cacoethes, an ill and irrepressible propensity or habit. Chiefly used in the phrase *cacoethes scribendi* = an itch for writing books.

Cacodyl, or **Cakodyle** (arsendimethyl cacodyl), is a colorless transparent liquid, boiling at 170°. It takes fire in the air, and is obtained in an impure state by distilling equal weights of potassium acetate and arsenious oxide. It is called cadets' fuming liquid, or alkarsin. Its vapor is very poisonous. The chloride, iodide, and cyanide are known.

Cacongo, or **Kakongo**, formerly a district of Guinea, Africa, extending along the South Atlantic Ocean, in lat. 5° S., just N. of the mouth of the Kongo. The Cacongo river enters the sea in lat. 5° 12' S. This territory was claimed by the Portuguese, and Cabinda is the N. part of it; the S. and E. to the Kongo have been absorbed in the Kongo Free State.

Cactaceæ (named from the cactus), Indian figs, an order of exogenous plants, placed by Lindley under his 52d alliance, the cactules. The sepals and petals are numerous and confounded with each other. The stamina are indefinite, the ovary fleshy, inferior, one-celled; the fruit succulent, one-celled, many-seeded. The flowers are sessile, and usually last only one day or night. The leaves are generally wanting, but an inexperienced observer might mistake for them the usually angular foliaceous stems. The cactaceæ are natives of this country, whence they have been imported into the warmer parts of the Eastern hemisphere. About 800 are known. The fruit of some species is refreshing and agreeable, that of others insipid. The juice of *mammillaria* is slightly sickly, being at the same time sweet

Cactus

and insipid. The fruit of *Opuntia* stains red the urine of those who eat it. Many of the cactaceæ are of very abnormal forms.

Cactus, an old and extensive genus of Linnaeus, in four sections: (1) The echinocacti; (2 and 3) cerei of two kinds; and (4) opuntiæ. It is now broken up into a number of genera. It is still popularly used as the designation of nearly the whole of the Cactaceæ, to which order, moreover, it has given its name. Cacti are sometimes called melon thistles.

Hedgehog cactus; a designation of the genus *Echinocactus*.

Leaf cactus; the *Epiphyllum*.

Melon thistle cactus; the *Melocactus*.

Nipple cactus; the *Mammillaria*.

The Hindus compare Europeans in the East to the species of cactus (*Opuntia dilenii*), which they know best. The plant, though now seen all over India, undoubtedly came at first from a foreign and a distant country. It grows very extensively in the western and southwestern part of the United States and all over tropical America, usually on arid lands. Once rooted in a place, it spreads so widely abroad that it is difficult to get it out again, and it is believed to impoverish the land of which it takes possession. It is of so abnormal a type that none but itself can be its parallel. An unpleasant feature about it is that, from whatever side you approach it, you are met in all directions by fixed bayonets.

Cacus, a son of Vulcan, was a huge giant who lived in a cave on Mount Aventine. Having stolen and dragged into his cave some of the cattle which Hercules had carried away from Geryon in Spain, he was killed by that hero, who discovered his place of hiding by the lowing of the oxen within, in response to the lowing of the remainder of the flock as they were passing the entrance of the cave.

Cadamba, or **Kudumba**, the wood of several species of *nauclea*, an Indian genus of cinchonaceæ. *N. (uncaria) gambir* is the source of gambier.

Cadamosto, Alois da (kä-dä-mos'to), an early navigator; born in Venice about 1432. He explored the W. coast of Africa as far S. as the Gambia. His "Book of the First Voyage Over the Ocean to the Land of Negroes in Lower Ethiopia" was published in 1507. He died in Venice about 1464.

Cadastral Maps, maps on a large and complete scale; properly a cadastral survey is made by the government for fiscal purposes; the word being derived through the French from Italian *catastro*, which is from the low Latin, *capitastrum*, "a register for a poll-tax" (Latin *caput*, "the head").

Caddis, the larva of the caddis-fly, a species of trichopterous insect, genus *phryganea*. It lives in cylindrical cases, open

Cadence

at each end, and covered with pieces of broken shell, wood, gravel, etc. It is a very favorite bait with anglers.

Caddoan Indians, a family of North American Indians, comprising the Arikari tribe in North Dakota; the four Pawnee villages, Grand, Tapage, Republican, and Skidi, in the Indian Territory; and the Caddo, Kichai, Wichita, and other tribes, formerly in Louisiana, Texas, and Arkansas. The present number of these Indians is about 2,130, of which 416 are in North Dakota, the rest in the Indian Territory.

Cade, Jack, the leader of a popular insurrection in the reign of Henry VI. of England. He was a native of Ireland, but, claiming kindred with the royal house of York, and assuming the name of John Mortimer, he collected 20,000 followers, chiefly Kentish men, who, in June, 1450, flocked to his standard, that they might claim redress for the grievances so widely felt. Cade defeated a detachment of the royal forces at Seven Oaks, and obtained possession of London, the King having retired to Kenilworth; but having put Lord Say cruelly to death, and laid aside the appearance of moderation which he had at first assumed, the citizens rose, gave his followers battle, dispersed them, and put Cade to death, 1450.

Cadelle (*Trogosita mauritanica*), a coleopterous insect sometimes found in granaries, where its larvæ often commit great ravages among stored corn and meal. They also live on bread, almonds, and even rotten wood. When full grown, they are about three-quarters of an inch long, flattened, fleshy, rough with scattered hairs, whitish, tapering toward the head; which is black, horny, and furnished with two curved jaws. The perfect insect is a glossy beetle of a deep chestnut color, marked with dotted lines. The adults are found in rotten wood, under bark, and in stores of edible materials. The family to which trogosita belongs (nitidulidæ) is a very large one, and the members (800 species) are widely distributed.

Cadenabbia, a health resort, beautifully situated among orange and citron groves, on the W. shore of Lake Como, Italy. Its famous Villa Carlotta contains works by Canova and Thorwaldsen.

Cadence, a close, the device which in music answers the use of stops in language. The effect is produced by the particular manner in which certain chords succeed one another, the order being generally such as to produce suspense or expectation first, and then to gratify it by a chord that is more satisfying to the ear. They are commonly divided into three kinds: the *perfect cadence* (again subdivided into *authentic* and *plagal*), the *imperfect cadence*, and the *interrupted cadence*.

Cadency

Cadency, Marks of, in heraldry, marks intended to show the descent of a younger branch of a family from the main stock.

Cadenza, a flourish of indefinite form introduced upon a bass note immediately preceding a close.

Cader Idris, a mountain mass about 10 miles long in Marionethshire, Wales. The highest peak is 2,914 feet above the level of the sea.

Cadet, a younger or youngest son; a junior male member of a noble family. Also the name or title given to a young man in training for the rank of an officer in the army or navy, or in a military school. In Great Britain cadets are trained for the army by a course of military discipline, at the Royal Military Academy at Woolwich, or the Royal Military College at Sandhurst, previous to obtaining a commission. A naval cadet is one who holds the first or lowest grade as a candidate for a commission in the navy. In the United States cadets are trained for military life at West Point, N. Y., and for naval life at Annapolis, Md.

Cadi, or **Kadi**, in Arabic, a judge or jurist. Among the Turks cadi signifies an inferior judge, in distinction from the molah, or superior judge. They belong to the higher priesthood, as the Turks derive their law from their prophet.

Cadiz, a city of Spain, capital of the province of the same name, which forms a part of Andalusia; is situated at the extremity of a narrow tongue of land projecting 5 miles N. W. from the Isle of Leon, 95 miles S. S. W. of Seville by rail, 7 miles S. W. of Xeres. A small channel, with a drawbridge and a railway bridge, separates the island from the mainland; at its N. outlet stands the arsenal of La Carraca, with large docks. On the W. and S. the Atlantic Ocean washes the city, and on the N. and N. E. the Bay of Cadiz, a deep inlet of the Atlantic, forming an outer and an inner bay. The city, which is walled and defended from the sea both by a series of forts and by low shelving rocks, is about 2 miles in circuit, and presents a remarkably bright appearance, with its shining granite ramparts, and its whitewashed houses crowned with terraces and overhanging turrets. Many of these flat roofs are also used as cisterns, the town being poorly supplied with water, which is brought from Santa Maria, 6 miles to the N. by sea, and 19 by rail. The streets are well paved and lighted, regular, but narrow, and there are some pleasant public walks, the most frequented of which is the Alameda, by the seaside. Cadiz has few public buildings of note; its two cathedrals are indifferent specimens of ecclesiastical architecture, but possess some excellent pictures by Murillo; while the custom-house, naval, and other schools, observa-

Cadmium

tory, signal-tower, almshouses, hospitals, and bull-ring are distinguished rather for excellent management than for architectural beauty. It reached its highest prosperity after the discovery of America, when it became the *dépôt* of all the commerce with the New World; declined greatly as a commercial city after the emancipation of the Spanish colonies in South America; but again revived, owing partly to the extension of the Spanish railway system, and partly to the establishment of new lines of steamers.

Cadiz is one of the most ancient towns in Europe, having been built by the Phœnicians, under the name of Gaddir ("fortress"), about 1100 B. C. It afterwards passed into the hands of the Carthaginians, from whom it was captured by the Romans, who named it Gades, and under them it soon became a city of vast wealth and importance. Occupied afterward by the Goths and Moors, it was taken by the Spaniards in 1262. In 1587 Drake destroyed the Spanish fleet in the bay; nine years later Cadiz was pillaged and burned by Essex; and in 1625 and 1702 it was unsuccessfully attacked by the English. From 1808 the headquarters of the Spanish patriots, Cadiz was blockaded by the French from February, 1810, until Aug. 25, 1812, when the victories of Wellington forced them to raise the siege. It was captured in 1823 for Ferdinand VII. by the French, who held it till 1828; and it was the birthplace of the Spanish revolution of 1868. In 1898 it was the rendezvous of the squadron under Admiral Camara, which, for a time during the war between the United States and Spain, was expected to make a demonstration against some of the principal American cities on the Atlantic coast. Pop. (1900), province, 452,659; city, 69,382.

Cadmium, a diatomic metallic element, discovered in 1818; symbol, Cd; at. wt., 112; sp. gr., 8.6; melting point, 315°, boils at 860°. It is a white, ductile, malleable metal; scarcely tarnishes in the air; burns when heated in the air, forming a brown oxide, CdO. It dissolves readily in nitric acid, and decomposes water at red heat. Its vapor density is 3.9 compared with air. Cadmium is found in some zinc ores; when these are distilled it rises in vapor before the zinc does so. It also occurs in the form of sulphide in greenockite. Cadmium is easily separated from zinc by passing HS₂ into their solution in HCl; the cadmium is precipitated as yellow sulphide, CdS. Cadmium can be separated from copper in analysis by dissolving their sulphides in nitric acid and adding ammonia in excess, filtering off oxides of other metals; then potassium cyanide is added till the precipitate first formed redissolves, then H₂S gas is passed through the liquid, from which it throws down the cadmium as sulphide.

Cadmus, according to ancient Greek tradition, the leader of a colony of Phœnicians, who settled at a very early date in Bœotia, and founded the city of Thebes, B. C. about 1450. The Greeks attributed to him the introduction into their country of the 16 simple alphabetical characters; and the close analogy in form between the Greek and Phœnician alphabets renders this account extremely probable. His personal history is almost entirely fabulous.

Cadore (kā-dō're), the birthplace of Titián; a small village of Venetia, on the slope of the Alps, and 22 miles N. E. of Belluno.

Cadoudal, Georges (kā-dö-däl'), a celebrated Chouan chief; born in Brittany, Jan. 1, 1769; was the son of a miller in Morbihan, France. In the protracted and sanguinary contests between the Royalists and Republicans during the French Revolution, the Chouans and Vendéans were the most resolute supporters of the Royal cause; and the energy and ability of Cadoudal soon raised him to an influential place among the adherents of the House of Bourbon. At this time attempts were made by Napoleon to gain over Cadoudal to the cause of the republic, and a lieutenant-generalship in the army was offered as the price of his submission; but he firmly declined all these overtures. He afterward engaged, in concert with Gen. Pichegru and others, in a conspiracy having for its object the overthrow of the consular government and the restoration of the monarchy; which being discovered, Cadoudal was arrested, and executed June 25, 1804.

Caduceus, Mercury's rod; a winged rod entwisted by two serpents, borne by Mercury as an ensign of quality and office. In modern times it is used as a symbol of commerce, Mercury being the god of commerce. The rod represents power; the serpents, wisdom; and the two wings, diligence and activity.

Cadwalader, George, an American lawyer and soldier; born in Philadelphia, in 1804. He practised law till 1846; was made brigadier-general of volunteers; and won distinction at Chapultepec. He resumed his law practice till 1861; became major-general of State volunteers; was placed in command at Baltimore; accompanied Patterson's expedition to Winchester (1861); and, as one of a military board, directed the United States army operations. He died in Philadelphia, Pa., Feb. 3, 1879.

Cadwalader, John, an American soldier, born in Philadelphia, Jan. 10, 1742. At the outbreak of the Revolution he was placed in command of a battalion and soon became brigadier-general. He fought at Trenton, Brandywine, Germantown, and Monmouth. In 1777 he organized the militia of East-

ern Maryland. In 1778 he challenged and wounded Thomas Conway for plotting against Washington. His daughter became, in 1800, the wife of Lord Erskine. He died in Shrewsbury, Pa., Feb. 10, 1786.

Cadzand, or **Cadsand**, a small port of Zeeland, in Holland, near the Belgian frontier. It was a great medieval port; and here in 1337 the English, under Sir Walter Manny and the Earl of Derby, defeated the Flemings in French pay.

Cæcilia, a genus of serpent-shaped amphibians, the type of the family Cæciliadæ. Also a name used by some authors for the fish more usually known by the name of the acus. It is common in the Mediterranean, and is called by the Venetian fishermen bis-cia, that is, viper-fish.

Cæciliadæ, cæcilians, serpent-shaped amphibians, belong to the order gymnophiona. The young have internal branchiæ, while the adults breathe by lungs. Of the genera, cæcilia is found in India, Africa and South America; siphonops and rhinatremia in America; and Epicrium in Asia. None have been found fossil.

Cæcilius Statius (sē-sil'i-us stā'shi-us), a Roman comic poet; born about 200 B. C. He was a native of Milan. His contemporaries ranked him with Plautus and Terence. He wrote over 30 comedies of which fragments remain. He died in 168 B. C.

Cæculus (sek'ū-lus), a son of Vulcan, and a great robber, who lived in Italy, and built Præneste.

Cæcum, the beginning of the great gut, commonly called the blind-gut, because it is perforated at one end only; it is the first of the three portions into which the intestines are divided. Also a genus of mollusks, by some considered to be the type of the family cæcidia, but generally placed under the family turritellidia. The species are recent or tertiary, commencing in the Eocene period.

Cædmon (kad'mon), an English poet; styled "the father of English song" on account of his epics of sacred history, written in old Northumberland dialect, mostly without titles, although one is called "Genesis." He died in 680.

Caen (kon), a town of France, in Normandy, chief place in the department of Calvados, 125 miles N. W. of Paris, and about 9 miles from the mouth of the Orne, which is here navigable. There is a dock connected with the sea by a canal as well as by the river. It is the center of an important trade, the market of a rich agricultural district, and carries on extensive manufactures. One of the finest churches is that of St. Pierre, whose tower, terminated by a spire, is exceedingly elegant, and was built in 1308. Two other remarkable churches are

St. Etienne or Church of the Abbaye-aux-Hommes, built by William the Conqueror, who was buried in it, and La Ste. Trinité or Church of the Abbaye-aux-Dames, founded by the Conqueror's wife. The buildings of the former abbaye are now used as a college, of the latter as a hospital. Other buildings are the castle and the hôtel de ville. There is a public library of over 60,000 volumes, and a botanic garden. Lace is largely made here. Valuable building stone is quarried. Pop. (1901) 44,524.

Caen Stone, the French equivalent for the Bath oölite of England, a cream-colored building stone of excellent quality, quarried near Caen in Normandy. Winchester and Canterbury Cathedrals, Henry VII.'s Chapel at Westminster, and many churches are built of it.

Caerleon (kär-lē'on), a town of England, on the Usk, 18 miles S. of Monmouth. This was the *Isca Silurum* of the Anglo-Romans, and was then of great importance, being the capital of the province of *Britannica Secunda* (modern Wales). At a later period it was famous as a seat of learning, and, in the 12th century, Giraldus Cambrensis gave a lively picture of its wealth and magnificence. Many fine Roman remains have been, and are still, found here.

Cærmarchen, Cærnarvon. See CARMAR-THEN, CARNARVON.

Cæsalpinia (named after Andrea Cæsalpinus, chief physician to Pope Clement VIII.), the typical genus of the leguminous sub-order *cæsalpinieæ*. They are trees or shrubs, with showy yellow flowers, 10 stamens, and bipinnatifid leaves. About 50 species are known. The intensely astringent *C. coriaria* has legumes which contain so much tannin that they are valuable for tanning purposes. They are known in commerce as dividivi, libidivi, or libidibi, and come from the West Indies and South America. *C. crista*, also West Indian, *C. Echinata*, from Brazil, and other species, produce valuable red, orange, and peach blossom dyes. The wood of the latter, given in powder, is tonic. *C. brasiliensis*, which, however, is not from Brazil, and is now called *Pellophorum Linnæi*, is said to produce the Brazil-wood of commerce. *C. Sappan*, from India, furnishes the sappan-wood. An oil is expressed from the seeds of *C. oleosperma* and other species. The roots of *C. nuga* and *C. moringa* are diuretic; the seeds of *C. bonducella* are intensely bitter. Several Chinese species bear soap-pods, that is, pods which may be used as a substitute for soap.

Cæsalpinieæ, one of the great sub-orders into which the leguminosæ are divided. They have an irregular flower, but not at all so much so as the papilionaceæ. The petals are spreading, the stamens adhere to

the calyx. They are mostly 10 in number, though in rare cases less than five. They have purgative qualities. They constitute a notable and attractive feature of the vegetation in tropical countries. Lindley divides them into eight tribes: (1) leptolobieæ, (2) eucæsalpinieæ, (3) cassieæ, (4) swartsieæ, (5) amherstieæ, (6) bauhinieæ, (7) cynometreæ, (8) dimorphandreæ.

Cæsalpinus (ses-al-pī'nus), the Latinized form of the name of Andrea Cæsalpino, an eminent botanist and physiologist, born in Arezzo, in Tuscany, in 1519. He made his studies at Pisa, afterward lectured there, and had charge of the botanical museum. He died in Rome in 1603. His fame depends on his work, "Sixteen Books on Plants" (Florence, 1583), which commenced a new epoch in systematic botanical science.

Cæsar, the name of a patrician family of the Julian gens, claiming descent from Iulus, son of Æneas. The origin of the surname Cæsar is uncertain.

Cæsar, Caius Julius, son of a Roman prætor of the same name, was born July 12, 100 B. C., according to Mommsen in 102 B. C. His circumstances and connections made him a resolute adherent of the democratic party at Rome. His aunt Julia was wife of Caius Marius; and in 83 B. C. Julius himself was married to Cornelia, daughter of Lucius Cinna, one of the principal enemies of Sulla. The anger of the dictator at this marriage cost Cæsar his rank, property, and almost his life itself. Feeling that he would be safer abroad for a time, he went to Asia, 81 B. C.; but on learning the death of Sulla (78 B. C.), he hurried back to Rome, where he found the popular party in a state of great ferment, and anxious to regain what it had lost under the vigorous despotism of the aristocratic dictator. Cæsar, however, took no part in the attempts of Lepidus to overthrow the oligarchy; but he showed his political leanings by prosecuting (77 B. C.) Cnæus Dolabella—a great partisan of Sulla—for extortion in his province of Macedonia. To improve his eloquence, he went to Rhodes to study under the rhetor Apollonius Molo.

In 74 B. C. he returned to Rome, where he had been elected pontifex, and now for the first time threw himself earnestly into public life. He soon became the most active leader of the democratic party, and had a large share in effecting the agreement by which Pompey and Crassus accepted the popular policy. The result was the overthrow of the Sullan constitution in 70 B. C., and the restoration of popular institutions such as the tribunate. In 68 B. C. Cæsar obtained a quæstorship in Spain. On his return to Rome (67 B. C.), he married Pompeia, a relative of Pompey, with whom he was daily becoming more intimate. In 65 B. C. he held the curule ædileship, and lav-

ished vast sums of money on games and public buildings, by which he increased his already great popularity. For the next few years Cæsar is found steadily active on the popular side. In 63 B. C. he was elected pontifex maximus, and shortly after prætor. During the same year occurred the famous debate on the Catiline conspiracy, in which the aristocratic party vainly endeavored to persuade the consul, Cicero, to include Cæsar in the list of conspirators. It is believed by some that he was at least indirectly concerned in the conspiracy. In 62 B. C. Pompey returned from the East and disbanded his army. Next year Cæsar obtained the province of Hispania Ulterior. His government of that province was useful to him as giving him military experience and supplying the means wherewith to meet his enormous debts. On his return he was elected consul, along with Calpurnius Bibulus.

With rare tact and sagacity Cæsar reconciled the two most powerful men in Rome, who were then at variance, Pompey and Crassus, and formed an alliance with them, known in history as the First Triumvirate (60 B. C.). Cæsar's proceedings during his consulship were marked by this policy of friendship to Pompey; he passed an agrarian law by which Pompey's veteran soldiers chiefly profited, and he obtained the ratification of that general's acts in the East. To strengthen the union which had been formed, Cæsar gave Pompey his daughter Julia in marriage, though she had been promised to Brutus; while he himself also married Calpurnia, daughter of Piso, his successor in the consulship. On the expiration of his term of office, he obtained for himself, by the popular vote, the province of Gallia Cisalpina and Illyricum for five years, to which the senate added—to prevent the popular assembly from doing so—the province of Gallia Transalpina.

In 58 B. C. Cæsar repaired to his provinces, and during the next nine years conducted those splendid campaigns in Gaul by which he completed the subjugation of the West under the dominion of Rome. In his first campaign he defeated the Helvetii, and also Ariovistus, who with a large number of Germans had settled W. of the Rhine. In 57 B. C. Cæsar broke up the Belgic confederacy and subdued the various tribes composing it, the greatest struggle being with the Nervii. When the senate received Cæsar's official dispatches, it decreed a thanksgiving of 15 days—an honor never previously granted to any general. During the winter and the spring following Cæsar stayed at Lucca, where he had a memorable meeting with Pompey and Crassus, and for three years following agreed upon a common policy. It was decided that Pompey and Crassus should be consuls for the year 55 B. C., while the government of Cæsar in Gaul

was to be prolonged for a second term of five years till 49 B. C. In the year 56 B. C. followed the subjugation of the Veneti and other peoples of Brittany and Normandy, and the conquest of Gaul might be considered complete. He now undertook a fourth campaign against two German tribes who were about to enter Gaul. He was again successful; and pursuing the fleeing enemy across the Rhine, spent 18 days in Sigambri. In the autumn of the same year (55 B. C.) he invaded Britain; but after a brief stay in the island, returned to Gaul. The Roman senate, astonished at his hardi-



JULIUS CÆSAR.

hood and his successes in regions where no Roman army had ever been before, accorded him a public thanksgiving of 20 days. In 54 B. C. Cæsar opened his fifth campaign by a second invasion of Britain, in which he crossed the Thames, and enforced at least the nominal submission of the British tribes in the S. E. of the island. On his return to Gaul, Cæsar was compelled—on account of the scarcity of corn—to disperse his forces for winter quarters, and this encouraged some of the Gallic tribes to revolt. It led to the first serious reverse

which Cæsar sustained in Gaul; a division of 15 cohorts was entirely destroyed by the Eburones. But he was speedily master of the insurrection, and exacted a terrible vengeance on its authors.

Cæsar now returned to Northern Italy, that he might be able to communicate more easily and securely with his friends at Rome. That city was gradually becoming more anarchic, the evils of weak government more apparent; the hour for decisive action seemed to be approaching, when there broke out a general rebellion of the Gauls, headed by a young warrior of the Arverni named Vercingetorix. It was in the dead of winter when the news came to Cæsar. Without delay he crossed the Cévennes mountains, though they were covered with snow to the depth of six feet. The struggle with Vercingetorix was a severe one; at Gergovia, the capital of the Arverni, Cæsar was defeated, and for a time his affairs seemed in a desperate condition. But he managed to unite his forces, and at the siege of Alesia (52 B. C.) crushed the whole hosts of the Gauls. Vercingetorix surrendered himself, and the independence of Gaul was at an end. Only some isolated tribes continued to resist; and next year (51 B. C.) Cæsar proceeded to quell them. This he successfully accomplished, and having in addition reduced the whole of Aquitania, passed the winter of his eighth campaign at Nemetocenna, in Belgium, where he spent the time in a magnanimous and politic manner. The Gallic princes were courteously and generously treated, and generally a mild system of government was set up, which made the Roman yoke as easy as possible. This was all the more necessary, as affairs at Rome urgently demanded attention. He took up his residence at Ravenna, where he was informed of everything that was going on by the tribune Curio, whose support he had purchased.

In the meantime Pompey had definitely gone over to the senatorial party. Many causes had contributed to this change of attitude. Pompey's wife, Cæsar's daughter Julia, was dead. Crassus had fallen in Asia in 52 B. C., and thus Cæsar and Pompey were left alone, the two most powerful men of Rome. Pompey was jealous of his younger rival. His natural tendency was to adhere to the old aristocratic party. He now cast in his lot with it, and it was decided to break the power of Cæsar. With this view it was necessary to deprive him of his command in Gaul. During the long manœuvring which followed, Cæsar acted with the greatest moderation, and managed to throw upon his opponents the responsibility of violating the law. Under the direction of Pompey the senate summarily called upon him to resign the command and disband his army. The tribunes Mark Antony and Cassius put their veto on this mo-

tion; but they were violently driven out of the senate-chamber, and fearing for their lives they fled to Cæsar's camp. Things had now come to an extremity. The senate intrusted Pompey with the duty of providing for the safety of the state. His forces far outnumbered Cæsar's legions, but they were scattered over the provinces of the empire, and the Italian levy was unprepared. In face of an enemy of such marvellous promptitude and energy as Julius Cæsar this dilatoriness was fatal. Perceiving that the time for energetic action had at length arrived, Cæsar harangued his victorious troops, who were willing to follow him anywhere; crossed the Rubicon (a small stream which separated his province from Italy proper), and moved swiftly southward. Pompey fled to Brundisium, pursued by Cæsar, but contrived to reach Greece in safety, March 17, 49 B. C. The Italian cities everywhere opened their gates to the conqueror. In three months Cæsar was master of all Italy.

Cæsar next subdued Pompey's legates in Spain, who were at the head of considerable forces. On his return, he took Massilia, where he learned that he had been appointed dictator of the Republic — a function which at this time he retained only for 11 days, but these were honorably distinguished by the passing of several humane enactments. Pompey, now thoroughly alive to the magnitude of his danger, had gathered in Egypt, Greece, and the East, a powerful army, while his fleet swept the sea. Cæsar, however, crossing the Adriatic at an unexpected season, made a rush for Dyrrhachium, where Pompey's stores were; but was nevertheless outstripped by his opponent. Pompey intrenched his army on some high ground near the city, where he was besieged by Cæsar. The first encounter was favorable to Pompey, who drove back Cæsar's legions with much loss. The latter now advanced into Thessaly, followed by his exulting enemies. A second battle ensued on the plains of Pharsalia, Aug. 9, 48 B. C. The senatorial army was utterly routed, and Pompey himself fled to Egypt, where he was murdered.

No sooner had the news reached Rome than Cæsar was again appointed dictator for a year, and consul for five years. He was invested with tribunician power for life, and with the right of holding all the magistratual comitia, except those for the election of the plebeian tribunes. He did not, however, return to Rome after the battle of Pharsalia, but went to Egypt, then in a distracted condition on account of the disputes regarding the succession. Out of love for Cleopatra (who subsequently bore him a son), he entered upon the "Alexandrine War," in which he was successful, and which he brought to a close in March, 47 B. C. He next overthrew a son of Mith-

ridates, near Zela, in Pontus, August 2 of the same year, and arrived in Rome in September. He was once more appointed dictator, and the property of Pompey was confiscated and sold. Before the close of the year he had set out for Africa, where his campaign against the Pompeian generals, Scipio and Cato, was crowned with victory at the battle of Thapsus, April 6, 46 B. C. Cato committed suicide at Utica, and with such irresistible celerity was the work of subjugation carried on, that by the end of the summer Cæsar was once more in Rome. Now occurred that display of noble and wise generosity for which Cæsar may be regarded as truly great. He was not a man that could stoop to the vulgar atrocities of Marius or Sulla; he majestically declared that henceforth he had no enemies, that he would make no difference between Pompeians and Cæsarians. His victories in Gaul, Egypt, Pontus, and Africa were celebrated by four great triumphs, during which the whole Roman populace was feasted and fêted by the magnificent liberality of the dictator.

Cæsar now proceeded with his schemes for the settlement of affairs at Rome. During the year 46 B. C. he conferred a benefit on Rome and on the world by the reformation of the calendar, which had been greatly abused by the pontifical college for political purposes. After quelling an insurrection which broke out in Spain, where Pompey's sons, Cneius and Sextus, had collected an army, he received the title of "Father of his Country," and also of *imperator*, was made dictator and *præfectus morum* for life, and consul for 10 years; his person was declared sacred, and even divine; he obtained a body-guard of knights and senators; his statue was placed in the temples; his portrait was struck on coins; the month Quintilis was called Julius in his honor, and on all public occasions he was permitted to wear the triumphal robe. He proposed to make a digest of the whole Roman law for public use, to found libraries for the same purpose, to drain the Pontine Marshes, to enlarge the harbor of Ostia, to dig a canal through the Isthmus of Corinth, and to quell the inroads of the Barbarians on the E. frontiers; but in the midst of these vast designs he was cut off by assassination on the Ides (15th) of March, 44 B. C. Of Cæsar's writings the "Commentaries" on the Gallic and Civil Wars have alone been preserved.

Cæsar, Sir Julius, an English judge, born in Tottenham in 1558; the son of Cesare Adelmare, physician to Queen Mary. He was called to the bar in 1580, and was appointed judge of the Admiralty Court in 1584, Chancellor of the Exchequer in 1606, and Master of the Rolls in 1614. He sat in six parliaments and was knighted in 1603. The close friend of Whitgift, and

afterward of Bacon, he has left a higher reputation for superiority to bribery than for legal acumen, and his lavish bounty to all beggars is related to have rendered the loan of his coach, so well known to this fraternity, an expensive favor for his friends. He wrote two treatises on the "Court of Requests" and on the "Privy-council," and a multitude of miscellaneous papers. He died April 18, 1636.

Cæsarea (sez-a-re'ä), the ancient name of many cities, such as: (1) CÆSAREA PHILIPPI in Palestine, N. of the Sea of Galilee, rebuilt by Philip, tetrarch of Galilee, son of Herod the Great. (2) CÆSAREA, on the shores of the Mediterranean, about 55 miles N. W. from Jerusalem, enlarged and beautified by Herod the Great, and named in honor of Cæsar Augustus; the place where St. Paul was imprisoned two years (Acts xxiii-xxv). (3) The capital of Cappadocia, in Asia Minor.

Cæsarian Operation, the most serious operation in midwifery, and only resorted to in extreme cases, to save life; as, for example, when a woman fully pregnant dies suddenly, by accident or otherwise, the child being still alive *in utero*; or when, by reason of deformity, the birth cannot take place naturally or with the aid of ordinary obstetrical instruments, *per naturales vias*. The operation consists in making an incision in the abdomen and removing the child with the contents of the womb *en masse*, and then sewing up the wound thus made in the usual way. As might be expected, the danger is very great to the living mother. Certain cases, however, have survived the operation—some have even gone through a repetition of it, and the number of successful cases is happily increasing, owing to the improvements in modern surgery, particularly in the knowledge of the correct use of antiseptics, as the great danger lies in septicæmia ensuing. The Cæsarian operation is of very ancient origin, being known to the Greeks and called by them *hysterotomotoke*. The Romans also practised it, and it was considered by them a fortunate circumstance to be so born. According to Pliny, Scipio Africanus was delivered in this way (*Auspiciatus enecta matre nascuntur sicut Scipio Africanus prior natus*). This author, with others, also asserts that the name of Cæson, afterward Cæsar, was first given to those thus born (*Quia cæso matris utero in lucem prodeunt*). It is more probably, however, from Latin *cæsaries* = a head of hair.

Cæsarion, son of Julius Cæsar and Cleopatra, put to death by order of Augustus.

Cæsars, The Era of, also known as the Spanish Era, a period of time reckoned from Jan. 1, 38 B. C., being the year follow-

ing the conquest of Spain by Augustus. It was much used in Africa, Spain, and the S. of France; but by a synod held in 1180 its use was abolished in all the churches dependent on Barcelona. Pedro IV. of Aragon abolished the use of it in his dominions in 1350. John of Castile did the same in 1383. It was used in Portugal till 1415, if not till 1422. The months and days of this era are identical with the Julian calendar, and to turn the time into that of our era, subtract 38 from the year; but if before the Christian era, subtract 39.

Cæsure (sē-zū-rä), in Latin verse the separation of the last syllable of any word from those which precede it, by making it part of the following foot. In English poetry it is equivalent to a pause.

Caf, or Kaf (käf), in Mohammedan mythology, a mountain which environs the whole earth as a hedge incloses a field. Its foundation is the stone Sakhr al, which is an emerald, whose reflection gives the sky its tints.

Cafe (kä-fä'), [Fr. *café* = (1) a coffee-bean, (2) the tree which produces it, (3) the beverage formed from it, (4) a coffee-house]. A coffee-house enlarged by American usage to include restaurants of all descriptions.

Caffeine, symbol, $C_8H_{10}N_4O_2$; the same as theine; a feeble organic base occurring in tea, coffee, and the leaves of *guarana officinalis* and *ilex paraguayensis*. A decoction of tea is mixed with excess of basic lead acetate, filtered, then H_2S is passed in to precipitate the excess of lead, evaporated, then neutralized by ammonia; the caffeine crystallizes out on cooling. It forms tufts of white, silky needles with a bitter taste. As a drug, it affects the circulation and respiration. It is a methyl substitution compound of theo-bromine.

Caffres. See KAFFIRS.

Cagayan (kä-gī-än'), an island of the Philippine group; the largest of six small islets, known as the Cagayan-Sulu group. It is 5 miles wide and 8 miles long. Pop. (1903) 2,000. There are mountains attaining a height of 1,100 feet. The chief products are tobacco and sugar. There are pearl and shell fisheries. Cagayan was sold by Spain to the United States, with Cibitu, in 1900, upon payment of \$100,000, having been inadvertently excluded from the terms of the treaty of peace.

Cage Birds, birds bred in cages and aviaries for household pets. Birds have been kept from the earliest history of the world to the present time by savage as well as by civilized races, and the origin of caging and domesticating birds as pets is lost in antiquity. Alexander the Great kept a ring-necked paroquette in a golden cage of fabulous value, and these birds still bear the

name of the famous Greek emperor. Australian and American paroquettes nestle freely in large cages or garden aviaries, burrowing into logs of rotten wood, making no nests, and laying their eggs in the holes. They stand winters well if supplied with abundance of suitable food — viz., canary, hemp, millet, and oats for aviaries; and canary only in cages, where want of exercise produces excessive fatness and egg-binding. Of all cage-birds, the best songsters are the shama (*Copsychus saularis*, an Indian bird of the thrush family), bulbul, Virginia nightingale (of which the hen sings quite as well as the male bird), and the American mocking-bird. Among English soft-billed songsters, the most desirable are the nightingale, blackcap, blackbird, thrush, lark, and starling; these all have to be fed on crushed hemp and bread-crumbs, with animal food in the shape of meat or insects — spiders being a wonderful tonic for these birds when out of health. Of the grain-eating birds kept for their song, linnets and goldfinches head the list; but the bullfinch is deservedly popular, for he is very handsome in his crimson breast and black velvet coat, and he is essentially of a knowing, jolly disposition, although his call-note is somewhat monotonous. He can easily be taught to whistle a tune if the lesson is begun before he is old enough to be in full song.

Broadly speaking, the ailments which afflict all cage-birds are in 99 cases out of 100 due to injudicious and excessive feeding, and it is far better to err on the side of short commons than to feed too high. As the sicknesses of the birds owe their origin to insufficient exercise and too much stimulating food, the safest and most universal medicine is a drop of castor-oil, put into the patient's mouth with a camel-hair brush. Artificially heated rooms and the fumes of gas are very deleterious to bird-life, and glass conservatories, by reason of their varying heat, are unsuitable places either for aviaries or cages. To hang a bird in a window, or to place an aviary cage there, is gross cruelty, because a draught is even more injurious to birds than to human beings, and pets kept under such conditions are always in bad health and wheezy.

The best parrot for talking purposes is the double-fronted, yellow-faced Amazon (*Chrysotis ochrocephala*), which is much hardier than the African gray birds, of which latter species more than 95 per cent. die in the process of acclimatization. There are two varieties of grays — small from the S. coast, and a larger kind from the W. of Africa; these latter are the best. The spring of the year is the proper season to buy a parrot, as the young birds are then imported, and there is the whole summer

Cagliari

and autumn in which to harden them off. The cockatoo family are all crested, and in some varieties the crests are fan-shaped, and can be opened or closed at will. These birds make noisy cage-pets, being querulous and excitable, and they never make good talkers. Canary-seed is the best staple article of diet for all the parrot tribe, both large and small.

Cagliari (käl-yär'ē), the capital of the Island of Sardinia, at the head of a fine bay on the S. coast. It is the residence of the Viceroy and of an Archbishop, and the seat of a university. It has some manufactures, and is the chief emporium of all the Sardinian trade. Its spacious and safe harbor is defended by several forts. Pop. 35,589.

Cagliari, Paul, also known under the name of PAUL VERONESE, a painter of Verona; born in 1528. His father, who was a sculptor, wished to educate his son for the same profession, but the young man betrayed a greater inclination for painting, and was therefore placed under his uncle, Antonio Badile. He next went to Mantua and Vicenza, and afterward to Venice. Here he imitated Titian and Tintoretto, but at the same time appeared desirous of surpassing them by a more studied elegance, and a richer variety of ornament. It soon became evident from his works that he had studied the casts of ancient statues as well as the etchings of Parmesan and Albert Dürer.

In his first great works, which are in the Church of St. Sebastian in Venice, his pencil appears timid. The "History of Esther," in fresco, which he afterward painted in this church, excited general admiration; and the execution of important works was intrusted to him, among which are many that adorn the library of St. Mark's. He afterward accompanied the Venetian ambassador Grimani to Rome, where he saw with enthusiasm the beautiful models of Raphael and Michael Angelo, and painted after his return his fine "Apotheosis of Venice." His numerous banqueting pieces are also excellent. Six at least of these are found at Venice in the refectories of the monasteries, among the best of which are the "Marriage at Cana," comprising 120 figures, many of which are portraits, and the "Feast of Christ with Simon." In the former piece the extravagant display of Asiatic pomp, and the confusion of different persons and dresses, have been justly censured. In the latter the air of pride in the aspect of Christ, instead of a simple expression of dignity, the placing of the principal personage in a corner of the picture, and the confused blending of the white tablecloth and the architecture of the background, have been considered blemishes. In his "Pilgrims of Emmaus" Paul violated all

Cagliostro

the unities of time, place, and action. But with all these faults he displays splendid talents and great fruitfulness of conception. His portraits are spirited and noble, and his coloring splendid. He died in Venice, April 19, 1588. His scholars were Charles and Gabriel, his sons, and Benedetto, his brother, besides Michael Parrasio, Naudi, Maffei, Verona, Francesco Montezzano.

Cagliostro, Alessandro, Conte di (real name GIUSEPPE BALSAMO), a celebrated charlatan; born in Palermo, Italy, June 8, 1743. His father died when he was young, and he was educated by his maternal relations. He entered the Order of the Brothers of Mercy, where he found an opportunity to cultivate his talents for medical science, by which he afterward distinguished himself; but he showed at the same time a great love of dissipation, and was at last compelled to separate from the order. He returned to Palermo, where, among other tricks, he deceived some credulous persons by his pretended skill in magic and the finding of hidden treasures. He also showed himself adroit in counterfeiting handwriting, and attempted to get possession of a contested estate by means of a forged document, but was discovered and obliged to flee.

Balsamo now determined to go to Rome, and in his journey through Calabria became acquainted with the beautiful Lorenza Feliciani, daughter of a beltmaker. She appeared to him intended by fortune to assist his designs. He formed an intimacy with her, and soon compelled her to assist in the accomplishment of his purposes by the loss of her virtue. They now began their travels, in which he assumed the character of a man of rank, first appearing under the name of the Marquis Pellegrini, and finally under that of the Count Cagliostro. He traveled through many countries of Europe, stopped in the capital cities, and by his chemical mixtures, by his tricks, and by the amours of his lady, gained considerable sums. We find him in Madrid, Lisbon, Paris, London, and many other cities. He knew how to cheat with great ingenuity, and was always fortunate enough to preserve himself by an early flight if men's eyes began to be opened, or waking justice threatened him with imprisonment.

The discovery of the philosopher's stone, the preparation of a precious elixir vitæ, etc., were the pretenses by means of which he extracted considerable sums from credulous people. Many had recourse to his assistance, not indeed to be initiated into the mysteries of magic, but to purchase at a high rate different kinds of medicine, one of which was the "water of beauty." This profitable business employed him many years; but with the fading charms of his

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lady many sources of wealth failed. His trade in medicine also began to grow less lucrative, and he determined to seek his fortune as the founder of a new and secret sect. In pursuance of this plan he passed himself off during his second residence in London for a Freemason, and played the part of a magician and worker of miracles, in which character he drew upon himself the eyes of all the enthusiasts in Europe. The Countess Cagliostro, on her part, did not remain idle. She was the first and most perfect scholar of her husband, and played the part of a priestess to this new order in as able a manner as she had before played that of a priestess to another goddess.

The count's plan for reviving an old Egyptian order, the founders of which he declared to be Enoch and Elias, contained a mass of the greatest absurdities and nonsense. But his pretensions to supernatural power, the mystery with which his doctrines were enveloped, his pretended ability to work miracles, his healing the sick without pay, with the greatest appearance of generosity, and the belief that, as the Great Kophta (this name he had taken as the restorer of Egyptian Masonry), he could reveal the secrets of futurity, gained him many friends and supporters. Cagliostro again traveled through Europe, and attracted great attention in Mittau, Strasburg, Lyons, and Paris. While in this last city (1785) he had the misfortune to be implicated in the scandalous affair of the necklace, and was banished the country as a confidant of Cardinal Rohan.

He now returned to London, and sent numerous epistles to his followers, wherein he bitterly complained of the injury he had received in France, and painted the French court in the blackest colors. From London, where he could not long remain, he went to Basel and other cities in that quarter. But at length, listening to the repeated entreaties of his wife and other friends, he returned (1789) to Rome. Here he busied himself about Freemasonry; but being discovered, and committed to the Castle of St. Angelo, he was condemned by a decree of the Pope to imprisonment for life as a Freemason, an arch heretic, and a very dangerous foe to religion. He died in the summer of 1795 in the Castle of St. Leo, a small city in the States of the Church.

Cagnola (kän-yō'lä), **Luigi, Marquis de**, an Italian architect; born in Milan, June 9, 1762. He was a member of the State Council, and was much engaged in political affairs. His most celebrated works are the "Arch of Peace," commenced in 1807, and the "Ticinese Gate" at Milan, the "Campanile," at Ugnano, completed in 1829, and the "Mausoleum" for the Metternich family. He died in Inveriga, Aug. 14, 1833.

Caillie

Caiaphas, a Jew, was the high-priest at the time when the crucifixion took place. He was deposed A. D. 35, and Jonathan, the son of Annas, appointed in his stead.

Cagots (kä-gōz'), a peculiar race of men inhabiting France, in the Western Pyrenees. In the Middle Ages they were believed to be cannibals and heretics, and treated with the greatest ignominy. Legally they are now on a level with other Frenchmen, but socially they are still regarded as degraded. The name is probably derived from the Armoric, *cacouz*, leprous; the Cagots being supposed to be descended from lepers.

Cahan, Abraham, an American journalist and novelist; born in Russia, in 1860. He is editor of the New York "Zukunft" (Future). He has written "Yekl, a Tale of the New York Ghetto," "Raphael Narizokh," in Yiddish, etc.

Cahenslyism, a name for the movement of Roman Catholic foreigners in the United States, clerical and lay, to obtain from the Pope separate national ecclesiastical organizations. The Germans were most prominent in this movement in 1891, Peter Paul Cahensly, Austrian Envoy at the Vatican, giving it every encouragement. The Vatican discountenanced the agitation in 1892, and Archbishop Corrigan of New York received a letter from the Pope in 1898, in which Cahenslyism was disapproved. The leading supporter of the movement in the United States was Archbishop Katzer of Milwaukee.

Caicos (kī'kōs), a group of islands belonging geographically to the Bahamas, but annexed in 1874 to Jamaica. The North, West, East, Grand, and other Caicos, have, together with Turk's Islands, an area of 223 square miles. Pop. (1891) 4,745. Salt and sponges are their chief products.

Cailliaud, Frederic (kī-yō'), a French traveler; born in Nantes, France, June 9, 1787. In examining the mineral resources of Egypt, he rediscovered the ancient emerald mines of Jebel Zobara, near the Red Sea; his report of a journey to Siwah led to its annexation by Egypt in 1820. In 1821-1822 he accompanied Ibrahim Pasha's expedition to the White Nile, and his "Journey to Meroe" (1823-1826) contained the first reliable information of that district. In 1827 he settled as conservator of the Natural History Museum at Nantes, where he died May 1, 1869.

Caillie, Rene or Auguste (kī-yā'), a French traveler; born in Poitou, France, Sept. 19, 1799. Having gone to Senegal, he learned about 1826 that the Geographical Society of Paris had offered a premium of 10,000 francs to the first traveler who should reach Timbuctoo. Provided with a stock of goods for barter, and dressed in Moorish garb, Caillié, who had learned Arabic,

Cain

started from Kakondy in Sierra Leone, April 18, 1827, and after some delay caused by illness, reached the mysterious city, April 20, 1828. His notes of travel, arranged by M. Jomard, were published under the title "Journal of a Trip to Timbuctoo," etc. (1830). Caillié died near Paris, May 7, 1839.

Cain, the first-born of the human race, and the first murderer. He became an outcast, traveling to the E. of Eden, where he built a city and had a son, named Enoch. The Jewish tradition is, that he was slain by Enoch.

Cain, Auguste (kan), a French sculptor; born in Paris, Nov. 4, 1822; was in early life a carpenter. He devoted his attention chiefly to groups of animals. He received the bronze medal in the Great Exhibition of 1851, another medal in 1864, and a third at the Universal Exposition in 1867. He died in Paris, Aug. 7, 1894.

Cain, Richard Harvey, an American clergyman; born in Greenbrier Co., Va., April 12, 1825; removed to Ohio in 1831; entered the ministry at an early age; elected to the South Carolina constitutional convention in 1867, and to the State Senate in 1868; and was a member of Congress in 1876-1880. He was made Bishop in the African Methodist Episcopal Church and placed in charge of the churches in Louisiana and Texas, and later was transferred to the first Episcopal district of that church. While in Texas he organized Paul Quinn College in Waco. He died in Washington, D. C., Jan. 18, 1887.

Caine, Thomas Henry Hall, an English novelist and dramatist; born in Runcorn, Cheshire, Eng., May 14, 1853; began his career as an architect in Liverpool. From contributing to the "Builder" and the "Building News," he became connected with journalism, joined the staff of the "Liverpool Mercury," and wrote in the "Academy" and the "Athenæum." Resided with Dante Rossetti in London till the poet's death. Published "Sonnets of Three Centuries" (1882), and also "Recollections of Rossetti," while in 1883 "Cobwebs of Criticism" appeared. His skill as a novelist has been since exemplified in "The Shadow of a Crime" (1885), "A Son of Hagar" (1886), "The Deemster" (1887), which was dramatized under the title of "Ben-my-Chree" (1887), "The Bondman" (1890), "The Scapegoat" (1891), and "The Manxman" (1894), a dramatic version of which was also performed by Wilson Barrett. The last-mentioned work began the era of the one-volume novel in England. "The Christian" was published in 1897, and nearly 100,000 copies were sold in England, and as many more in the United States, within the first year after publication. On both conti-

Cairn

nents it provoked great discussion, the verdict in England being generally unfavorable to the motive of the book, while in the United States it was generally favorable. It was immediately translated into most of the languages of Europe, and provoked the same divided opinion everywhere. He traveled in Iceland (1890), in Russia (1892), on behalf of the persecuted Jews; and in 1895 visited the United States and Canada, where he represented the Society of Authors, and obtained important concessions from the Canadian Parliament as to the Canadian Copyright demands. In 1898 he visited the United States again in order to produce a dramatic version of "The Christian," which first appeared in Washington Sept. 26, and in New York Oct. 3.

Cainites (named after Cain, the eldest son of Adam), a small gnostic sect of the 2d century. They appear to have held that the God of the Jews was a rebel against the true God, and honored the memory of Cain, Korah, Dathan, and others for resisting Him. They cannot have been even a semi-Christian sect, if it is true, as has been stated of them, that they had deep respect also for the traitor Judas.

Cainozoic. See CENOZOIC.

Ca ira (sä ē'rä'), a popular song which arose in the fever of the French Revolution, so named from its refrain:

Ah! ga ira, ga ira, ga ira!
Les aristocrates à la lanterne!
(“Ah! it will go, it will go, it will go!
To the lamp-post with the aristocrats!”)

Like the "Marseillaise," the "Carmagnole," and the "Chant du Départ," it became a French national song, and was styled the "Carillon National." The words, which are worthless rubbish enough, were due to a street singer named Ladré; the melody to Bécourt, a stage drummer. The song was prohibited by the Directory in 1797.

Caird, John, a Scottish preacher; born in Greenock, Scotland, Dec. 15, 1820. He studied at the University of Glasgow. A sermon preached before the Queen at Crathie in 1855, and published under the title of "The Religion of Common Life," quickly carried the fame of the author into all parts of the Protestant world. Dean Stanley said it was the greatest single sermon of the century. He received the degree of D.D. in 1860, was appointed professor of Divinity in 1862, and in 1873 Principal of Glasgow University. In 1880 he published a (Neo-Hegelian) "Introduction to the Philosophy of Religion," and in 1888 a small work on Spinoza. He died July 30, 1898.

Cairn, a round or conical heap of stones erected as a sepulchral monument. They are found on the hills of England, Wales, and Scotland, and some have assigned to them a peculiar character, as receptacles for

Cairnes

the bodies of criminals burnt in the wicker images of the Druids, etc. According to some antiquaries, cairn is distinct from carnedd, the Welsh name for heaps of stones on the tops of high mountains (Carnedd David, Carnedd Llewellyn, etc.), which are said to have been sacrificial. Some cairns are undoubtedly sepulchral. In common language, a cairn is distinguished from a barrow, the former being a heap of stones, the latter a mound of earth; but in all probability they had for the most part the same object, and the difference of materials was merely occasioned by local circumstances.

Cairnes, John Elliot, a British political economist; born in Drogheda, Ireland, Dec. 26, 1823. He was successively professor of political economy in Dublin, Galway, and London. His chief works are "Character and Logical Method of Political Economy"; "Political Essays"; and "Leading Principles of Political Economy." He died in London, England, July 8, 1875.

Cairngorm Stone, a mineral; a variety of quartz of a smoky yellow to smoky brown, and often transparent, but varying to brownish-black, and then nearly opaque in thick crystals. The color is probably due to titanitic acid, as crystals containing rutile are usually smoky. It is extensively used among all classes in Scotland for ornaments of various kinds.

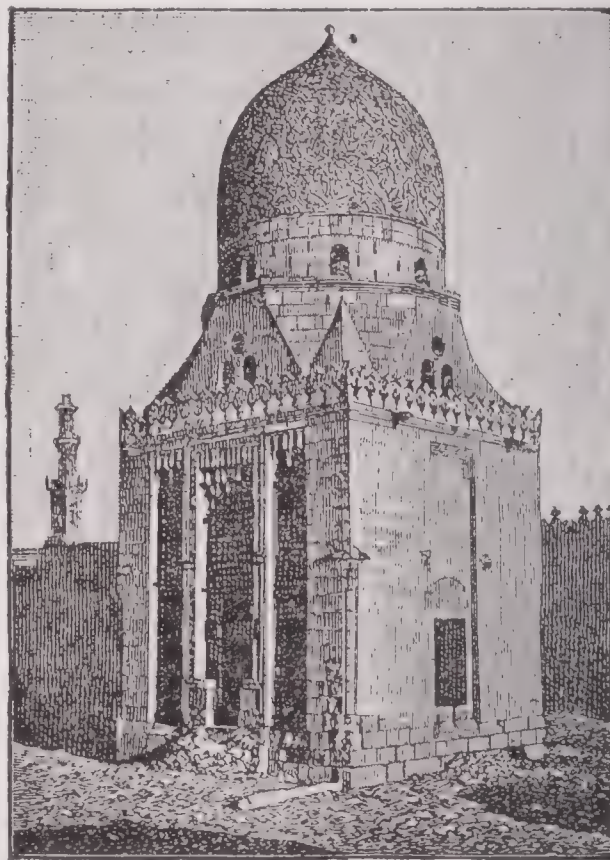
Cairns, Earl (HUGH MACCALMONT CAIRNS), an Irish lawyer and parliamentary debater; born in County Down, Ireland, in 1819, and educated at Trinity College, Dublin. He was called to the bar at the Middle Temple in 1844, was returned to Parliament for Belfast in 1852, and quickly made his mark in the House by his fluency and readiness in debate. He became Queen's Counsel in 1856, in 1858 Solicitor-general, and in 1866 Attorney-general under Lord Derby. Later in the same year he was made a judge of appeal, and in 1867 was created Baron Cairns. Under Disraeli's premiership he became Lord Chancellor in 1868, and again in 1874, and was created Viscount Garmoye and Earl Cairns in 1878. For some years he led the Conservatives in the House of Lords with equal dexterity and vigor. He died at Bournemouth, April 2, 1885.

Cairns, John, an English theologian; born in Berwickshire, Aug. 23, 1818; was a distinguished student at Edinburgh, and was ordained at Berwick in 1845, where he remained till 1876, becoming also in 1867 Professor of Theology in the United Presbyterian Church, and principal in 1879. Dr. Cairns, who was an eminent preacher, wrote the article "Kant" in the "Encyclopædia Britannica" (8th ed.), contributed to the new edition of Herzog's "Real-encyclopædie," and published the memoir of Dr. John Brown (1860), and "Unbelief in the

Cairo

18th century" (1881). He died in Edinburgh, Mar. 14, 1892.

Cairo (kī'rō) (Arab. Musr ei Kaherah, "the victorious capital"), the capital of modern Egypt, situated in a sandy plain between the right bank of the Nile and the ridge of Mokattam, near the point of the delta of the Nile. From the foundation of the city in 969 the Fatimite caliphs of Africa reigned for 10 generations over the land of Egypt. The caliph Hakem, who built a mosque near Bab-el-Nasr, and who is the supposed founder of the Druse religion, was the third in this succession. In the year 1171 Saladin usurped the throne from the last of the Fatimites. His descendant, Moosa-el-Ashref, was deposed in his turn in 1250; from that time till the year 1517, when the city was stormed and taken by Sultan Selim, it was governed by a succession of Mameluke kings. The most remarkable buildings in the city are its min-



TOMB OF SULTAN SOLOMON-UN-SELIM IN CAIRO.

arets and mosques. The minarets are the most beautiful of any in the Levant, of a prodigious height, and built of alternate layers of red and white stone. The most ancient of all the minarets is that attached to the great mosque of Sultan Tayloón. This mosque was built in the year of the Hegira 265 (879 A. D.) before the foundation of the city, and consists of an immense cloister or arcade built on pointed arches, being the earliest extant in that form.

The city proper is built on the slope of one of the lowest ridges of the Jebel Mokattam, and is surrounded, N. and E., by old walls, and the highest part of the ridge is occupied

Cairo

by a citadel commanded by forts on the Mokattam, and containing the palace of the viceroy, the arsenal, mint, public offices, and the magnificent new mosque of Mehemet Ali. The city is separated from its suburbs Bulak and Masr-el-Atîqa by a series of gardens and plantations, chief of which is the Ezbekiah. Bulak, the port of Cairo, is connected with it by a railway; it was built in 1313 on land deposited by the river. At Bulak is the celebrated museum of antiquities, an unequalled collection of Egyptian remains of unique historical interest. Cairo is divided into several distinct quarters, as Coptic, Jews, and Frank quarters, which were formerly separated by gates. The new quarter, called Ismailiyeh, the residence of Europeans and wealthy natives, has many of the houses in the Italian style, with large gardens attached.

The remarkable edifices of Cairo comprise many of the finest remains of Arabian architecture, all dating from the time of the ancient sultans of Egypt. Among these, besides mosques, chapels, and Coptic churches, are several of the ancient gates, an aqueduct for conveying water from the Nile to the citadel, the works of the citadel, and the palace and well of Joseph. At Old Cairo are the seven towers, still called the "Granary of Joseph," and serving their ancient purpose. In the island of Rhoda is the celebrated Nilometer. On the S., outside the walls, are the tombs of the Mamelukes, and on the N. E. the obelisk of Heliopolis. There are also a public library containing a splendid collection of illuminated copies of the Koran, one of which, in Old Kufic, is ascribed to the 7th century; a magnetic observatory, and the Mohammedan college of El Ahzar (originally a mosque), the principal university of the Mohammedan world, attended by 10,000 to 12,000 students from all parts of the East. The sanitary condition is very bad; death rate more than 46 per 1,000 per annum. In 1892 an international sanitary commission recommended a scheme for conveying all the drainage by gravitation to one point, whence it might be pumped and distributed for irrigation. The suburb of Masr-el-Atîqa, or Old Cairo (first called Fostat, "tent-town"), was the site of the original Cairo, founded about 642 by the Sultan Amru, the town on the present site, a little to the N. of Old Cairo, not having been founded till about 970; its citadel was built by Saladin in 1176, and it was the capital of the sultans of Egypt till the time of the Turkish conquest in 1517; since that time it has been the residence of the pashas, governors of the province. It was taken by the French in 1798, and held by them for more than three years. Pop. (1907) 654,000.

Cairo, a city and county seat of Alexander county, Ill.; at the confluence of the

Cajeput Oil

Ohio and Mississippi rivers, and on the Illinois Central, the Mobile and Ohio, the St. Louis, Iron Mountain and Southern, the Cleveland, Cincinnati, Chicago and St. Louis and the St. Louis Southwestern railroads; 150 miles S. E. of St. Louis. It is the trade center of Southern Illinois, and has freight and passenger steamer communications with all river ports, important manufactures, daily and weekly newspapers, 2 national banks, and an assessed property valuation of \$2,000,000. Pop. (1890) 10,324; (1900) 12,566; (1910) 14,548.

Caisson, a military term, denoting a wooden chest to hold ammunition; formerly applied to the ammunition-wagon itself. Also a wooden box containing shells and loose powder, which was buried in the ground and ignited by means of a fuse when the enemy was passing over it. In engineering a caisson is a wooden case or frame sunk in the beds of rivers, etc., to keep out the water during the laying of the foundations of a bridge, etc. It is constructed of strong timbers, firmly and closely joined together. The term in architecture is applied to sunk panels of various geometrical forms symmetrically disposed in flat or vaulted ceilings, or in soffits generally.

Caius, Key, or Kaye, John, an English physician; born in Norwich, England, Oct. 6, 1510. He was successively first physician to Edward VI., Mary, and Elizabeth. Having obtained permission to erect Gonville Hall, at Cambridge, into the college which still bears his name (Gonville and Caius College), he accepted the mastership and retired from public life, when he appears to have assiduously devoted himself to literary labors connected with his profession. He died in London, July 29, 1572.

Cajabamba (kä-hä-bäm'bä), capital of the province of Chimborazo, in Ecuador, 102 miles S. of Quito, on the arid plateau of Topi, at an elevation of 9,480 feet. Pop. 16,000. The former town of RIOBAMBA, founded on this site in 1533, was in 1797 overwhelmed by an earthquake in which 30,000 lives were lost.

Cajamarca (kä-hä-mär'kä), a department in the N. W. of Peru, between the W. chain of the Andes and the Amazon. A railway connects it with the Pacific, and there is a large farming and cattle-raising industry. Area, 12,538 square miles; pop. (1896) 442,412. The capital is Cajamarca; pop., 12,000.

Cajeput (kī'e-pöt), or **Cajuput** (kī'ö-pöt), the name of several trees, genus *Melaleuca*, order myrtaceæ, natives of the East Indies and Australia.

Cajeput Oil, the volatile oil obtained from the leaves of the cajeput tree (*Melaleuca Cajuputi*), a native of the Indian Archipelago, and some parts of Australia,

Cajetan

or from others of the same genus. It is used in medicine as a carminative, stimulant, sudorific, and antispasmodic; also externally in chronic rheumatism, and has been used as a cure for cholera.

Cajetan, Thomas de Vio (kä'ye-tän), an Italian cardinal; born in Gaëta, Italy, in 1469. In 1518, Leo X. sent him as legate to Germany, his high character and learning giving him great weight and influence. Luther appeared before him at Augsburg, but their conferences were without result; the legate insisting on one point—retraction—and the monk steadily refusing. Cajetan was soon after named bishop of Gaëta, was again sent into Germany in 1523, and was taken prisoner at the sacking of Rome in 1527. He died in 1534.

Calabar, a maritime district of West Africa on the Bight of Biafra, intersected by two rivers, called respectively Old and New Calabar, under British protection. A large portion of the population are employed in the palm-oil trade. Old Calabar or Bongo river is situated about 90 miles nearly due W. from New Calabar river, with a wide estuary opening into the Bight of Biafra. This river enters the Bight of Biafra at lon. 7° 7' E., and is believed to be one of the numerous terminating branches of the Niger. Duke Town and Creek Town, the chief towns on Old Calabar river, are stations of British missionaries.

Calabar Bean, the seed of *Physostigma venenosum*, of Western Africa, where it is used as an ordeal in cases of suspected witchcraft. If it causes vomiting in the accused, he is declared innocent; if it is retained and death ensues, he is called guilty. It is an emetic, purgative, and a narcotic poison, and induces fainting and partial paralysis. It has come to be used medicinally in tetanus, chorea, etc.

Calabash, a tree, the *Crescentia Cujete*, the typical one of the order Crescentiaceæ, or crescentiads. It is a tree about 30 feet high, found in some places wild, in others cultivated, in the West Indies and other tropical parts of America. Its flowers are variegated with green, purple, red, or yellow; its leaves are narrowly elliptical. Its fruits are oval or globular, and are so hard externally that where they grow they are used as household utensils, such as basins, water bottles, and even kettles. They are not easily broken by rough usage or burnt by exposure to fire. The pulp is purgative, and considered useful in chest diseases; when roasted, it is employed as a poultice for bruises and inflammations. The fruit of the tree is inclosed in a shell used by the natives of the Caribbee Islands for drinking cups, pots, musical instruments, and other domestic utensils.

Calabash Nutmeg (the *Monodora myristica*), a tree of the order Anonaceæ, intro-

Calais

duced into Jamaica probably from Western Africa. The fruit resembles small calabashes; hence the name. It is called also American nutmeg, or Jamaica nutmeg.

Calabria, a name anciently given to the peninsula at the S. E. extremity of Italy, but now applied to the S. W. peninsula in which Italy terminates, from about lat. 40° N. to the Strait of Messina; area, 5,819 square miles; pop. (1901) 1,370,208. It is divided into three provinces—Cosenza, Reggio, and Catanzaro. The central region is occupied by the great Apennine ridge, to which whole colonies with their cattle migrate in the summer. The flats near the coast are marshy and unhealthy, but the valleys at the foot of the mountains are rich with the most luxuriant vegetation. The country is subject to earthquakes. Wheat, rice, saffron, anise, liquorice, madder, flax, hemp, olives, almonds, and cotton are raised in abundance. The sugar-cane also comes to perfection here. Sheep, horned cattle, and horses are numerous. Silkworms are extensively raised. The minerals include alabaster, marble, gypsum, alum, chalk, rock-salt, lapis-lazuli, etc. It suffered from an appalling earthquake in 1908.

Caladium, a genus of endogenous plants, the typical one of the family caladiæ. They are cultivated in greenhouses here, and



CALADIUM.

flourish in warmer parts of the world. The leaves of the *Caladium sagittifolium* are boiled and eaten as a vegetable in the West Indies. The rootstocks or rhizomes of others are eaten there and in the Pacific, the process of cooking destroying the dangerous acidity.

Calais, a city, port of entry, and county seat of Washington county, Me.; on the St. Croix river, opposite St. Stephen, N. B.,

Calais

and on the St. Croix and Penobscot and the Canadian Pacific railroads; 120 miles E. of Bangor. It is the extreme N. E. seaport of the United States and is connected by steamship lines with Boston, Portland, and St. John, N. B. It has a large lumber trade and numerous foundries, machine shops, shipyards, and other extensive mechanical industries; a national bank, several newspapers, high and grammar schools, electric lights, a public library, and an assessed property valuation of \$2,500,000. Pop. (1900) 7,665; (1910) 6,116.

Calais (kä-lä'), a fortified seaport town of France, in the department of Pas-de-Calais, on the Strait of, and 25 miles S. E. of Dover, and distant 184 miles by rail from Paris. The Old Town or Calais proper has a citadel, and was formerly surrounded by fortifications; but the modern suburb of St. Pierre les Calais having been amalgamated with Calais proper, both are now surrounded with forts and other works, to which morasses lend additional strength. Extensive harbor improvements have been carried out. Calais has considerable exports of grain, wine, and spirits, eggs, fruit and vegetables; but the town derives its principal importance from its being the chief landing place for English travelers to the Continent. It has important manufactures of cotton and silk bobbin-net lace. In 1347 Calais was taken by Edward III. of England, after a siege of 11 months. In 1558 it was retaken by the Duke of Guise, being the last relic of the French dominions of the Plantagenets, which at one time comprehended the half of France. Pop. (1906) 66,627.

Calamanco, a kind of woolen stuff made in the Netherlands, which has a fine gloss, and is checkered in the warp, so that the checks are seen on one side only. It was fashionable in Addison's time.

Calamander Wood, a valuable furniture wood from India and Ceylon, of a hazel-brown color with black stripes, very hard in texture; called also coromandel wood.

Calamary, the English name of the cephalopodous genus *Loligo*, and specially of the *Loligo vulgaris*, or common calamary. Also the English name for the cephalopod mollusks of the family Teuthidæ. The shell consists of an internal expansion or "pen," with a central shaft and two lateral wings. The species are called also squids.

Calambac, aloes-wood, the product of a tree growing in China and some of the Indian isles. It is of a very light, spongy texture, containing a soft, fragrant resin, which is chewed by the natives.

Calambuco, a very durable tree, indestructible by ants, used for ship-building and farming implements; grows in the island of Luzon, Philippines.

Calamus

Calamianes (kä-lä-mē-ä'nes), an island group of the Philippine Archipelago. Their surface is mountainous, and richly wooded, producing rice, wool, cacao, and the bird's nests used for food. Busuanga, Calamian and Linacapan are the largest of the islands. Area about 3,000 square miles; pop. over 14,000.

Calamine, or **Calaminaris**, a transparent or translucent brittle orthorhombic mineral, of a vitreous or even adamantine luster, its color white yellowish or brown, its hardness 4.5-5, its sp. gr. 3.16-3.90. It possesses double refraction. Composition: Silica, 23.2-26.23; oxide of zinc, 26.85-68.30; and water, 4.4-10.8. It is a native carbonate of zinc, ZnCO_3 . It is often found associated with Smithsonite. It is found in this country, in Scotland, Wales, England, and on the continent of Europe. Dana makes three varieties: 1. ordinary (1) in crystals (2) mammillary or stalactitic, the latter including wagite. 2. carbonated. 3. argillaceous.

Calamint (*Calamintha*), a genus of Labiatae, nearly allied to balm and thyme. *C. officinalis* is not unfrequent in England. It has an agreeable aromatic mint-like odor, and is used by the country people to make herb tea, and enjoys a widespread traditional repute as a pectoral medicine. *C. clinopodium* is Wild Basil, and *C. Acinos*, Basil Thyme. The common calamint is found in North America, with several native species.

Calamite, a coal fossil plant recurring in the form of jointed fragments, formerly cylindrical, and perhaps hollow, but now crushed and flattened. The stems are branched, and there appears to have been a distinct wood and bark. Both stems and branches are ribbed and furrowed. Some refer the numerous species of Calamites to Equisetaceæ, but the presence of wood and bark has led others to place them among the Dicotyledons.

Calamus, the reed pen which the ancients used in writing, made of the stem of a reed growing in marshy places, probably *Arundo donax*, of which the best were obtained from Egypt. The stem was first softened, then dried, and cut and split with a knife (scalprum librarium), as quill pens are made. To this day the Orientals generally write with a reed (Arab. *Kalâm*).

Calamus, the traditional name of the sweet flag (*acorus calamus*), which is no doubt the "calamus aromaticus" of Roman authors, and probably the sweet calamus and sweet cane of Scripture, although it has sometimes been attempted to identify calamus with one of the fragrant grasses which yield the grass-oil of India. The sweet flag, although resembling *Iris* in habit, belongs to the order *Aroideæ*, and is

Calamy

widely distributed through the Eastern palæarctic region, and is also indigenous to North America. It is said to have been introduced into Europe from Asia Minor in the 16th century, and is now widely naturalized in ditches and by the sides of ponds. Hooker indeed regards it as a native of Great Britain. The root-stock yields an aromatic stimulant and tonic, which has fallen into disuse in regular medicine, but is still of high repute in the East. It is in fact cultivated in Ceylon and Burma. It is sometimes used to flavor beer, and in the perfuming of tooth powder and snuff; and was masticated to clear the voice and sweeten the breath. It is also made into confections and used in the preparation of liqueurs in Germany, etc. The plant was formerly used to strew floors instead of rushes, and particularly in cathedrals on festival days. The name *calamus* is also given to a genus of palms.

Calamy, Edmund, a Puritan clergyman; born in London, England, in 1600. He studied at Pembroke Hall, Cambridge (1616–1619), where he attached himself to the Calvinistic party. In 1639 he was chosen minister of St. Mary's Aldermanbury, London. He entered warmly into the controversies of the time, and became noted as a leading man on the side of the Presbyterians. He had a principal share in the composition of "Smectymnuus," a work intended as a reply to Bishop Hall's "Divine Right of Episcopacy," and one of the most able and popular polemics of the day. Like the mass of the Presbyterian clergy, he was monarchical and not republican in his political opinions. He disapproved, therefore, of the execution of Charles, and of Cromwell's protectorate, and did not hesitate to avow his attachment to the Royalist cause. Ejected for nonconformity in 1662, he continued to attend service in his old church, till heart-broken by the Great Fire of London, he died Oct. 29, 1666.

Calanus (kal'a-nus), an Indian philosopher, much esteemed by Alexander the Great. At the age of 73 (B. C. 323), being seized with illness at Pasargada, he caused a funeral pile to be erected, which he ascended with a composed countenance, and expired in the flames, saying, that having lost his health and seen Alexander, life had no more charms for him.

Calas, Jean (kä-lä'), a French victim of fanaticism; born in 1698. He was a Protestant, and was engaged as a merchant in Toulouse, when his eldest son committed suicide; and as he was known to be attached to the Roman Catholic faith, a cry arose that he had on that account been murdered by his father. Jean Calas and his whole family were arrested, and a prosecution instituted against him, in support of which numerous witnesses came forward.

Calcareous Tufa

The parliament of Toulouse condemned him, by eight voices against five, to be tortured and then broken on the wheel, which sentence was carried out in 1762, his property being also confiscated. Voltaire became acquainted with his family, and procured a revision of the trial, when Calas was declared innocent, and his widow pensioned.

Calatafimi (kä-lä-tä-fē'mē), a town of Sicily near its W. end, with a ruined Saracenic castle. Near it is the scene of Garibaldi's first victory over the Neapolitans in 1860.

Calathea (-lā'thē-ä), a genus of plants of the order Marantaceæ, the Cannæ of Jussieu. The species are natives of tropical America, and several are in cultivation for the sake of their handsome foliage.

Calatrava la Viega (vyä'gä), a ruined city of Spain, on the Guadiana, 12 miles N. E. of Ciudad Real. Its defence against the Moors, undertaken by Raymond, abbot of Fitero, and Diego Velasquez in 1158, after it had been abandoned by the Templars, is famous on account of its having originated the Order of the Knights of Calatrava, which was instituted at Calatrava in 1158, by King Sancho III. of Castile, and was at several periods associated with the Cistercian monks. Their almost uniform success against the Moors gave rise to rashness, and in 1197 they were defeated and nearly exterminated, the survivors transferring the seat to the castle of Salvatierra. In 1523 the grand-mastership was transferred to the crown by a papal bull, the knights being permitted to marry once by way of compensation for their loss of independence. Since 1808 the body has been continued as an order of merit.

Calcareous, a term applied to substances partaking of the nature of lime, or containing quantities of lime. Thus we speak of calcareous waters, calcareous rocks, calcareous soils. Calcareous spar, crystallized carbonate of lime. It is found crystallized in more than 700 different forms, all having for their primitive form an obtuse rhomboid. The rarest and most beautiful crystals are found in Derbyshire, England.

Calcareous Tufa, a deposition from springs, streams, or underground water, from which it is precipitated partly by the escape of carbonic acid which acts as a solvent, and partly by evaporation of the water. It is usually white, creamy-white, yellowish, or brownish in color, but other hues occur, and variegated and mottled varieties are not uncommon. It is of variable texture and consistency; some kinds being rather soft, brittle, and friable, and porous or cellular. These cellular varieties have been deposited from the waters of springs, and often contain vegetable and animal remains, as leaves, twigs, nuts, moss, insects, land and freshwater shells, etc. The so-

Calceolaria

called "petrifying springs" of Matlock afford a good example of the formation of calcareous tufa. In some regions the deposition from calcareous waters is on a very extensive scale, as along the river Anio, at Tivoli, near Rome, where calcareous tufa occurs in masses many feet in thickness. In that district the formation is harder and more compact, and under the name of *travertino* is used as a building stone at Rome. Calcareous tufa is abundantly deposited from thermal springs, as in the Yellowstone region of the United States. The calcareous incrustations so commonly seen in caverns in limestone rocks are varieties of calcareous tufa. They are known as stalactites and stalagmites.

Calceolaria, a well known and beautiful genus of plants—order *Scrophulariaceæ*. The resemblance to a shoe is in the bilabiate corolla of the best known species, the elongated lower lip of which is inflated and turned down. The stamens are only two. The species, which are numerous, come from South America, chiefly from the western slope or side of the Andes. The greater number have yellow flowers, others are purple, while in a few the two colors are intermingled. The roots of *Calceolaria arachnoida* are collected in Chile, where they are called *relbun*, and are used for dyeing woolen cloth crimson. Various calceolarias are cultivated in the United States.

Calchas (kal'kas), a celebrated soothsayer, son of Thestor, lived in the 12th century B. C. He accompanied the Greeks to Troy, in the office of high priest, and prophesied the principal events which were destined to take place regarding that doomed city. He had received the power of divination from Apollo, and was informed that as soon as he found a man more skilled than himself, he must perish. This happened near Colophon, after the Trojan war. He was unable to tell how many figs were on the branches of a certain tree; and when Mopsus mentioned the exact number, Calchas died through grief.

Calciferaous Epoch, one of the subordinate divisions of the Lower Silurian System of North America. The division is characterized by the presence of calcareous sandstones and limestones. In Scotland a subdivision of the Carboniferous system is known as the Calciferaous Sandstone group.

Calcination, the operation of expelling from a substance by heat, either water or volatile water combined with it. Thus, the process of burning lime, to expel the carbonic acid, is one of calcination. The result of exposing the carbonate of magnesia to heat, and the removal of its carbonic acid, is the production of calcined magnesia. The term was, by the earlier chemists, applied only when the substance exposed to heat was reduced to a calx, or to a friable

Calcium

powder, this being frequently the oxide of a metal. It is now, however, used when any body is subjected even to a process of wasting. Marble, limestone, and chalk, which are all carbonates of lime, are deprived of their carbonic acid and water by calcination. It also deprives copper and other ores of their sulphur, the sulphurets being oxidized and sulphuric acid being disengaged and volatilized.

Calcite, **Calcareous Spar**, or **Calc-spar**, the name usually given by mineralogists to carbonate of lime, rhombohedral in its crystallization. It differs from aragonite only in crystallization. Calcite is one of the commonest minerals. Marble, for example, is composed of small crystalline granules of this mineral. It is abundantly met with in very many rocks as a secondary mineral; that is to say, it is a decomposition product—the result of the chemical alteration of various rock-constituents, such as the felspars. Thus it frequently occurs in the cracks, fissures, and vesicles of igneous rocks. The name Iceland spar has often been given to calcite, at least to the finest colorless and transparent variety, because it is found in Iceland, filling up clefts and cavities in the basalt-rocks of that region. Slate spar is a lamellar variety, often with a shining, pearly luster and a greasy feel, and is found in Wicklow in Ireland, Glen Tilt in Scotland, and Kongsberg in Norway.

Calcium, a dyad metallic element. Symbol, Ca; at. wt., 40; sp. gr., 1.57; obtained by Davy by decomposing the chloride by electricity; also by heating the iodide with sodium in a closed vessel. Calcium is a yellowish white, ductile, malleable metal, which oxidizes in damp air; it decomposes water, and dissolves easily in dilute acids. Heated in the air, it melts at red heat, and burns with a bright orange-red light. Calcium occurs in nature chiefly as a carbonate, silicate, and sulphate. Calcium oxide, CaO, called also lime, is obtained by heating the carbonate of calcium to redness. It is a white, earthy, infusible powder, phosphorescent at high temperatures; it is strongly alkaline, and readily absorbs carbonic anhydride. It unites vigorously with water, throwing out great heat, and forms a hydrate, CaOH₂O, which is slightly soluble in cold water; it is used in medicine as lime-water. Impure lime mixed with sand forms mortar.

Calcium sulphate, CaSO₄, found as hydride as gypsum, CaSO₄·2H₂O, and selenite and alabaster. The water is given off by heating it, and a white powder is left, which dissolves in 500 parts of cold water. Mixed with water, it sets in a hard substance; it is used under the name of plaster of Paris for making casts of medals and statues, etc.

Calcium Carbide

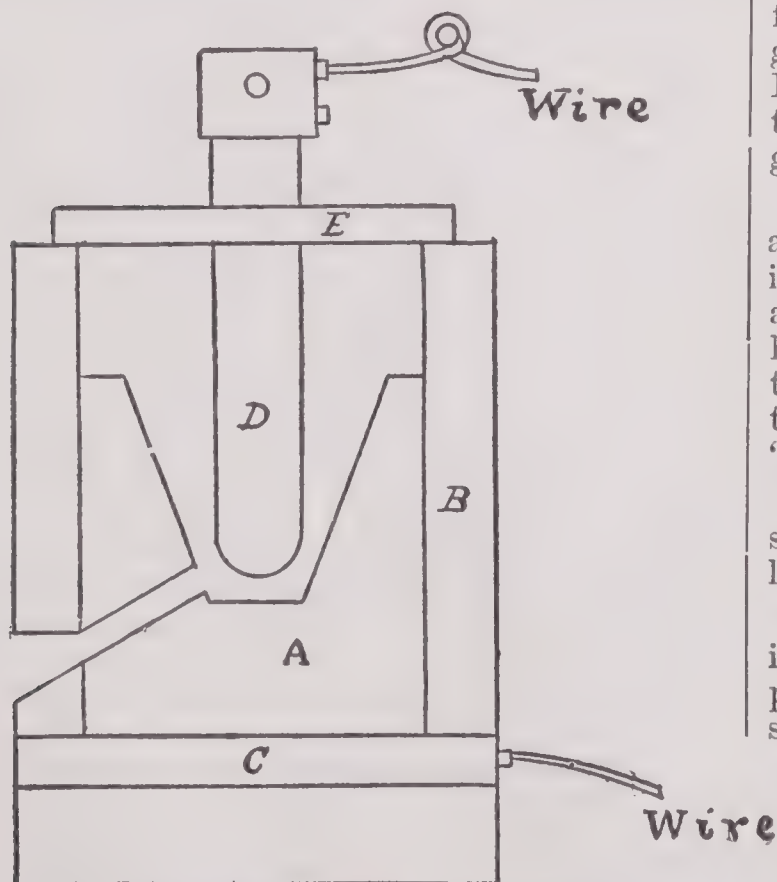
Calcium carbonate, CaCO_3 , forms the chief constituent of limestone, marble, chalk, etc. It occurs crystallized as calc-spar and aragonite. Calcium carbonate is insoluble in water, but is dissolved by water containing carbonic acid gas; it is deposited from this solution by boiling, hence boiler deposits.

Calcium phosphates occur in the bones of animals and are native in Apatite. Calcium chloride, CaCl_2 , is obtained by dissolving the carbonate in hydrochloric acid. It crystallizes in white prismatic crystals; it is very deliquescent. Fused calcium chloride is used to dry gases, etc. It absorbs ammonia gas.

Calcium fluoride, CaF_2 , occurs as fluor spar.

Calcium sulphides and phosphides have been obtained. Salts of calcium are not precipitated by H_2S , either in an acid or alkaline solution. Alkaline carbonates and ammonia carbonate give a white precipitate insoluble in excess; oxalate of ammonia gives a white precipitate from a neutral solution; the precipitate is not soluble in acetic acid. A solution of sulphate of calcium gives no precipitate. The chloride gives an orange-red flame with alcohol. The spectrum of calcium gives several characteristic lines, especially an orange-red and a green line. Chloride of lime, or bleaching powder, is a mixture of calcium chloride and calcium hypochlorite.

Calcium Carbide, a chemical compound of calcium and carbon, according to the symbol CaC_2 . It is a hard, bluish-black,



CALCIUM CARBIDE FURNACE.

clear crystalline body (exceptional specimens are reddish-brown), and is impervious to light, insoluble in all known solvents,

Calculating Machine

and with a sp. gr. of 2.22. Although calcium carbide has been known for many years, it did not come into prominence until 1894, when Moissan produced it by heating 120 grains of oxide of calcium and 70 grains of sugar charcoal in an electric furnace. The furnace was heated to $3,500^\circ \text{C}$. by an electrical current of 350 amperes and 70 volts for 20 minutes. This produced about 150 grains of carbide. Calcium carbide is produced in a furnace similar to that shown in accompanying drawing. A crucible A (into which the mixture to be smelted is put) is surrounded by a wall B, resting on a metal plate C, which acts as an electrode; a carbon rod D, passes through the cover E and acts as the second electrode. A mixture of 56 parts of calcic oxide and 36 parts of coal dust is placed in the crucible and the current turned on. Dry carbide is not affected by heat in an ordinary atmosphere, but when heated in an excess of oxygen it burns and forms calcium carbonate. When exposed to damp air for a short time it disintegrates and gives off a peculiar odor resembling garlic. When calcium carbide comes in contact with water, ACETYLENE GAS (q. v.) is produced and calcium hydroxide thrown down ($\text{CaC}_2 + 2\text{H}_2\text{O} = \text{C}_2\text{H}_2 + \text{Ca}(\text{OH})_2$). It is used generally for the production of acetylene and the reduction of iron.

Calcium Light, a brilliant light produced by directing the flame of an oxy-hydrogen blow-pipe against a block of compressed quicklime. It has been used on the stage for many years, and by the aid of colored glasses very charming effects are produced. More recently it has been employed in lanterns for projecting photographic and biographic pictures on a screen.

Calcker, Calcar, or Calkar, Jan Van, a Flemish painter; born in 1500. He studied art under John de Bruges and in Italy, and, taking Titian as his model, imitated him so faithfully that it is difficult to detect any difference in style between the two painters. His best known works is a "Mater Dolorosa." He died in 1546.

Calc-sinter, a carbonate of lime, the substance which forms the stalactites and stalagmites that beautify many caves.

Calculating Machine, a piece of mechanism for assisting the human intellect in the performance of arithmetical operations. The system of logarithms, invented by the celebrated Napier of Merchistoun, in 1614, which is of the greatest assistance to mathematicians and others in the computation of figures, by shortening the ordinary operations, seems to have been instrumental in directing attention to the construction of an instrument by which arithmetical results could be produced by mechanical means, although the abacus had been long used in

Europe and Asia for effecting calculations; and Napier himself had produced what may be termed an elementary calculating machine, consisting of rods with four faces, known as Napier's Bones. The first instrument which can be justly called a calculating machine was invented by Blaise Pascal in 1642, when he was about 19 years of age. It was more especially contrived for the calculation of sums of money, although it would also perform the ordinary operations of arithmetic with numbers on the common, or decimal scale of notation. It consisted of a set of cylinders, with numbers marked on their external surface, moving on axles to which wheels were attached, with a certain number of notches cut in their circumference. Among the various machines of later invention, the two devised by Mr. Babbage, but never fully executed, are by far the more elaborate. The invention of the brothers Scheutz was based on the description of Mr. Babbage's difference machine, and is similar to it in general principles, though it varies from it in some points in the method adopted in its construction. It was purchased by Mr. Rathbone, of Albany, and presented by him to the Dudley Observatory in that city. More modern calculating machines are the slide-rule and bank and cash registers. See BAB-BAGE, CHARLES; PASCAL, BLAISE.

Calculus, the medical term for what is popularly known as stone. Calculi vary in size from a pin's head to a pigeon's egg, and even larger, and weigh from a few grains to several ounces. They derive their special name and character as well from the organs of the body in which they are found as from the constituents of which they are composed. Thus, for example, a calculus found in the kidney or ureter is called renal, in the bladder vesical, and so on; but, according to its chemical composition, it would also be called either (1) uric (lithic) acid calculus, or (2) oxalic (mulberry) calculus, or (3) phosphatic calculus. Calculi derived from the bile are also found in the gall-bladder, and in the biliary and intestinal ducts, where they receive the name of gall-stones, or biliary calculi. Those found in the salivary glands are called salivary calculi.

Calculus, The Infinitesimal, or Transcendental Analysis, a branch of mathematical science. The lower or common analysis contains the rules necessary to calculate quantities of any definite magnitude whatever. But quantities are sometimes considered as varying in magnitude, or as having arrived at a given state of magnitude by successive variations. This gives rise to the higher analysis, which is of the greatest use in the physico-mathematical sciences. Two objects are here proposed: First, to descend from quantities to their elements.

The method of effecting this is called the differential calculus. Second, to ascend from the elements of quantities to the quantities themselves. This method is called the integral calculus. Both of these methods are included under the general name infinitesimal, or transcendental analysis. Those quantities which retain the same value are called constant; those whose values are varying are called variable. When variable quantities are so connected that the value of one of them is determined by the value ascribed to the others, that variable quantity is said to be a function of the others. A quantity is infinitely great or infinitely small, with regard to another, when it is not possible to assign any quantity sufficiently large or sufficiently small to express the ratio of the two.

When we consider a variable quantity as increasing by infinitely small degrees, if we wish to know the value of those increments, the most natural mode is to determine the value of this quantity for any given period, as a second of time, and the value of the same for the period immediately following. This difference is called the differential of the quantity. The integral calculus, as has been already stated, is the reverse of the differential calculus. There is no variable quantity expressed algebraically, of which we cannot find the differential; but there are differential quantities which we cannot integrate: some because they could not have resulted from differentiation; others because means have not yet been discovered of integrating them. Newton was the first discoverer of the principles of the infinitesimal calculus, having pointed them out in a treatise written before 1669, but not published till many years after. Leibnitz, meanwhile, made the same discovery, and published it before Newton, with a much better notation, which is now universally adopted.

Calcutta (literally, the ghaut or landing-place of Kâli, from a famous shrine of this goddess), capital of British India, and of the presidency and province of Bengal; situated on the left bank of the Hooghly (Húglí), a branch of the Ganges, about 80 miles from the Bay of Bengal. The Hooghly is navigable up to the city for vessels of 4,000 tons or drawing 26 feet. The navigation, however, on account of sand-banks which are continually changing their size and position, is dangerous, and ships must take on board a pilot. The river opposite the city varies in breadth from rather more than a quarter to three-quarters of a mile. The city may be said to occupy an area extending along the river for about 5 miles from N. to S., and stretching E. to a distance of nearly 2 miles in the S., narrowing in the N. to about half a mile. The E. boundary is nominally formed by what is known as the Circular Road, the Lower

Circular Road forming part of the S. boundary. Another E. boundary on the N. is the Circular Canal, which runs for some distance parallel to the Circular Road. The S. W. portion of the area thus spoken of is formed by the Maidan, a great park stretching along the river-bank for about $1\frac{3}{4}$ miles, with a breadth in the S. of $1\frac{1}{2}$ miles. This grassy and tree-studded area is one of the ornaments of Calcutta, and is much frequented by all classes. It is intersected by fine drives, and is partly occupied by public gardens, a cricket-ground, race-course, etc., and partly by Fort William, which rises from the river-bank. It was built in 1757-1773, being begun by Clive after the battle of Plassey, and is said to have cost about £2,000,000 sterling.

Along the river-bank there is a promenade and drive known as the Strand Road, which has for the most part been reclaimed from the river by successive embankments. Along the E. side of the Maidan runs Chauringhi Road, which is lined with magnificent residences, about 60 of them occupying $1\frac{1}{2}$ miles from N. to S. This line of noble structures forms the front of the European fashionable residential quarter, the rest of which extends back from Chauringhi Road and is intersected with several fine streets. Along the N. side of the Maidan runs a road or street known as the Esplanade, on the N. side of which are the government house, the town hall, and high court. The European commercial quarter lies N. of the Esplanade, between it and another street called Canning street, having the river on the W. The center of this area is occupied by Dalhousie Square (inclosing a large tank or reservoir), and here there are a number of public buildings, including the postoffice, telegraph office, custom house, Bengal secretariat, etc. The European retail trading quarter occupies a small area to the E. of the above area. Everywhere outside of the European quarters Calcutta is interspersed with *bastis*, or native hamlets of mud huts, which form great outlying suburbs. "The growth of the European quarters, and the municipal clearings demanded by improved sanitation, are pushing these mud hamlets outward in all directions, but especially toward the E. . . . They have given rise to the reproach that Calcutta, while a city of palaces in front, is one of pig-styes in the rear." First among the public buildings is the Government House, the viceregal residence, situated, as already mentioned, on the Esplanade. It was built in 1799-1804, and with its grounds occupies six acres. It is a magnificent pile, with four wings extending towards the four points of the compass from a central mass which is crowned with a dome and approached from the N. by a splendid flight of steps. Besides accommodating the viceroy and his

staff it contains the council chamber in which the supreme legislature holds its sittings. Nearer to the river stands the high court, an imposing structure in the Gothic style, completed in 1872. Between these two edifices is the town hall, a large building in the Doric style, built in 1804, having a grand portico approached by a noble flight of steps. The bank of Bengal, the currency office, postoffice, etc., are among the other public buildings in this locality, while further to the N. stands the mint, near the bank of the Hooghly.

The chief of the Anglican churches in Calcutta is the Cathedral of St. Paul's, at the S. E. corner of the Maidan, a building in the "Indo-Gothic" style, with a tower and spire 201 feet high, consecrated in 1847. St. John's Church, or the old cathedral, is another important church, in the graveyard surrounding which is the tomb of Job Charnock, founder of Calcutta. The chief Presbyterian church is St. Andrew's or the Scotch Kirk, a handsome Grecian building with a spire. The Roman Catholics have a cathedral and several other churches; and there are also places of worship for Greeks, Parsees, and Hebrews. Hindu temples are numerous but uninteresting; among the Mohammedan mosques the only one of note is that which was built and endowed by Prince Ghulam Mohammed, son of Tippoo Sultan. The religious, educational, and benevolent institutions are numerous. Various missionary and other religious bodies, British, European, and American, are well represented. There are four government colleges — the Presidency College, the Sanskrit College, the Mohammedan College, and the Bethune Girls' School. There are five colleges mainly supported by missionary efforts; besides several others, some of them under native management. Other educational institutions include Calcutta Medical College, a government school of art, Campbell Vernacular Medical School, and a school of engineering at Howrah, on the W. side of the river. Besides these there is the Calcutta University, an examining and degree-conferring institution. Among the hospitals are the Medical College Hospital, the General Hospital, the Mayo Hospital (for native.), and the Eden Hospital for women and children. The Martinière (so named from its founder, General Martin, a Frenchman in the Company's service) is an important institution for the board and education of indigent Christian children. Elementary and other schools are increasing in numbers. In this connection we may mention the Asiatic Society, founded by Sir W. Jones in 1784, for the study of the languages, literature, antiquities, etc., of Asia; and the Botanic Garden, which occupies a large area on the right bank of the river.

Calcutta possesses a number of public

Calcutta

monuments, most of them in or about the Maidan. Several governors-general are thus commemorated, as also Sir David Ochterlony and Sir James Outram, "the Bayard of the East"; of whom there is an admirable equestrian statue by Foley. The city is lighted partly by gas, partly by electricity. There is an extensive system of tramways. The sanitation of Calcutta, though vastly improved in recent years, is still defective, more especially in the suburban districts, where the *bastis* or native huts are so common. One difficulty in the way is the site of the city itself, which is practically a dead level. An Act which came into force in 1889 brought a large additional area under the municipal authorities, and since then much has been done in the way of drainage, opening up of arterial streets, alignment of roads, etc. The water-supply has also been greatly increased, and filtered water from the Hooghly (there is a pumping-station at Palta, 16 miles above Calcutta) is now available at the daily rate of 36 gallons per head in the city, and over 15 in the suburbs, besides a supply of unfiltered water for washing and other purposes. The mortality over the entire municipality in 1893 was 29.5 per 1,000, a great improvement on former times. The death-rate is far higher among the natives than among the Europeans, and in the native quarters cholera is said to be seldom entirely absent. The healthiest months are July and August, which form part of the season of the rains; the unhealthiest are November, December, and January. The mean temperature is about 79°, the average rainfall a little over 66 inches.

Calcutta belongs to an area that is subject to periodical cyclones, which sometimes do an immense amount of injury. One of the most violent of these was in 1864, when enormous damage was done to the town and the shipping in the river, with great loss of life. Out of 195 vessels only 23 remained uninjured, many being totally wrecked. The port of Calcutta extends for about 10 miles along the river, and is under the management of a body of commissioners. Opposite the city it is crossed by a great pontoon bridge, which gives communication with Howrah for vehicles and foot-passengers, and can be opened at one point to let vessels pass up or down. It cost £220,000. Beside the accommodation for shipping furnished by the river, there are also several docks. The trade is very large, Calcutta being the commercial center of India. There is a very extensive inland trade by the Ganges and its connections, as also by railways (the chief of which start from Howrah), while almost the whole foreign trade of this part of India is monopolized by Calcutta. In 1897-1898 the gross tonnage of the shipping inward and outward was over 5,000,000 tons; while the total of exports

Caldara

and imports was 71,994,608 tens of rupees, the exports being largely in excess of imports. The chief exports are opium, jute and jute goods, tea, grain and pulse, oil-seeds, raw cotton, indigo, hides and skins, silk and silk goods, etc. The most important import is cotton goods. The jute manufacture is extensively carried on, also that of cottons.

The first factory in Bengal of the East India Company, which was incorporated by royal charter in the year 1600, was established at Hooghly, 28 miles further up the river, in 1644. Job Charnock, the company's agent, was driven out of this settlement in 1686, and the English then occupied part of the present site of Calcutta, which in 1689-1690 became the headquarters of the commercial establishments of the company in Bengal. In 1700 the company acquired from Prince Azim, son of the Emperor Aurengzebe, the three villages of Sutanati, Kalikata (Calcutta), and Govindpore, for an annual rent of 1,195 rupees, and these formed the nucleus of the present city. The original Fort William, named after William III., was built in 1696, on a site considerably to the N. of the present fort. Calcutta was taken and plundered by Suraj-ud-Dowlah in 1756, and retaken by Lord Clive in 1757. To the capture by Suraj-ud-Dowlah belongs the episode of the "Black Hole" of Calcutta, when 146 Europeans were crowded into a cell 20 feet square, and next morning only 23 came out alive. When the British recovered possession, much of the town was in ruins and had to be rebuilt, so that it may be said to date only from 1757. Clive built the new Fort William on the site of Govindpore, between 1757 and 1773. In 1773 Calcutta became the seat of British government for the whole of India. Since then the history of Calcutta has been an almost unbroken record of progress and prosperity. The pop. in 1872 of the city proper was 447,601; in 1881 it was 433,219, or including the suburbs and Howrah, 789,864; in 1891, including Howrah (116,606) and other suburbs, the total was 857,750; in 1901, 1,121,664.

Caldara, Polidora called CARAVAGGIO, an Italian painter; born in Caravaggio, in the Milanese, in 1495. He went to Rome in his youth and carried bricks at first for the masons who worked in the Vatican. He first felt a great desire to become a painter from seeing Giovanni da Udine and the other painters who were occupied in the Vatican. He formed a close friendship with Maturin of Florence, who assisted him with his advice. Caldara soon surpassed him, and exerted himself to introduce improvements in drawing, having always in view the antiques. Raphael employed him in the galleries of the Vatican, where he painted under his direction several excel-

lent friezes. At Messina he executed an oil painting, which represents Christ bearing the cross, contains a number of beautiful figures, and proves his ability to treat the most elevated subjects. He has approached more than any one to the style and the manner of the ancients, particularly in imitating their bas-reliefs. His figures are correct, well distributed and arranged; the positions are natural, the heads full of expression and character. It is evident that he would have acquired great celebrity if he had undertaken greater works. He applied himself to the chiaroscuro, particularly to that kind of it which is called *sgraffiato*. He showed, also, much talent in his landscapes. At the sack of Rome in 1527 he fled to Naples, and on his return from that place to Rome in 1543 he was murdered by his domestic.

Caldecott, Randolph, an English artist; born in Chester, England, March 22, 1846; was a clerk in a bank, first at Whitechurch (1861-1867) and then at Manchester (1867-1872). Having developed talent for art at an early age, he was encouraged by his success in the London illustrated papers to remove to the metropolis. In 1882 he became a member of the Institute of Painters in Water-colors. He will chiefly be remembered by the admirable "Caldecott's Picture-books," which began in 1878, with "John Gilpin" and "The House that Jack Built." After vain attempts to restore his health by trips abroad, he died in St. Augustine, Fla., Feb. 12, 1886.

Calderon, Francisco Garcia (käl-dā-rōn'), a Peruvian jurist and statesman; born in Arequipa in 1834. While still a minor he was admitted to the bar, and at 21 was teaching jurisprudence. He became a member of Congress in 1867; accepted the treasury portfolio in 1868, and, after the Chilean occupation in 1883, became the head of the provisional government. Being captured by the enemy, he was retained as a prisoner at Valparaiso, and, although his election as President was confirmed, he was unable to take the office. He became President of the Senate in 1886; died Sept. 21, 1905.

Calderon, Philip Hermogenes (kal'deron), an English painter; born in Poitiers, France, of Spanish parentage, May 3, 1833; studied in London and Paris, and contributed to the Royal Academy from 1853, his subjects being chiefly historical or imaginative. He was elected an Associate in 1864, and an Academician in 1867. He exhibited at the Paris International Exhibitions of 1867 and 1878, receiving at the former the first medal awarded to English art, and at the latter a first-class medal and the Legion of Honor. In 1887 he was appointed keeper of the Royal Academy. He died in 1898.

Calderon, Serafin Estebanez (käl-dā-rōn'), a Spanish writer; born in Malaga, Spain, in 1801; was professor of poetry and rhetoric at Granada, 1822-1830, but resigned and went to Madrid. There he collected a library of old Spanish literature, especially of ballads, whether MS. or in print: the collection is in the National Library at Madrid. He wrote a volume of "Poems" (1833); a novel, "Christians and Moriscos" (1838), and a very valuable study of "The Literature of the Moriscos." He also wrote "The Conquest and the Loss of Portugal," and a charming volume of "Andalusian Scenes." He died in Madrid, Feb. 7, 1867.

Calderon de la Barca, Pedro (dā lä bär'kä), a Spanish dramatist; born in Madrid, Spain, Jan. 17, 1600; educated in the Jesuits' College, Madrid, and at Salamanca. Before his 14th year he had written his third play. Leaving Salamanca in 1625, he entered the army and served with distinction for 10 years in Milan and the Netherlands. In 1636 he was recalled by Philip IV., who gave him the direction of the court entertainments. The next year he was made knight of the order of Santiago, and he served in 1640 in the campaign in Catalonia. In 1651 he entered the clerical profession, and in 1653 obtained a chaplain's office in the Archbishop's church at Toledo. But as this situation removed him too far from court, he received, in 1663, another at the king's court chapel (being still allowed to hold the former); and at the same time a pension was assigned him from the Sicilian revenue. His fame greatly increased his income, as he was solicited by the principal cities of Spain to compose their "Sacramental Acts," for which he was liberally paid, and on which he specially prided himself. Besides heroic comedies and historical plays, some of which merit the name of tragedies, Calderon left 95 sacramental acts, 200 preludes, and 100 farces. He wrote his last play in the 80th year of his age. His smaller poems are now forgotten, but his plays have maintained their place on the stage even more than those of Lope de Vega. Their number amounts to 128. He wrote, however, many more, some of which were never published. He died in Madrid, May 25, 1681.

Calderwood, Henry, a Scotch philosopher; born in Peebles, Scotland, May 10, 1830. He was graduated at Edinburgh and ordained a Presbyterian minister (1856). He was Professor of Moral Philosophy at Edinburgh (1868-1897), and wrote "Philosophy of the Infinite," "Science and Religion," etc. He died in Edinburgh, Nov. 19, 1897.

Caldwell, Charles, an American physician; born in Caswell county, N. C., May 14, 1772; studied medicine at Philadelphia, and, in 1795, translated from the Latin,

Blumenbach's "Elements of Physiology." His writings soon became numerous. In 1819 he became Professor of the Institutes of Medicine in Transylvania University, Lexington, Ky. He subsequently founded a medical school in Louisville, where he died, July 9, 1853.

Caldwell, Charles Henry Bromedge, an American naval officer; born in Hingham, Mass., June 11, 1828. He did notable service in an expedition against a tribe of cannibals inhabiting one of the Fiji Islands, defeating them in a pitched battle and destroying their town. In the Civil War he commanded the "Itasca," taking part in the bombardment of Forts Jackson and St. Philip and the Chalmette batteries, and in the capture of New Orleans. He was promoted commodore in 1874. He died in Boston, Mass., Nov. 30, 1877.

Caldwell, James, an American patriot; born in Charlotte county, Va., in 1734. After graduating at the College of New Jersey, he became Presbyterian pastor at Elizabethtown. During the growing antagonism between the Colonies and Great Britain, he warmly took the side of the former, and when hostilities began, became chaplain to the New Jersey brigade, and took an active share in its campaigns, fighting "with the sword in one hand and the Bible in the other." He was shot by a sentinel, at the Point, New York, Nov. 24, 1781, and buried at Elizabethtown, N. J., where a costly marble monument covers the remains of the "soldier-parson."

Caledonia and **Caledonians**, the names by which the N. portions of Scotland and its inhabitants first became known to the Romans. The year 80 of the Christian era is the period when Scotland first becomes known to history. The invasion of Cæsar did not immediately lead to the permanent occupation of Southern Britain. It was only in the year 43 that the annexation of this portion of the island to the Roman empire began. It was completed superficially about 78, and two years were occupied in reconciling the natives to the Roman yoke. Agricola then moved N., invading Scotland by the E. route, and occupying the country up to the line of the Friths of Clyde and Forth.

Agricola ran defensive works across this line, and hearing, in the third year of his occupation, rumors of an organized invasion in preparation by the Caledonians, a name applied to the dwellers N. of the boundary, he resolved to anticipate them, and again advanced N. The Roman army marched in three divisions. The weakest, consisting of the 9th Legion, was attacked by the barbarians, who fought their way to the Roman camp. Agricola came to the rescue, and the Romans were victorious. The Roman army now advanced to Mons

Grampius, where they found the enemy, 30,000 strong, under a chief named Galgacus. Agricola had to stretch his line as far as he deemed prudent to prevent being outflanked. The auxiliaries and Romanized Britons were in the center and front, the legions in the rear.

The Caledonians are described as riding furiously about in chariots between the two camps. Each chief (Roman and Caledonian) made a set speech to his followers; that of Galgacus was peculiarly eloquent. The Caledonians were armed with small shields, arrows, and large pointless swords. Their chariots routed the Roman cavalry, but afterward became embarrassed in the broken ground; and when the Roman auxiliaries charged the masses of the enemy with the gladius, they gave way before a method of fighting to which they were unaccustomed. Some further maneuvers occurred, but the victory of the Romans was complete. It does not appear, however, to have been productive of great effects, as next morning the enemy had entirely disappeared. Such is the account given by Tacitus of the only one of the numerous battles between the Romans and the Caledonians of which we have a detailed description. The site of the battle remains undetermined, and the origin of the name Caledonian remains in equal obscurity. Various derivations are given of the word, but whether it was a native term, and to what exact people it applied, cannot with certainty be determined. The name Caledonian is first used by Pliny, who, as well as Tacitus, is supposed to have derived it from Agricola. The name is applied by Ptolemy to one of the numerous populations of North Britain. The use of the name by Tacitus gave it immediate popularity with the Romans, and to the same source its subsequent popularity in Britain is to be traced. Its historical importance is therefore exclusively limited to this first mention of it.

Caledonia, New, a French island in the Pacific Ocean; lying between the parallel of 20° S. and the Tropic of Capricorn, some 700 miles E. of Australia. Its length N. W. to S. E. is 250 miles, the breadth being about 35 miles. The area is 6,500 square miles. It is surrounded by coral reefs, at a distance of from 5 to 18 miles. It was discovered by Cook in his second voyage (1774), who remained on the coast a week. D'Entrecasteaux was the first who sailed completely round it (1791 and 1793). Two parallel ranges of mountains extend through the island, attaining in the N. a height of 5,570 feet. The soil is fertile, and the island produces the breadfruit tree, banana, sugar cane, arum, cocoa, and excellent timber. The climate is healthy. Iron, copper, cobalt, nickel, silver, mercury, anti-

mony, and gold have been discovered in recent years, and the nickel mines are now an important source of this metal. Coal is also found in abundance. The animals are very few, mammals and reptiles being specially deficient. The natives, known as Kanakas, were formerly given to cannibalism. They are armed with darts and clubs, but do not use the bow. Their huts are small, circular, and well built, with conical tops. Their numerous languages are described as harsh and croaking. Their dress is a girdle of fibrous bark. They also wear ornaments of bone or coral, and paint their breasts with wide black streaks. Their hair is crisp and woolly. Their skin is of a chocolate color. They are mainly Papuan in character, and are grouped in tribes, each with its own chief. In the irrigation and tillage of the soil, they show no small skill. Contact with the baser elements of civilized life has contributed much to their deterioration, and it is probable that they will soon become extinct. The chief crops of the island are maize and taro; and among the other objects of cultivation are rice, wheat, sugarcane, coffee, cotton, coconuts, etc. The imports, largely for the convict stations, are wines and spirits, flour, vegetables, etc.; and the exports include nickel, preserved meat, chrome and other ores, etc.

New Caledonia was taken possession of by the French on Sept. 24, 1853, and a small colony was formed there. During the time of the second empire it was employed as a place of banishment for criminals, a purpose which it still serves. In 1872, by a decree of the National Assembly at Versailles, New Caledonia was fixed on as the place to which the condemned Communists should be transported. The number of the condemned amounted to more than 3,000. The Communists, however, were not mixed with the ordinary criminals, but were stationed apart in the Isle of Pines, about 30 miles from the main island. In 1878 a native rising took place, during which much damage was done to life and property among the European settlers; and in order to suppress it, a large number of the natives had to be killed and many more condemned to penal servitude. The dependencies of the island are the Isle of Pines, the Loyalty Islands, the Huon Islands, the Chesterfield Islands, and the Wallis Archipelago. The whole of this territory is under a governor, advised by a council-general, and is divided into five arrondissements. A railway now connects Nouméa with Kanala. The capital, and only important town, is Nouméa, formerly called Port-de-France, with a population of 6,968. It lies in a small mountainous peninsula on an excellent bay of the same name. In 1876 the white population was 16,895, the free civil population being 3,340, the military and their families, etc.,

amounting to 2,445. In 1901 the total population was 51,415, of whom 12,253 were Europeans (citizens and military), 10,056 penal, and 29,106 Kanacs.

Calendar, a systematic division of time into years, months, weeks, and days, or a register of these or similar divisions. Among the old Romans, for want of such a register, it was the custom for the *pontifex maximus*, on the first day of the month, to proclaim (*calare*) the month, with the festivals occurring in it, and the time of new moon. Hence *calendæ* (the first of the month) and *calendar*. The periodical occurrence of certain natural phenomena gave rise to the first division of time. The apparent daily revolution of the starry heavens and the sun about the earth occasioned the division into days. The time at which a day begins and ends has been differently fixed; the reckoning being from sunrise to sunrise, from sunset to sunset, or from midnight to midnight. The day adopted for all civil purposes is the mean solar day, because the true solar day is a constantly varying quantity. The difference between the two days is, however, so slight as to be inappreciable to ordinary observation. The changes of the moon, which were observed to recur every 29 or 30 days, suggested the division into months, but the month now used, though nearly equal to a lunation, is really an arbitrary unit; and as a still longer measure of time was found necessary for many purposes, it was supplied by the apparent yearly revolution of the sun round the earth in the ecliptic. The time of this revolution has been finally determined to be 365 days, 5 hours, 48 minutes, and 50 seconds, but as it has at various times been reckoned differently, this has given rise to corresponding changes in the calendar. This division of time is called a solar year.

The division into weeks, which has been almost universally adopted, is not founded on any natural phenomenon, and as it originated in the East, it has been attributed to the divine command to Moses in regard to the observation of the seventh day as a day of rest. By other authorities it has been ascribed to the number of the principal planets, a theory supported by the names given to the days. It was not used by the Greeks, nor by the Romans till the time of Theodosius. The great influence of the sun's course on the seasons has naturally attracted the attention of men at all periods to this phenomenon; accordingly all nations in any degree civilized have adopted the year as the largest measure of time. The year of the ancient Egyptians was based on the changes of the seasons alone, without reference to the lunar month, and contained 365 days, which were divided into 12 months of 30 days each, with 5 supplementary days at the end of the year. The Jewish year consisted of lunar months of which

they reckoned 12 in the year, intercalating a 13th when necessary to maintain the correspondence of the particular months with the regular recurrence of the seasons. The Greeks in the earliest period also reckoned by lunar and intercalary months. They divided the month into three decades, a system also adopted long afterward at the time of the French Revolution. It possesses the advantage of making the smaller division an exact measure of the larger, and under it the number of a day in the 10-day period readily suggests its number in the month.

The Greeks of the time of Solon had a year of 12 months alternately of 29 and 30 days, the total number of days being thus 354, and the year being very nearly equal to a lunar one. Soon afterward a month of 30 days began to be intercalated every other year in order to reconcile their year with that founded on the sun's movement, but as the error was still very large the intercalary month was afterward omitted once in four times. The Jewish and also the Greek year thus both varied in duration according as the intercalary month was introduced or omitted. This with the uncertainty as to the exact duration of the year was a constant source of confusion.

Various plans for the reformation of the calendar were proposed from time to time; but all proved insufficient, till Meton and Euctemon finally succeeded in bringing it to a much greater degree of accuracy, by fixing on the period of 19 years, in which time the new moons return upon the same days of the year as before (as 19 solar years are very nearly equal to 235 lunations). This mode of computation, first adopted by the Greeks about 432 B. C., was so much approved of that it was engraven with golden letters on a tablet at Athens. Hence the number, showing what year of the moon's cycle any given year is, is called the golden number. This period of 19 years was found, however, to be about 6 hours too long. This defect Calippus, about 102 years later, endeavored to remedy, but still failed to make the beginning of the seasons return on the same fixed day of the year.

The Romans at first divided the year into 10 months, but they early adopted the Greek method of lunar and intercalary months, making the lunar year consist of 354, and afterward of 355 days, leaving 10 or 11 days and a fraction to be supplied by the intercalary division. This arrangement, which was placed under the charge of the pontiffs, continued till the time of Cæsar. The first day of the month was called the calends. In March, May, July, and October the 15th, in other months the 13th, was called the ides. The ninth day before the ides (reckoning inclusive) was called the nones. The other days of the month they reckoned forward to the next calends, nones, or ides, whether in the same

or the succeeding month, always including both days in the reckoning. Thus the 3d of March, according to the Roman reckoning, would be the fifth day before the nones, which in that month fall upon the 7th. The 8th of January, in which month the nones happen on the 5th, and the ides on the 13th, was called the 6th before the ides of January. Finally, to express any of the days after the ides, they reckoned in a similar manner from the calends of the following month. From the inaccuracy of the Roman method of reckoning, it appears that in Cicero's time the calendar brought the vernal equinox almost two months later than it ought to be. To check this irregularity Julius Cæsar invited the Greek astronomer Sosigenes to Rome, who, with the assistance of Marcus Fabius, invented that mode of reckoning which, after him who introduced it into use, has been called the Julian calendar. The chief improvement consisted in restoring the equinox to its proper place in March. For this purpose two months were inserted between November and December, so that the year 707 (46 B. C.), called from this circumstance the "year of confusion," contained 14 months. In the number of days the Greek computation was adopted, which made it $365\frac{1}{4}$. The number and names of the months were kept unaltered, with the exception of Quintilis, which was henceforth called in honor of the author of the improvement Julius. To dispose of the quarter of a day it was determined to intercalate a day every fourth year between the 23d and 24th of February. This was called an intercalary day, and the year in which it took place was called an intercalary year, or as we term it, a leap year.

This calendar continued in use among the Romans until the fall of the empire, and throughout Christendom till 1582. The festivals of the Christian Church were determined by it. With regard to Easter, however, it was necessary to have reference to the course of the moon. The Jews celebrated Easter (that is, the Passover) on the 14th of the month Nisan (or March); the Christians in the same month, but always on a Sunday. Now, as the Easter of the Christians sometimes coincided with the Passover of the Jews, and it was thought unchristian to celebrate so important a festival at the same time as the Jews did, it was resolved at the Council of Nice, A. D. 325, that from that time Easter should be solemnized on the Sunday following the first full moon after the vernal equinox, which was then supposed to take place on the 21st of March. As the course of the moon was thus made the foundation for determining the time of Easter, the lunar cycle of Meton was taken for this purpose; according to which the year contains $365\frac{1}{4}$ days, and the new moons, after a period

Calendar

of 19 years, return on the same days as before. The inaccuracy of this combination of the Julian year and the lunar cycle, must have soon discovered itself on a comparison with the true time of the commencement of the equinoxes, since the received length of $365\frac{1}{4}$ days exceeds the true by about 11 minutes; so that, for every such Julian year, the equinox receded 11 minutes, or a day in about 130 years. In consequence of this, in the 16th century, the vernal equinox had changed its place in the calendar from the 21st to the 10th; that is, it really took place on the 10th instead of the 21st, on which it was placed in the calendar.

Luigi Lilio Ghiraldi, frequently called Aloysius Lilius, a physician of Verona, projected a plan for amending the calendar, which, after his death, was presented by his brother to Pope Gregory XIII. To carry it into execution, the Pope assembled a number of prelates and learned men. In 1577 the proposed change was adopted by all the Catholic princes; and in 1582 Gregory issued a brief abolishing the Julian calendar in all Catholic countries, and introducing in its stead the one now in use, under the name of the Gregorian or reformed calendar, or the "new style," as the other was now called the "old style." The amendment ordered was this: Ten days were to be dropped after the 4th of October, 1582, and the 15th was reckoned immediately after the 4th. Every 100th year, which by the old style was to have been a leap year, was now to be a common year, the fourth excepted; that is, 1600 was to remain a leap year, but 1700, 1800, 1900 to be of the common length, and 2000 a leap year again. In this calendar the length of the solar year was taken to be 365 days, 5 hours, 49 minutes, and 12 seconds, the difference between which and subsequent observations is immaterial. In Spain, Portugal, and the greater part of Italy, the amendment was introduced according to the Pope's instructions. In France the 10 days were dropped in December, the 10th being called the 20th. In Catholic Switzerland, Germany, and the Netherlands, the change was introduced in the following year; in Poland in 1586, in Hungary in 1587. Protestant Germany, Holland, and Denmark accepted it in 1700, and Switzerland in 1701. In the German empire a difference still remained for a considerable time as to the period for observing Easter. In England the Gregorian calendar was adopted in 1752, in accordance with an act of Parliament passed the previous year, the day after the 2d of September becoming the 14th. Sweden followed in 1753. The change adopted in the English calendar in 1752 embraced another point. There had been previous to this time various periods fixed for the commencement of the year in various countries of Europe. In France, from the time of

Calenders

Charles IX., the year was reckoned to begin from the 1st of January; this was also the popular reckoning in England, but the legal and ecclesiastical year began on March 25. The 1st of January was now adopted as the beginning of the legal year, and it was customary for some time to give two dates for the period intervening between January 1 and March 25, that of the old and that of the new year, as January $175\frac{2}{3}$. Russia alone retains the old style, which now differs 12 days from the new.

In France, during the revolutionary epoch, a new calendar was introduced by a decree of the National Convention, Nov. 24, 1793. The new reckoning was to begin with Sept. 22, 1792, the day on which the first decree of the new republic had been promulgated. The year was made to consist of 12 months of 30 days each, and, to complete the full number, five fête days (in leap years six) were added at the end of the year. Instead of weeks, each month was divided into three parts called decades, consisting of 10 days each; the other divisions being also accommodated to the decimal system. The names of the months were so chosen as to indicate, by their etymology, the time of year to which they belonged. They were as follows: Autumn, from Sept. 22 to Dec. 22: *Vendémiaire*, vintage month (October); *Brumaire*, foggy month (November); *Frimaire*, sleet month (December). Winter, from Dec. 22 to March 22: *Nivôse*, snowy month (January); *Pluviôse*, rainy month (February); *Ventôse*, windy month (March). Spring, from March 22 to June 22: *Germinal*, bud month (April); *Floréal*, flower month (May); *Prairial*, meadow month (June). Summer, from June 22 to Sept. 22: *Messidor*, harvest month (July); *Thermidor*, hot month (August); *Fructidor*, fruit month (September). The 10 days of each decade were called (1) *Primidi*, (2) *Duodi*, (3) *Tridi*, (4) *Quartidi*, (5) *Quintidi*, (6) *Sextidi*, (7) *Septidi*, (8) *Octidi*, (9) *Nonidi*, (10) *Decadi* (the Sabbath). This calendar was abolished at the command of Napoleon, by a decree of the senate, Sept. 9, 1805, and the common or Gregorian calendar reestablished on Jan. 1 of the following year. Of calendars projected since then we may mention that put forward by Auguste Comte in 1849, by which a separate name is given to every day in the year, while the months and weeks have also particular names, all arranged upon a principle of hero-worship. Moses, Homer, Aristotle, Shakespeare, Descartes, Cæsar, St. Paul, etc., are honored with months; while minor individuals, such as Ulysses, Romulus, Socrates, and Plato have days assigned to them.

Calenders, a sect of dervishes in Turkey and Persia. They preach in the market places and live upon alms. Their name is derived from their founder.

Calends

Calends, the first day of the month among the Romans. THE GREEK CALENDs, a time that never occurred; an ancient Roman phrase which originated in the fact that the Greeks had nothing corresponding to the Roman calends.

Calendula. See MARIGOLD.

Calgary, a city of the province of Alberta, Canada, at the confluence of the Bow and Elbow rivers, and on the Canadian Pacific railway, 425 miles directly E. N. E. of Vancouver and 642 miles by rail, 750 miles directly W. of Winnipeg and 840 miles by rail. There are connections with the Canadian Northern and Grand Trunk Pacific railways. The city is situated near the foothills of the Rocky mountains, 3,430 feet above sea level, and is built of light-gray stone quarried in the vicinity. Area, 12 square miles.

Buildings, Institutions, etc.—The principal buildings are the city hall, Western Canada College, Burns block, Hudson's Bay Company's store, Alberta Hotel, Normal School, Roman Catholic and Episcopal cathedrals, Methodist church, Bank of Montreal, and other bank buildings. There are three parks: Victoria, 90 acres; Metrata, in the west end; and St. George's Island, 20 acres, on the Bow river.

Calgary is the seat of an Episcopal and a Roman Catholic bishop, and the Presbyterians and Methodists have fine churches here. The educational institutions include, besides the Western Canada College and the Normal School, St. Hilda's Ladies' College, Convent of the Sacred Heart, a high school, and the public schools. Among the charitable institutions are the General Hospital, Holy Cross Hospital, and a sanitarium for consumptives. There are 5 clubs: the Ranchers, Alberta, Canadian, Young Men's, and St. Mary's; the Lyric Theater; and the Alberta, Yale, Grand Union, Royal Dominion, and Queen's hotels. There are three daily newspapers: the "Herald," the "Alberta," and the "News." The "Prairie" is a weekly. Calgary is an important station of the Northwest Mounted Police and of the Hudson's Bay Company.

Industry, Commerce, etc.—The city is the trading center for one of the finest live-stock regions on the continent, the headquarters for supplies for the surrounding mining districts in the mountains, and the milling center for a district producing immense crops of winter wheat. Rye, barley, oats, potatoes, and hay are also grown, and there are coal and building stone in abundance. The leading manufactures are lumber, Portland cement, beer, flour, sashes and doors, etc. There are also cold-storage plants and meat-packing establishments. The annual value of manufactured output is over \$8,000,000, and the annual wholesale business is about \$22,000,000. The water works, electric lighting plant, and the street railway system are owned and operated by the

Calhoun

municipality. The assessed value of taxable property in 1907, including new additions to the city limits, was \$18,832,496; the municipal assets amounted in that year to \$1,250,000, and the debt was \$735,950.

Both wheat-growing and mixed farming in the surrounding district have been made more profitable by the great irrigation scheme of the Canadian Pacific railway. The irrigation works are designed to irrigate 3,000,000 acres of land on both sides of the railway between Calgary and Medicine Hat, the water supply being taken from the Bow river at Calgary. The main intake canal is 17 miles long, 60 feet wide at the bottom, and 120 feet wide at the water line. Pop. (1901) 4,091; (1906) 11,967; local est. (1907) 20,711.

Calhoun, John Caldwell, an American statesman; born in Abbeville district, S. C., March 18, 1782; graduated with distinction at Yale College in 1804, and was admitted to the South Carolina bar in 1807. After serving for two sessions in the legislature of his native State, he was elected to Congress in 1811. From that time until his death, a period of nearly 40 years, he was seldom absent from Washington, being nearly the whole time in the public service, either in Congress or in the Cabinet. When he first entered Congress, the difficulties with England were fast approaching actual hostilities, and he immediately took part with that section—the Young Democracy, as they were termed—of the dominant party, whose object it was to drive the still reluctant administration into a declaration of war. They succeeded, and, as a member of the Committee on Foreign Relations, he reported a bill for declaring war, which was passed in June, 1812. When Monroe formed his administration in 1817, Calhoun became Secretary of War, a post which he filled with great ability for seven years, reducing the affairs of the department from a state of confusion to simplicity and order. In 1824 he was chosen Vice-President of the United States under John Q. Adams, and again, in 1828, under General Jackson. With the latter he did not long continue in amicable political relations, but entered into fierce opposition when the President and a majority of Congress determined to enforce submission to the law of 1828, imposing a heavy protective tariff. It was at this period that he broached his famous "Nullification Doctrine," which is substantially that the United States is not a union of the people, but a league or compact between sovereign States, any of which has a right to judge when the compact is broken, and to pronounce any law to be null and void which violates its conditions. In short, Calhoun was the first great advocate of the doctrine of secession. From this time forward, that is, for the last seventeen years of his public service, he hardly aspired

to be considered a national statesman acting for the whole country; he was content—he was even proud to be viewed only as a Southern statesman. Hence his advocacy of the extreme doctrine of State Rights; his censure of the Missouri Compromise, passed thirteen years before, when he was himself in the Cabinet; his support of all measures tending to the extension of slave-holding territory; and, finally, his proposal to amend the Constitution by abolishing the single office of the presidency, and creating two presidents, one for the North and the other for the South, to be in office at the same time. The place in which he advocated these doctrines was his own favorite arena—the United States Senate, where he continued for the rest of his life, except for a short time at the close of Mr. Tyler's administration, when he accepted the office of Secretary of State, in order to complete a favorite measure—the annexation of Texas. He died in Washington, March 31, 1850.

Calico Printing, the art of producing on calico or cotton cloth variegated patterns by the process of printing, the object as a rule being to have the colors composing the designs as fast as possible to washing and other influences. The origin of the art of calico printing is probably coeval with that of dyeing (*q. v.*). India is generally regarded as the birthplace of calico printing, and the word calico is derived from the name of the Indian town Calicut, where it was at one time extensively manufactured and printed. Calico printing, as an Egyptian art, was first described by Pliny in the first century. Indian printed chintz calicoes were introduced into Europe by the Dutch East India Company, and the first attempts at imitating them in Europe are said to have been made in Holland, but at what exact date is uncertain. The art, however, soon spread to Germany and England, where it is said to have been introduced about 1676. At the present time the chief seats of the calico printing trade in Great Britain are in the neighborhood of Glasgow and Manchester. The chief European seat of calico printing is Mülhausen (Alsace), Germany, and it is practised in various towns in France, Austria, Russia, Switzerland, Holland, and the United States. Calico printing is a process highly complex in character, and one requiring delicate skill. It enlists not only the coöperation of the arts of designing, engraving, bleaching, and dyeing, but also the science of chemistry, which is an important element in its successful accomplishment.

The first operation to which the gray calico, as it comes from the loom, is submitted is that of singeing. This consists in burning off the loose downy fibers from the surface by passing the pieces rapidly, in an open and stretched condition, over red-hot plates or a row of smokeless Bunsen gas

flames. The next operation is that of bleaching, which consists in boiling the fabric with weak alkaline solutions, followed by a treatment with cold dilute solutions of bleaching powder and acid, interspersed with frequent washings with water. A number of pieces are now stitched together, wrapped on a wooden roller, and passed through a shearing machine, after which the calico is ready for the printer.

The printing of the patterns upon the cloth may be carried out in various ways, the earliest method being by means of wooden blocks, on which the figures of the patterns stand out in relief. Where several colors are employed in one pattern, a block for each color is necessary. In a set of blocks for one pattern, each block, although at first having the same design drawn upon it, is cut in such a manner that it ultimately transfers only a single color, which appears in different parts of the pattern. To insure accurate juxtaposition of the colors, each block is furnished with brass points at the corners in order to guide the workman. The printer first furnishes the face of the block with the requisite color by pressing it several times on a piece of woolen cloth suitably stretched and supported on a so-called color-sieve, and which has been previously brushed over with color by a boy attendant. The printer then applies the block to the surface of the calico, which is stretched on a long table covered with felt, striking the back of the block with his hand or with a small mallet. The operation of block printing is slow and tedious.

The modern method of printing, which dates from 1785, is effected by means of engraved copper cylinders, and this method has now practically superseded all others.

The method of engraving employed varies according to the kind of pattern to be put on the roller. In the case of very large patterns the figures are engraved by hand on the cylinders themselves with the use of the ordinary tools of the copper-plate engraver. For smaller designs, however, which are often repeated, it is usual in the first instance to engrave the pattern by hand on a very small cylinder of soft steel in intaglio. This die is then tempered to a high degree of hardness, and by means of machinery is pressed against another cylinder of soft steel, on which the pattern is thus made to appear in relief. This last cylinder, called the mill, is then hardened, and being pressed against the copper cylinder, the figures are indented and the roller is ready for use. In the first instance, the original pattern of the designer has always to be reduced or enlarged, so as to repeat an exact number of times over the roller to be engraved. In order to reduce the amount of skilled labor, one repeat only of the pattern is engraved on the die; the mill, which is of larger diameter, has two,

three, or four repeats; while the number of repeats on the circumference of the copper cylinder is still greater. A third method of engraving, which has now largely superseded the foregoing, is that of etching, in conjunction with the pentagraph or pantograph system of transferring the design to the copper roller. The roller, being coated uniformly with a bituminous varnish, has the pattern traced on the varnish in the pentagraph machine by a set of diamond points, and it is then submitted for a very brief period to the action of nitric acid. In the parts where the pattern has been traced the varnish is removed, there the copper is speedily attacked by the acid, and the pattern is thus etched upon it. After removing the varnish the roller is ready for printing.

The cylinder printing machine consists of a large central iron drum, around which are arranged one or more engraved copper rollers, according to the number of colors to be printed simultaneously. Each roller is provided with the means of making several adjustments, in order to determine the exact position of the color which it prints. The central drum is wrapped with cloth, and it is further provided with an endless blanket and back-cloth, so as to present a yielding surface to the printing rollers. The cloth to be printed passes from a roll behind the machine, round the central drum, in a tightly stretched condition, while the several printing rollers press forcibly against it. Each roller as it revolves is fed with color from a small trough below, the superfluous color being scraped off the plain surface of the roller by means of a sharp-edged steel blade, or "doctor," thus leaving the color only in the engraved portions. As the rollers thus charged with color press against the cloth the latter absorbs or withdraws the color from the engraving, and the pattern is thus transferred to the calico. By this machine as much work can be performed in three minutes as could be done by block-printing in six hours. After the cloth has received the impression from the rollers it passes over a series of steam-heated flat iron chests, or cylinders, and is thus dried.

In close connection with the printing machine department is the so-called color house or color shop, where the solutions of coloring matters are suitably thickened and made ready for the printer. The color house is provided with numerous steam-heated copper pans, so arranged on supports that they can be readily turned over for emptying or cleaning. The color mixtures are stirred with wooden blades by hand, or by mechanical agitators, and carefully strained through cloth before use. The thickening of the color solutions with starch, flour, gum, dextrin, albumen, etc., is necessary to prevent the spreading of the color by capillary attraction beyond the printed parts, and thus

ensure sharp and neat impressions. Near the color house is a well-appointed chemical laboratory, and a drug-room containing the store of coloring matters, dyewood extracts, thickenings, chemicals, etc.

The various classes or styles of calico-prints are usually arranged either according to the chief dyestuffs employed or their mode of application. Each of these primary styles may be further separated into subdivisions, of which the most important are the discharge and resist styles, which refer to the manner in which the pattern is produced. The following include the chief styles of calico-prints at present in vogue:

Madder Style.—This is so named because the chief dyestuff formerly employed in it was madder. This dyestuff belongs to the class of so-called mordant-colors. Such dyestuffs are worthless if employed alone by the calico-printer, and only furnish useful colors if applied in conjunction with certain metallic salts or mordants, of which the chief ones here employed are the acetates of aluminum and iron. At first the pattern is printed on the white calico with these or similar mordants alone, and only after they have been suitably fixed is the madder or other similar coloring matter applied in the dye bath, where for the first time the desired colored pattern appears. The aluminum mordant yields red and pink, iron yields purple or black, a mixture of iron and aluminum yields chocolate, etc. The fixing of the mordant after printing and drying is effected by passing the printed calico through the so-called ageing-machine, a large chamber suitably heated and charged with moisture, where the acetic acid of the printed mordants is driven off, leaving the aluminum salt in an insoluble form on the calico. A more complete fixing of the mordant is subsequently effected by passing the fabric through solutions containing silicate or arseniate of soda, and a final washing completes its preparation for dyeing. The dyeing operation consists in boiling the fabric in a solution or decoction of the requisite dyestuff. After dyeing, the stained unprinted portions are cleansed and purified, while the printed colors are rendered more brilliant by washing, soaping, coloring, etc. Variety of effect is produced by printing the same fabric two or three times with various designs (print, cover, pad) before proceeding to the ageing, etc. If in the first instance a portion of the pattern is printed with lime juice (citric acid), it resists or prevents the fixing of the mordants applied over it in the second and third printings, and the part remains undyed and appears as a so-called resist white. In a similar manner stannous chloride, mixed with aluminum acetate before printing, resists the fixing of iron mordants printed over the aluminum mordant, and a resist red pattern under a purple cover is obtained, pre-

suming madder to be the dyestuff employed. Alizarin now replaces the madder formerly used, and similar variegated effects are obtained if other mordant dyestuffs are employed, *e. g.*, cochineal, quercitron bark, etc. Formerly a preparation of madder termed garancine was largely employed, and gave rise to the garancine style, in which the colors were fuller and darker, the prevailing hues being browns, chocolates, drabs, etc. Since the range of colors yielded in the madder style is limited, additional colors, *e. g.*, green, blue, yellow, may be printed in by block after dyeing, etc., and are fixed by steaming. If the whole fabric is evenly impregnated with mordant by means of a "padding-machine" and dried, and then a pattern is printed over the mordant with lime juice, the mordant is removed or discharged in the printed parts, and remains white in the subsequent dyeing. Such a print would be termed a padded style with discharge white.

Steam Style.—Many coloring matters, differing from each other widely in character, are fixed by the operation of steaming instead of by dyeing, so that this style is somewhat varied in character. Ordinary steam-colors consist of a thickened mixture of dyewood extract and mordant, with the addition of assistant metallic salts and acids. The mixture is printed upon the white calico, which, after drying, is exposed from a half to one hour in closed chambers to the action of steam. This steaming operation effects the combination of the coloring matter and mordant, and the color is thus developed and at the same time fixed upon the calico. Black is produced with logwood extract and chromium acetate, scarlet is produced with cochineal extract and stannous chloride. The prints are washed and dried after steaming, the colors being usually bright, but not very fast. Steam-colors, fast to light and soap, are obtained in a similar manner by printing mixtures of alizarin and allied coloring matters with mordants, and then steaming. These are used in the so-called madder extract or steam alizarin style, in which red, pink, purple, etc., appear. In the pigment style use is made of pigments, *i. e.*, insoluble colored mineral powders, *e. g.*, ultramarine-blue, chrome yellow, Guignet's green, etc. These are mixed with a solution of egg or blood albumen, printed, and steamed. The albumen coagulates on steaming, and thus adheres firmly to the cloth, at the same time inclosing the pigments within the coagulum. Such colors are fast to light and soap, and may therefore be printed simultaneously with the steam alizarin colors for the production of variegated fast prints. Another class of colors are the so-called basic colors, *e. g.*, magenta, aniline blue, etc. Their solutions may also be thickened with albumen, printed, and steamed, to give fast steam-

colors. It is more usual, however, to print a mixture of the thickened color solution and tannic acid, and to pass the steamed print through a boiling solution of tartar emetic. By this means an insoluble color-lake (tannate of antimony and color-base) is fixed on the calico, which is fast to soaping, but not to light. Basic colors applied in this manner are now very usually printed along with the steam alizarin colors, instead of pigments thickened with albumen, and variegated fast prints are thus obtained. Loose pigment colors are basic colors thickened with starch or gum tragacanth only, and then steamed. Such prints do not even stand washing with cold water.

Turkey-red Style.—In this style use is made of the fact that Turkey red is at once bleached by the action of chlorine. Plain dyed Turkey-red calico is printed with tartaric acid, dried, and passed through a solution of bleaching powder. In the printed parts chlorine gas is evolved, the red is destroyed, and a white discharge pattern is produced. A blue pattern results if Prussian blue is added to the printing mixture; yellow is obtained if a lead salt is added, and the fabric is afterward passed through bichromate of potash solution, whereby yellow chromate of lead is produced; green results from a mixture of the blue and yellow; black is printed direct. These and other discharge colors may also be obtained by other methods.

Indigo Style.—Of the numerous indigo styles in use it is only possible to refer to one or two of the most important. Indigo blue patterns on a white ground are obtained by printing a thickened mixture of finely ground indigo and caustic soda on white calico previously impregnated with glucose. A subsequent steaming reduces the indigo to indigo white, and causes it to penetrate the fiber, while a final washing oxidizes, regenerates, and fixes the color. A resist white pattern on a blue ground is obtained by first printing upon white calico a resist paste composed of gum or flour, China clay, sulphate of copper, etc. When the printed calico is dyed in the indigo vat the paste resists the entrance of the color, partly in a mechanical and partly in a chemical manner, hence the blue is only fixed in those parts which are unprotected by the paste, after the removal of which by washing the white pattern appears. Various resist colors, *e. g.*, yellow, green, etc., are obtained by the addition of different chemicals to the paste and altering the after-processes. A discharge white pattern on a blue ground is obtained by printing on plain indigo blue dyed calico a solution of bichromate of potash thickened with gum, and then passing the fabric through a solution containing sulphuric and oxalic acids. During this passage there is liberated, in the printed parts only, chromic acid, which

at once oxidizes and destroys the blue, producing the desired white pattern. Colored discharge patterns are produced similarly by employing albumen thickening instead of gum thickening, and adding to the printing mixture such pigments as are not affected by acids, *e. g.*, vermilion, chrome yellow, Guignet's green, etc.

Bronze Style.—Manganese brown or bronze is decolorized by reducing agents, hence white discharge patterns on a bronze ground are obtained by printing plain manganese brown dyed calico with a mixture of stannous chloride and oxalic acid, and then steaming. Colored discharge patterns are obtained if coloring matters are added to the printing mixture which are not affected by reducing agents, or which even require stannous chloride as a mordant to develop the color, *e. g.*, Prussian blue, chrome yellow, Persian berry yellow, Brazil wood pink, safranine, acridine orange, etc.

Aniline Black Style.—Aniline black being a product of the oxidation of aniline, patterns in this color on a white ground are obtained by printing a thickened solution of aniline hydrochloride containing the oxidizing agent, sodium chlorate, and a salt of copper or vanadium. When the printed fabric is slightly steamed or exposed to a moist, warm atmosphere, the impression, which is at first devoid of color, gradually becomes dark green, and this by a final treatment with an alkaline solution, soap, etc., changes at once to a rich black. The color is extremely fast to light, alkalis, acids, etc., and it is largely employed by the printer, both alone and in conjunction with dyed or steam colors. The development of the black during the ageing or oxidizing process only occurs in the presence of a mineral acid, hence resist whites are obtained by first printing the design on the white calico with thickened solutions of substances of an alkaline or reducing character, or salts of organic acids, *e. g.*, acetate of soda, and then printing or padding over all with the aniline black mixture, ageing, steaming, etc. Where the design is printed the alkalinity entirely prevents the development of the black. Pigment colors thickened with albumen, also certain benzidine colors, containing an admixture of chalk, acetate of soda, etc., are largely employed in this manner. These resist colors may also be printed immediately after the application of the aniline black mixture, before the development of the color by ageing.

Azo Color Style.—The so-called insoluble azo colors result from the interaction of an azo compound and a phenol. Two methods of printing based upon this principle are employed. One method is to print the design with a thickened solution of β -naphthol on the white calico, and then pass the fabric through a very cold solution of the azo compound (developing bath), when the

design at once appears in a color corresponding to the azo compound employed. Another method is to print the design with a thickened solution of the azo compound upon calico which has been previously impregnated with a solution of sodium-naphthol and dried; in this case the color of the design is developed in the moment of impression. The necessary azo compounds are obtained by the action of nitrous acid on salts of amido substances, *e. g.*, parani-traniline, naphthylamine, nitrotoluidine, dianisidine, etc., each of which yields a distinct color, bright red, claret red, orange, blue, etc. The naphthol-prepared cloth and also the azo compounds are somewhat unstable so that this style is not successfully printed without considerable care. The insoluble azo colors, also the direct or benzidine colors, are capable of furnishing discharge patterns, since, in common with the azo colors generally, they are readily decomposed and destroyed by reducing agents. It suffices to print calico dyed with these colors, *e. g.*, benzopurpurine, chrysophenine, benzoazurine, Mikado brown, etc., with a mixture containing stannous acetate, zinc powder, or other similar reducing agent, and then steam the printed fabric, to obtain white discharge patterns. If there be added to the printing mixture such mordants and coloring matters as are not affected by reducing agents, *e. g.*, safranine, auramine, etc., a variety of colored discharges are obtained, exactly as in the bronze style. Many of the benzidine colors may also be printed direct on white calico to furnish color designs, but such prints are not particularly fast to washing.

Calicut, a seaport of India, in the presidency of Madras, on the Malabar coast, which was ceded to the British in 1792. It was the first port in India visited by Europeans, Pedro da Covilham having landed here about 1486, and Vasco da Gama in 1498. It has considerable trade, and manufactures cotton cloth, to which it has given the name calico. Pop. (1901) 75,510.

Calif, or Khalif. See CALIPH.

California, a State in the Western Division of the North American Union, bounded by Oregon, Nevada, Arizona, Lower California, and the Pacific Ocean; land area, 155,980 square miles; admitted to the Union Sept. 9, 1850; number of counties, 57; pop. (1900) 1,486,053; (1910) 2,377,549; capital, Sacramento.

Topography.—The surface of the State is very mountainous, being traversed by two ranges extending in a N. W. and S. E. direction. The Coast Range, consisting of a number of broken ridges, has an average width at the base of 65 miles, and varies from 1,000 to 8,000 feet in height. The highest peaks are Mt. Ripley, 7,500 feet, and Mt. Downie, 5,675 feet. The Sierra Nevada

Mountains join the Coast Range and extend along the E. border of the State for about 450 miles, with nearly 100 peaks exceeding 10,000 feet in height, the highest being Mt. Whitney, 14,898 feet, Mt. Tyndall, 14,386 feet, and Mt. Shasta, 14,350 feet. Between these ranges is a basin, at some early time the bed of a lake, about 450 miles in length, the N. section known as the Sacramento Valley, and the S. section as the San Joaquin Valley. This valley contains Tulare Lake, and is drained by the Sacramento and San Joaquin rivers. The coast line is irregular, with numerous capes and bays, affording many good harbors. San Francisco Bay is the largest and best harbor on the Pacific coast.

Geology.—The mountainous parts of California consist almost entirely of volcanic rocks, with many extinct craters. Tertiary and cretaceous sandstones are found in the foothills and along the coast range, while the central mass of the Sierras and their highest peaks are of granite. Metamorphic formations are found in the N. W., and extend along the Sierra and San Bernardino mountains, and the detached triassic and jurassic fields bordering the Sierras are known as the auriferous or gold belt.

Mineralogy.—California was for many years the first State in the Union in the production of gold, but it has now dropped to second place. As early as 1841 gold was obtained by washing near the San Fernando Mission. In 1848 the discovery at Coloma of large gold deposits started the up-building of California. At first mining was carried on by washing the river gravel, and in 1851 sluices were built through which the water was passed. These sluices were filled with blocks of wood or stones, which collected the gold as it sank. Digging was carried on also, and in 1852 an hydraulic system was introduced, by which great streams of water were turned against the gravel banks. This process was successful, but by it the banks were rapidly swept away and the detritus threatened to choke the rivers, so that its use was soon prohibited by law. Gold is found in the metallic state, often associated with silver and other metals, on the slopes of the Sierras. It is also found in streams and alluvial deposits in coarse grains, and quartz deposits where it is extracted by amalgamation. A very rich quality of silver occurs in small quantities, and magnetic iron and cinnabar abound in the Sierras. Pyrites of iron and copper are found in gold-bearing quartz, and a rich variety of argentiferous galena occurs in San Bernardino county. Other valuable mineral products are: tin, plumbago, cobalt, granites, marbles, sandstones, hydraulic limestones and bituminous coal. Diamonds, onyx and other precious stones abound, and bitumen and petroleum are

found in many places. In 1898–1899 there was a great boom in the mineral oil productions in the Los Angeles district, and, although the business is still in its infancy, it bids fair to become one of California's greatest industries. In Los Angeles alone, in 1900, there were 750 wells working and many new ones under construction. In 1898, California produced 756,483 fine ounces of gold, valued at \$15,637,900; 642,300 fine ounces of silver, valued at \$830,448; 31,092 flasks (of 76½ pounds each) of quicksilver, and 2,257,207 barrels of petroleum, valued at about \$1 per barrel. In 1900, the Director of the Mint estimated the gold output at \$15,197,800, an increase over that of the preceding year, while the silver output decreased to \$494,580.

Soil.—The soil varies with the surface conditions of the State. In the elevated portions it is rich, mellow, and easily worked, and timber land abounds. In the lower portions the soil varies from a rich loam to a heavy clay or adobe. What was formerly considered desert land can now, under irrigation, be turned into valuable agricultural districts. See BIG TREES.

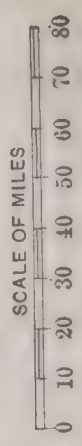
Agriculture.—The State is very rich in its agricultural interests. During the calendar year 1900, hay was the most valuable product, yielding 2,708,171 tons, valued at \$22,071,594; wheat, 28,543,628 bushels, valued at \$16,555,304; barley, 14,856,170 bushels, valued at \$6,388,153; corn, 1,351,975 bushels, valued at \$824,705; potatoes, 2,788,032 bushels, valued at \$1,477,657; oats, 3,282,770 bushels, valued at \$1,345,936; and rye, 502,580 bushels, valued at \$291,496. There were (1899) 321,729 horses, valued at \$12,432,429; 48,628 mules, valued at \$2,360,713; 2,001,501 sheep, valued at \$5,710,282; 308,872 milch cows, valued at \$10,424,430, and 604,881 other cattle, valued at \$14,864,947.

Commerce.—During the calendar year 1900, the imports of merchandise at the custom houses at San Francisco was \$39,402,935; San Diego, Humboldt, and Los Angeles aggregated \$40,867,777, and the exports at all ports (San Francisco, \$37,940,334), \$39,761,592. The trade in gold and silver ore, bullion, and coin, was, imports at San Diego and San Francisco, \$28,525,670; exports at San Francisco, \$10,057,872, giving a total foreign trade during the year of \$119,212,911. In 1899 there were 527 American and 464 foreign vessels entered, and 506 American and 394 foreign vessels cleared, making a total of 1,891 vessels engaged in the foreign commerce of the State.

Manufactures.—In 1900 there were reported 12,582 manufacturing establishments, employing \$205,395,025 capital and 98,931 persons; paying \$55,786,776 for wages and \$188,125,602 for materials; and having a combined output valued at \$302,874,761. The principal industries, accord-

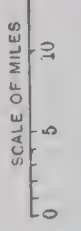


CALIFORNIA



- State Capitol
- County Seats
- Indian Reservation Boundaries
- Military Reservation Boundaries
- Forest Reserve Boundaries

SAN FRANCISCO AND VICINITY





PART OF
SOUTHEASTERN CALIFORNIA
SAME SCALE AS MAIN MAP

Hammond's 8 x 11 Map of California
Copyright, 1905 by C.S. Hammond & Co., N.Y.

B 123° C 122° D 121° E 120° Longitude 119° from G Greenwich 118° H 117° J 116°

California

ing to the value of output, were refined sugar and molasses (\$15,909,998); lumber and timber products (\$13,764,647); flour and grist (\$13,100,944); canned fruits and vegetables (\$13,081,829); foundry and machine shop products (\$12,047,149; slaughtering and meat-packing, wholesale (\$8,232,680); carpentering (\$7,816,386); railroad cars (\$7,553,626); leather (\$7,405,981).

Banking.—In 1900 there were 39 National banks in operation, having \$11,012,500 in capital, \$4,619,975 in outstanding circulation, and \$6,972,856 in reserve. There were also 178 State banks, with \$26,981,973 in capital, \$85,881,584 in deposits, and \$146,495,782 in resources. In the year ending Sept. 30, 1900, the exchange at the United States clearing houses in San Francisco and Los Angeles aggregated \$1,131,975,069, an increase in a year of \$130,140,309.

Education.—In 1899 the school population was 357,200; the enrollment in the public schools, 253,397, and the average daily attendance, 203,248. There were 3,565 public school buildings; 8,157 teachers; public school property valued at \$18,682,634; receipts of the year \$5,869,034, and expenditures, \$6,164,053. The State held in trust for the public schools and the State University interest-paying bonds amounting to \$2,277,500. For higher education there were 96 public high schools, 63 private secondary schools, four public and three private normal schools, 12 universities and colleges for men and for both sexes and Mills College and the College of Notre Dame at San Jose, for women. Among the best known private secondary schools are the University Academy at Alameda; Los Angeles Military Academy at Los Angeles; St. Vincent's Academy, at Petaluma; the Convent of Our Lady of the Sacred Heart, at Oakland; Sacred Heart College, at San Francisco; and the Dominican College, at San Raphael. The principal universities and colleges are, University of California (opened 1869, non-sectarian); Leland Stanford Junior University (1891, non-sectarian); St. Ignatius College (1855, Roman Catholic); Santa Clara College (1851, Roman Catholic), and the University of Southern California (1880, Methodist Episcopal). See **LELAND STANFORD UNIVERSITY: UNIVERSITY OF CALIFORNIA.**

Churches.—The strongest denominations in the State are the Roman Catholic, Methodist Episcopal, Presbyterian, Congregational, Baptist, Protestant Episcopal, Lutheran, and Disciples of Christ. All denominations reported in 1890: organizations, 1,996; churches and halls, 1,505; members, 280,619; and value of church property, \$11,961,914. In 1899 there were 1,187 Evangelical Sunday Schools, with 9,187 officers and teachers and 82,683 scholars.

Railroads.—The total length of railroads

California

within the State, Jan. 1, 1900, was 5,461 miles, of which 169 miles were constructed during the previous year. The assessed valuation of railroad, telegraph, and express property was \$46,394,275.

Post Offices and Periodicals.—In 1901 there were 1,659 post offices of all grades, and 681 periodicals, of which 111 were daily, 2 tri-weekly, 21 semi-weekly, 435 weekly, 1 bi-weekly, 6 semi-monthly, 100 monthly, 3 bi-monthly, and 2 quarterly.

Finances.—The assessed valuation of all taxable property in 1900 was \$1,218,228,588. The total bonded debt Sept. 1, 1900, was \$2,281,500, of which \$1,526,500 was held in trust for the public schools and \$751,000 for the State University. There were also outstanding bonds aggregating \$600,000, not included in the public indebtedness because payable out of collections by the harbor commissioners. Of this amount the State School Funds held \$200,000.

State Government.—The Governor is elected for a term of four years and receives a salary of \$6,000 per annum. Legislative sessions are held biennially, beginning on the first Monday after January 1, and are limited to 60 days each. The legislature has 40 members in the Senate and 80 in the House, each of whom receives \$8 per day and 10 cents mileage. There are eight Representatives in Congress. The State government in 1904 was Republican.

History.—The name California was applied to an island in the Pacific in 1521, and, sometime between 1535 and 1549, was also applied to that part of North America now known as California and Lower California. Several Spanish and English explorers visited this section during the 16th and 17th centuries, and in 1769 the Franciscan monks founded San Diego and soon afterward many other missions, including Dolores at San Francisco, 1776. In 1826 the first American emigrant train entered the present limits of the State, and in 1840 Monterey was made the capital. The United States tried to form an alliance with California in 1846; but the Americans already settled there seized Sonoma and proclaimed a republic. At the outbreak of the Mexican War, San Francisco was seized by the Americans, and, on Aug. 15, 1846, California was declared United States territory. In 1848 gold was discovered, and this led to a great immigration. In less than four years there were 250,000 people in the State. Many of these were lawless and capable of any crime, and several times vigilance committees were organized by the better class for active measures in the suppression of crime. California was admitted to the Union as a Free State, Sept. 9, 1850. In 1869 the Central Pacific Railroad was completed, and the employment of Chinese in

this work led to serious riots, and resulted in the passage by Congress of the Chinese Exclusion Act. During the Spanish-American war and the American operations against the Filipino insurgents, nearly all the expeditions to the Philippines started from San Francisco.

J. L. GILLIS.

California, Gulf of, or Sea of Cortes, an arm of the Pacific Ocean, separating Lower California from the Mexican mainland. It is 700 miles in length and varies in width from 40 to 100 miles. There is but little navigation carried on there. On the W. coast are pearl fisheries. The gulf was discovered by Cortes, and for some time was called after him. The river Colorado empties into the N. extremity.

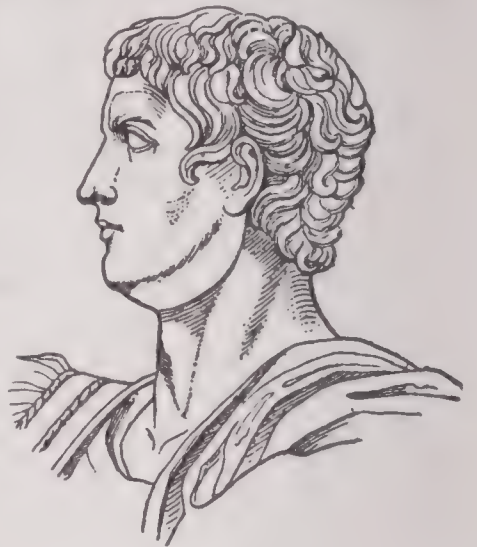
California, Lower, a territory of Mexico, comprising a peninsula jutting into the Pacific Ocean, and separated from the mainland throughout its entire length by the Gulf of California. It is nearly 800 miles in length, and in different places 30, 60, 90, and 120 miles wide; area 58,328 square miles. It is largely mountainous and arid, but possesses valuable agricultural and mineral resources. The chief towns are Loretto and La Paz, the capital. Pop. (1900) 47,082, of whom perhaps a half are Indians.

California, University of, a non-sectarian coeducational seat of learning in Berkeley, Cal., chartered in 1869. Its grounds exceed in value \$1,600,000; its buildings, \$3,620,000; its endowment, \$4,300,000; and its ordinary income, \$1,500,000. The library, of over 250,000 volumes, is valued at \$325,000. There is an average of 400 professors and instructors; students, over 3,400; and graduates, over 8,000. The undergraduate department is located at Berkeley, 9 miles from San Francisco; the astronomical department and Lick Observatory at Hamilton, Santa Clara county, and the professional schools at San Francisco. Tuition is free. At Menlo Park the great Flood Mansion and grounds, donated in 1898, comprise a commercial college endowment. The university receives \$15,000 a year from the National Government for its agricultural experiment station; the State adds a large appropriation; and the whole is spent on four stations and several sub-stations, where many important horticultural experiments are made. The university in 1899 accepted plans for a new set of buildings to cost about \$7,500,000 and to be erected in accordance with designs by Bertrand, a French architect, who was awarded the highest prize for them in competition with the architects of the world. The principal benefactor of the university, since 1896, has been Mrs. Phœbe A. Hearst, widow of Senator Hearst. Her gifts have reached millions of dollars. In 1900 she offered to bear the expense of the university's excavations and

archæological explorations throughout the world, notably in Egypt, Mexico, and Greece. As a result of these and other resources of endowment, the institution has become one of the richest of American universities and seems destined to remain so for generations.

Caligula, Caius Cæsar Augustus Germanicus (ka-lig'ū-lä), a Roman emperor, son of Germanicus and Agrippina; born A. D. 12, in the camp at Antium. He received from the soldiers the surname of Caligula, on account of his wearing the *caligæ*, a kind of boots in use among them.

He succeeded Tiberius, A. D. 37, and made himself very popular by his mildness and ostentatious generosity; but at the end of eight months he was seized with a disorder, caused by his irregular mode of living, which appears to have permanently deranged his



CALIGULA.

intellect. After his recovery he suddenly showed himself the most cruel and unnatural of tyrants—a monster of debauchery and prodigality, a perpetrator of the greatest crimes and follies. The most exquisite tortures inflicted on the innocent served him for enjoyments. In the madness of his arrogance he even considered himself a god, and caused sacrifices to be offered to himself. One of his greatest follies was the building of a bridge between Baiæ and Puteoli (Pozzuoli), in order that he might be able to boast of marching over the sea on dry land. He projected expeditions to Gaul, Germany and Britain, and having reached the sea, he bade his soldiers gather shells for spoils, and then led them back to Rome. He was assassinated by a band of conspirators A. D. 41.

Caliper Compasses, compasses made either with arched legs to measure the diameters of cylinders or globular bodies, or with straight legs and retracted points to measure the interior diameter or bore of anything.

Caliph, Calif, or Khalif, the title borne by the successor of Mohammed in temporal and religious authority.

The First Four Caliphs.—The Prophet leaving no son, the wise and good Abu-bekr, father of his favorite wife Ayesbah, was elected by an assembly of the faithful (632 A. D.). On Omar's death (644) a council of six appointed as third caliph Othman,

the Prophet's secretary and son-in-law. He fixed the text of the Koran, and prevented disputes by burning all previous copies. His weak government raised complaints and insurrection on all sides. But in his reign Persia was finally subdued. By the capture of Herat, Merv, and Balkh, Othman's hold on the country between that gulf and the Oxus was completed. He was besieged in Medina and murdered (656). Othman was succeeded by the heroic Ali, poet, soldier, and saint, husband of Fâtima, and son of the prophet's uncle Abu Taleb. Ayesha, fomenting rebellion, he defeated near Basra on the "Day of the Camel," in the first battle of the first Moslem civil war. She was taken on her camel and sent into retirement in Medina, for Ali had transferred the seat of government to Kufa. Moawîya, governor of Syria, son of that Abu Sufiân who as Mohammed's enemy had been beaten at Bedv, and had helped to beat him at Ohud, claimed to succeed his cousin Othman, and seduced or subdued Syria, Egypt, Yemen, and Persia. On Ali's murder by a fanatic he negotiated the abdication of Ali's son, Hassan, and becoming caliph in "the year of union" 661, made the title hereditary.

The Omniades.—Moawîya (661–679) was the first caliph of the line called Omniades, from one of his forefathers. Their seat was Damascus. The conquest of Syria had now provided harbors, men, and materials for fleets; yet in naval warfare the Saracens acknowledged the superiority of the Greeks. As archers and horsemen they had no superiors, but in the scientific part of warfare they never attained eminence. Moawîya had captured Rhodes in 653. In 672 he began a siege of Constantinople by sea and land which lasted seven years. None of the army and little of the fleet returned. In Africa, conquest was resumed in 661, when, the emperors having imposed an additional assessment equal to the tribute that Africa had yielded to the Saracens, Moawîya was asked for aid by the province, groaning under the civil and military tyranny of the Patriarch of Carthage. Ocba subdued the open country until he spurred his horse into the Atlantic Ocean. In 669 about 180,000 captives were carried by the Saracens from North Africa. In 670 Ocba planted Cairwan, 50 miles S. of Carthage and inland; but thereafter he lost much ground and afterward his life. In 698 Hassan the governor took Carthage, and destroyed it so that it disappeared. In 711 Count Julian, governor on both sides of the strait, betrayed Ceuta to Musa, and admitted a Moslem army to Gebel al Tarik (Gibraltar), so called from the leader's name. The battle of Xeres de la Frontera cost the Gothic king Roderick his kingdom and his life. In a few months, amid the indifference of the people, the persecuted Jews giving considerable help, Spain was added to the califate.

Gothic patriotism still defended itself in Asturias and the Pyrenees. Further conquest was soon attempted in Southern France. Abdurrahman, rounding the E. end of the Pyrenees, carried victory to the Loire; but Charles Martel destroyed him and his enormous army between Tours and Poitiers in 732. Narbonne and the rest of Septimania the Saracens lost (752–759) when the Franks aided the revolted Goths and carried the Frank empire to the East Pyrenees.

Moawîya was a statesman; the rest of his line were neither statesmen nor saints. His son Yezîd I. (679–683) succeeded him. Ali's son Hussein (Hosain) had fought well at Constantinople under the father, but the son's right he would not own. Splendid promises lured him from Medina to lead a rebellion in Irak; but ere he arrived Obeidullah, governor of Kufa, had crushed his cause in the bud. On the plain of Kerbela he was slain in battle, but Yezîd spared his kindred. Ali, Hassan, and Hosain, and Hosain's lineal descendants to the ninth generation, are the only 12 Imâms or spiritual heads recognized by the Shiite creed. The twelfth, the Mahdi, is not yet dead, but will appear before the judgment day. The tomb of Ali, the first caliph recognized by the Shiites, and whose name is the watchword of undying hatred between Turk and Persian, is at Mesjid Ali, the ancient Hira, S. of Kufa. All the Imâms' tombs are centres of Shiite pilgrimage. Hosain's martyrdom marks one of the holiest Shiâh celebrations.

Yezîd I. was followed by Moawîya II. (683); and he by Merwân I. (murdered 685). Abdulmâlik's troubled reign lasted till 705. In 692, to support his wars, he imposed the Haratch or capitation tax on all Christian men, one of the deadliest blights of the Saracen and Turkish empires.

The glorious reign of the inactive Walîd I. (705–715) saw the caliphate extended at one end by the addition of Spain, and at the other end Sogdiana, between the Oxus, the Jaxartes, and the Caspian Sea, taken from the Turks by Kuteibah, and the caliphate extended to the mouth of the Indus. Sul-eimân I. (died 717) sent a magnificent army and fleet under his brother Móslemah against Constantinople; but next year (718) both perished almost utterly. The newly invented Greek fire had immensely aided the city in this siege and the former. To Constantinople belongs the honor of having been the first and strongest bridle of the Saracen. Good Omar II.'s reign was ended with poison (720). Yezîd II. died 724. Hishâm died 743. Walid II. was killed in an insurrection (744). Yezid III. died 744. Ibrahim was dethroned by Merwân II., governor of Armenia (745).

The Abbassides.—The first Ommiade united the caliphate; the first Abbasside divided it. One Ommiade, Abdurrahman, escaped

from the massacre of Abdallah, and, crossing the strait into Spain, founded after a struggle the Omniade caliphate of Spain or Cordova.

Abûl Abbas (750-754), called also Saffah, "the shedder" of his enemies' blood, was followed by his brother Abu Jafar Alman-sôr (754-775), who founded Bagdad for the seat of empire. The £30,000,000 sterling left by him, his son Almahdi (775-785) and grandson Alhâdi (785-786) vaingloriously squandered. Alhâdi's brother, Harûn ar Rashid, "The Just" (Haroun al Raschîd) (786-809), owes his fame to the interested praise of orthodox and literary men. He persecuted the Christians, and made eight destructive attacks on the Greek empire in Asia Minor, but rather as a brigand and slaver than as a conqueror. His three sons, instead of accepting his partition of the empire, fought for supremacy. Almin, the caliph, was defeated and slain (813); Almamûn, his brother (813-833), aided the culmination of Saracen culture.

Mutassem (833-842), following his brother, maintained the desolating indecisive wars in Asia Minor. With him departed the glory of the Abbassides. Sectarian persecution was the bane of Alwâthek's reign (842-847) and Mutawakkil's (847-861). His son, Mûntasir, conspired with the Turks against him and slew him, and reigned 861-862. Almustain reigned 862-870; Almûhtadi, 870-871; Almûtamid, 871-893; Almûtadhîd, 893-903; Almûktafi, 903-908; Almûktadir, 908-932; Kahir, 932-934; Radhi, 934-940, was the last caliph that like a true Imâm and caliph preached to the people. Mutakki died 944; Mustakfi, his successor, had no temporal power beyond the walls of Bagdad.

Ommiades of Spain.—Abdurrahman I. (755-787), on accepting the Spanish throne which was offered him by the Arab chiefs, assumed the titles of *Caliph* and *Emîr-ul-Muminîn*, and in spite of numerous revolts, strengthened and extended his power in Spain till, with the exception of Asturias and the country of the Ebro, his authority was everywhere acknowledged. He built (786) the great mosque of Cordova, now the cathedral. He divided his kingdom into six provinces, whose rulers, with the *walis* of the twelve principal towns, formed a sort of national diet. His successors, Hashem I. (787-796) and Al-Hakem I. (796-821), were much troubled with internal revolts, under cover of which Charlemagne planted at the E. end of the Pyrenees the state called the Spanish March or county of Barcelona, and at the W. end the Gascon March, afterward called the kingdom of Navarre. Abdurrahman II. (821-852) reëstablished internal quiet, and occupied his subjects with incessant wars against the Christians. These conflicts developed among the Arabs that chivalrous heroism which is found no-

where else in the Mohammedan world. Abdurrahman, himself a man of learning, greatly encouraged the arts and sciences, and diffused information among his people; he also attempted, by regulating the laws of succession to property, to constitute his kingdom on a basis analogous to that of other European nations. During his reign Mohammedan Spain was the best-governed country in Europe. His successors, Mohammed I. (852-880), Mondhar (880-882), and Abdallah (882-912), followed in his footsteps. Abdurrahman III. (912-961), after suppressing some dangerous revolts which had gathered head during his minority, conquered the kingdom of Fez from the Edrisides, and brought a long and exhausting war with the powers of Asturias and Leon to a victorious conclusion. This period is justly termed the golden age of the Arab domination in Spain, for at no other period was their power so consolidated and their prosperity so flourishing. Abdurrahman, like his predecessors, was a great encourager of learning, and a poet of no mean ability. He founded schools which far surpassed those in other parts of Europe. His son, Al-Hakem II. (961-976), was in every way worthy to be his successor, but his premature death was the cause of the downfall of the Ommiades in Spain. Hashem II. (976-about 1013), a child of eight years, now occupied the throne; but fortunately his mother, Sobeiha, possessed the abilities necessary for such an emergency, and appointed as her son's vizier Mohammed ben Abdallah, surnamed Almansôr, "the victorious," who had originally been a peasant. Hashem finally, after having been supposed dead for several years, resigned the throne about 1013; and, with the exception of the brief reign of Hashem III. (1027-1031), from this time the family of Ommeyah, which had for more than two centuries so happily and brilliantly governed the greater part of Spain, disappears from history. One remarkable feature of their rule deserves mention, as it contrasts them so favorably with the contemporary and subsequent rulers of Spain, even to the present time, and that is their universal toleration in religious matters.

Calisaya Bark, a variety of Peruvian or cinchona bark, namely, that of *Cinchona calisaya* or *flava*.

Calisthenics, or **Callisthenics**, a name for exercises for promoting gracefulness and strength, and comprises the more gentle forms of gymnastics, especially for girls.

Calixtines (ka-lik's'tins) (from Lat. *cabix* = a cup, which the sect or party wished restored to the people in the Lord's Supper), a Christian sect in Bohemia, the more moderate of the two great sections into which the Hussites were divided in 1420. Unlike the Taborites — the other and extremer sec-

tion—they did not seek to subvert the constitution and government of the Church of Rome, but demanded (1) the restoration of the cup to the people in the celebration of the Supper; (2) the preaching of the Gospel in primitive simplicity and purity; (3) the separation of the priests from secular, and their entire devotion to spiritual, concerns; and, (4) the prevention or punishment, by lawful authority, of "mortal" sins, *e. g.*, simony, debauchery, etc. The council of Basel, in 1433, to end the disastrous Bohemian war, invited envoys from the Hussites. Procopius Rasa—their leader since the death of the famous John Ziska in 1424—and others appeared, but the effort failed. Afterward the council sent Aeneas Sylvius into Bohemia. He, by conceding the use of the cup to the Calixtines, reconciled them to the Church of Rome.

Calixtus, the name of several Popes:

CALIXTUS I., Roman bishop in 217; succeeded Zephyrinus in 219; suffered martyrdom in 223.

CALIXTUS II., son of Count William of Burgundy, Archbishop of Vienna, and papal legate in France; was elected in 1119 in the monastery of Clugny, successor of the expelled Pope, Gelasius II., who had been driven from Italy by the Emperor Henry V., and had died in this monastery. He received the tiara in Vienna. He held councils in Toulouse and Rheims. As the Emperor Henry V. would not confirm an agreement which he had already made on the right of investiture, Calixtus repeated the excommunication which he had pronounced against him at the Council of Vienna, in 1112. He excommunicated the anti-pope, Gregory VIII., and renewed former decrees respecting simony, lay investiture, and the marriage of priests; successful in his contest with the emperor, he made his entrance into Rome in 1120 with great pomp; took Gregory VIII. prisoner in 1121, and forced him to agree to the Concordat of Worms. He died in 1124.

CALIXTUS III., elected anti-pope to Paschal III. in Rome in 1168, and confirmed by the Emperor Frederick I. in 1178, was obliged to submit to Pope Alexander III. As he was not counted among the legal Popes, Alfonso Borgia, a Spanish nobleman and counsellor of Alfonso, King of Aragon and the Sicilies, was made Pope under the title of CALIXTUS III., in 1455. He was at this time far advanced in life, but equaled in policy the most enterprising rulers of the Church. To appease the displeasure occasioned by the councils of Constance and Basel, he instigated a crusade against the Turks. He died in 1458.

Calixtus (kä-lëks'tös) (properly CALLISEN), **Georg**, a German theologian of the Lutheran Church; born in Schleswig in 1586. In 1614 he became professor of theol-

ogy in Helmstedt. He wrote against the celibacy of the clergy, and proposed a reunion of Catholics and Protestants upon the basis of the Apostle's creed. He died in 1656.

Calkins, Gary Nathan, an American scientist; born in Valparaiso, Ind., Jan. 18, 1869. He was graduated at the Massachusetts Institute of Technology in 1890; had charge of scientific expeditions to Alaska in 1896 and 1897; and in 1900 was instructor in Zoölogy at Columbia University.

Calla, a genus of plants of the order of Araceæ. The species are perennials. They are natives of North America and Northern Europe. They are herbaceous marsh plants. The most familiar of the species is the beautiful calla lily.

Callahan, James Morton, an American publicist; born in Bedford, Ind., Nov. 4, 1864. He was graduated at the University of Indiana in 1894, and became lecturer on American Diplomatic History at Johns Hopkins in 1898. He has written "Neutrality of the American Lakes," "Cuba and International Relations," and similar works.

Callao (käl-lä'ö), the port of Lima, Peru, lies 7 miles S. W. of Lima by rail, on a small bay. The streets generally are narrow and the buildings unimportant. The town possesses a floating dock, and fine harbor works, embracing an area of 520 acres, with extensive pier and dock accommodation; and the spacious roadstead, sheltered by the island of San Lorenzo, is one of the safest in the world. The huge old Spanish fortress is used for custom-house offices. There are sugar refineries, ironworks and sawmills; but the place depends chiefly for its prosperity on its trade. The exports are wool, sugar, specie, copper, cotton, bark, hides, guano, and cubic niter. The present Callao dates only from 1746, when the original city, a short distance to the S., was destroyed by an earthquake and an invasion of the sea. Callao was bombarded in 1880 during the war between Chile and Peru, and the annexation by the former of the guano-producing islands materially decreased the exports of this manure; cubic niter (a government monopoly) and wool come next in importance. By the completion of a direct cable between this port and Mollendo, telegraphic communication has been established with the United States. Pop. (1907) 31,000.

Callcott, Sir Augustus Wall, an English painter; born in 1779. He most excelled in landscape, especially English scenery. He has been called the English Claude. He died in 1844.

Callcott, John Wall, an English composer; born in 1766. He studied under Handel. He was especially noted for his glee compositions. He died in 1821.

Callichthys, a genus of fishes belonging to the abdominal malacopterygians, and family Siluridæ or sheat-fishes. They are natives of hot climates, and are said to make their way over land in search of water during dry seasons.

Calligonum, a genus of plant shrubs belonging to the polygonaceæ. They are leafless plants, with small flowers. The branches are jointed, dichotomous. The fruit is a large, four-cornered nut. The root of *C. Pallasia*, a leafless shrub found in the sandy steppes of Siberia, furnishes from its roots, when pounded and boiled, a gummy, nutritious substance like tragacanth, on which the Calmucks feed in times of scarcity, at the same time chewing the acid branches and fruit to allay their thirst.

Callender, James Thomas, an American publicist; born in England; was exiled for his pamphlet "The Political Progress of Great Britain." He wrote: "Sketches of the History of America"; "The Prospect Before Us." He died in 1803.

Callender, John, an American historian; born in Boston, Mass., 1706; collected many valuable papers relating to the Baptists in America; and published "A Centennial Discourse on the Civil and Religious Affairs of the Colony of Rhode Island" (1739), which was the only history of that State for more than a century. The State Historical Society reprinted it, with notes by Rev. Romeo Elton, D.D. (1838) and a memoir of the author. He died in Newport, R. I., Jan. 26, 1748.

Callimachus (ka-lim'a-kus), a Greek poet; born in Cyrene; flourished in the 3d century B. C. He wrote epics called "Hecale" and "Galatea," besides tragedies, comedies, elegies, and hymns; but only some epigrams, sacred songs, and verses have come down to us, among which are a "Hymn to Jupiter," an "Epitaph on Heracleitus," and one on himself.



CALLIOPE.

Only a few fragments of his elegies are extant.

Callinus (ka-lē'nus), of Ephesus, the earliest Greek elegiac poet, flourished about 730 B. C.

Callionymus, the dragonets, a genus of fishes of the family Gobidæ, or Gobies, the typical one of the sub-family callionyminae. The anterior dorsal fin, supported by a few setaceous rays, is frequently very elevated; the second dorsal and anal are elongated.

Calliope (ka-lī'ō-pē), one of the Muses. She presided over eloquence and heroic poetry, and is said to have been the mother of Orpheus by Apollo.

Calliope, an asteroid, the 22d found. It was discovered by Hind, on Nov. 16, 1852. Also a series of steam whistles, pitched to produce musical notes, grouped together and operated by a keyboard. The instrument is much in use in traveling circuses of the United States, and is sometimes placed on steamboats for the delectation of passengers and the astonishment of the natives along shore. It is an American device.

Callipers. See CALIPER COMPASSES.

Callippus, or **Calippus**, an astronomer of Cyzicus, who went to Athens and assisted Aristotle to rectify the discoveries of Eudoxus. He invented the cycle or period of 76 years, called the Callippic Period. He lived in the 4th century B. C.

Callisthenes (kal-is'the-nēz), a Greek philosopher, born in 365 B. C. He was a disciple and grandson of Aristotle, and accompanied Alexander the Great in his expedition to Asia. He refused to acknowledge the alleged divinity of this hero, and even had the misfortune to displease him by his railleries. He was afterward accused of conspiracy, and put to death B. C. 328.

Callisthenics. See CALISTHENICS.

Callisto, in classical mythology, an Arcadian nymph. Zeus's love for her aroused the jealousy of Hera, who induced Artemis to put Callisto to death. Subsequently Zeus transformed Callisto into the constellation Arctos or the Bear.

Callistratus (ka-lis'tra-tus), an Athenian orator, whose eloquence is said to have fired the imagination of the youthful Demosthenes. For his Spartan sympathies he was condemned to death by the Athenians in 361, and on his return from exile in Macedonia was actually executed. Another Callistratus was a grammarian and critic.

Callosity, any thickened or hardened part of the human skin caused by pressure and friction. Also the natural cutaneous thickenings on the buttocks of monkeys.

Callot, Jacques (kā-lō'), a French engraver; born about 1593; distinguished himself in Italy and France, and was patronized by the Grand Duke of Tuscany and by Louis XIII. He preferred etching, probably because his active and fertile genius could in that way express itself more rapidly. In the space of 20 years he designed and executed about 1,600 pieces, the characteristics

of which are freedom, variety, and naïveté. He died in 1635.

Calmar, a fortified seaport town of Sweden, on the W. side of a narrow strait of the Baltic, separating the island of Öland from the continent, 90 miles N. E. by E. of Carlskrona. The town, built of wood, stands on the small island of Quarnholm; its harbor is small but safe and commodious. Tar, alum, hemp, and timber are extensively exported. Here, in 1397, was concluded the famous treaty which united the kingdoms of Sweden, Denmark, and Norway under the rigorous scepter of Queen Margaret, surnamed the "Northern Semiramis." Here also, in 1520, Gustavus Vasa disembarked to deliver his country from the domination of foreigners and of a sanguinary tyrant. Pop. (1900) 12,715.

Calmet, Augustine (käl-mā'), a French exegetical and historical writer; born in Lorraine, France, in 1672. He early entered the order of St. Benedict, and became the head of several abbeys in succession. He was an industrious compiler of voluminous works, such as "Commentary on the Old and New Testaments" (Paris, 1707-1716), "Historical and Critical Dictionary of the Bible," "Ecclesiastical and Civil History of Lorraine, etc." He died in Paris in 1757.

Calms, Regions of, tracts in the Atlantic and Pacific Oceans, on the confines of the trade-winds, where calms of long duration prevail. About the winter solstice their average N. limit is in lat. 5° N., and in the months about the summer solstice about lat. 12° N. The S. limit lies nearly always to the N. of the equator, varying between lat. 1° and 3° N.

Calmucks. See KALMUCKS.

Calomel, mercury sub-chloride, Hg₂Cl₂. For its preparation see MERCURY. It is insoluble in water, and blacked by ammonia. It is used in liver complaints, and in any of the complaints for which mercury internally administered is indicated. Care should be exercised in its use, as it is likely to induce salivation. It should be tested to see if it contains any mercuric chloride (corrosive sublimate), which is soluble in boiling water. Calomel is a translucent or subtranslucent mineral, consisting of chlorine, 15.1, and mercury, 84.9. The hardness is 1.2, the sp. gr., 6.48, the luster adamantine, the color white gray or brown. It occurs in Germany, Austria, and Spain.

Calonne, Charles Alexandre de (käl-lon'), a French statesman; born in Douai, Jan. 20, 1734; succeeded Necker in 1783 as comptroller-general of the finances, and found not a single crown in the treasury. In this office he continued till 1787. During this period he maintained the public credit by a punctuality till then unknown in the payments of the royal treasury,

though he found it drained to the lowest ebb. He labored with unwearied assiduity to restore the equipoise between the annual income and expenditure, and to provide a supply for the emergencies of the state, without increasing the burdens of the people. For this purpose he advised the King to revive the ancient usage of convening the national assemblies of the "notables," to whom he proposed the bold project of suppressing the pecuniary privileges and exemptions of the nobility, clergy, and magistracy. This measure alarmed those powerful bodies, and M. de Calonne found it necessary to retire to England, where he wrote two defences of himself—his "Petition to the King," and "Reply to Necker." He subsequently returned to Paris, where he died, Oct. 30, 1802.

Calophyllum, a genus of plants belonging to the order *Clusiaceæ* (Guttifers). Sepals, 2-4; petals, 4; stamina, many; style, 1; stigma, pellate-lobed. Flowers in racemes, sometimes unisexual. About 25 species are known, mostly from the eastern hemisphere, though a few are from the western world. *Calophyllum calaba* is the calaba-tree of the West Indies and of Brazil. *C. inophyllum*, from the East Indian and Malayan regions, is a large tree, sometimes 100 feet high. Its timber is used for masts and spars. A greenish-colored resin from the trunk constitutes a kind of tacamahac. Its seeds furnish a dark-green, thick, sweet-scented oil, used in India to burn and in medicine. *C. tomentosum*, of Ceylon, also furnishes timber and oil. *C. Tacamahaca*, on the Isle of Bourbon and Madagascar, and *C. brasiliense*, in Brazil, also yield resin. The fruits of *C. spurium*, of Malabar, and *C. edule* and *Madruno*, of South America, are eaten.

Calorescence, the transmutation of heat rays into light rays; a peculiar transmutation of the invisible calorific rays, observable beyond the red rays of the spectrum of solar and electric light, into visible luminous rays, by passing them through a solution of iodine in bisulphide of carbon, which intercepts the luminous rays and transmits the calorific. The latter, when brought to a focus, produce a heat strong enough to ignite combustible substances, and to heat up metals to incandescence; the less refrangible calorific rays being converted into rays of higher refrangibility, whereby they become luminous.

Caloric, the name given to a supposed subtle imponderable fluid to which the sensation and phenomena of heat were formerly attributed.

Caloric Engine, the name given by JOHN ERICSSON (*q. v.*), to his hot-air engine.

Caloric Paradox, the assumption by drops of water, when thrown on a hot metallic surface, of the spheroidal form, each

Caloric

liquid spheroid being surrounded by an atmosphere of its own vapor, which prevents it from being properly in contact with the metal. It is called also Leidenfrost's phenomenon.

Calorie, the metric heat unit; the amount of heat necessary to raise the temperature of 1 gram of water 1° C.

Calorimeter, an instrument for measuring the quantity of heat which a body parts with or absorbs when its temperature sinks or rises through a certain number of degrees, or when it changes its condition. An ice-calorimeter was invented by Lavoisier and Laplace. It is now superseded by the mercury calorimeter of Favre and Silbermann, which is a very delicate instrument. It is essentially a thermometer with a very large bulb and a capillary tube.

Calotropis, a genus of asclepiads, consisting of three species, which form shrubs or small trees, and are natives of the tropics of Asia and Africa. Their flowers have a somewhat bell-shaped corolla, expanding into five divisions. *C. gigantea*, the largest of the genus, forms a branching shrub or small tree about 15 feet high, with a short trunk 4 or 5 inches in diameter. Its flowers are of a pretty rose-purple color. Cloth and paper have been made from the silky down of the seeds. The bark of the roots of several of the species furnishes the substance called *mudar*, which is used in India as a diaphoretic. The juice has been found very efficacious in the cure of elephantiasis, in syphilis, and anasarca. From the bark of the plant is made a substance called *mudarine*. The bark of the young branches also yields a valuable fiber. The leaves warmed and moistened with oil are applied as a dry fomentation in pains of the stomach; they are a valuable rubefacient. The root, reduced to powder, is given in India to horses. An intoxicating liquor, called *bar*, is made from the *mudar* by the hillmen about Mahabuleshwar, in the Western Ghauts.

Calottistes (käl-ō-tēst'), a society of witty and satirical men in the time of Louis XIV., who were headed by two officers in the king's bodyguard, named Torsac and Aimon. Their name was taken from the word *calotte* (a "small cap," worn by monks over the tonsure), and their amusement consisted in sending to any public character who had exposed himself to ridicule, a "patent," authorizing him to wear the *calotte*, as a covering for the weak part of his head. As the society became audacious, and did not spare even royalty itself, it was dissolved by the Minister Fleury. The "Memoirs attending the History of the Calotte" (Basel, 1725), is an amusing little book. After the Restoration, the title "Reign of the Calotte" was applied to the priestly administration of affairs.

Caltrop

Calotype, a process invented by Fox Talbot, by which paper saturated with iodide of silver is exposed to the action of light, the latent image being subsequently developed and fixed by hyposulphite of soda.

Calovius, Abraham (originally KALAU), the chief representative of controversial Lutheran orthodoxy in the 17th century; born in Mohrungen in East Prussia, April 16, 1612. He waged war incessantly on Arminian, Socinian, Reformed and Catholic doctrines, and with the greatest bitterness against Calixtus. He was six times married, the last time in his 72d year. He died Feb. 25, 1686. His chief writings are his "System of Theological Locations" (1655-1677); the "History of Syncretism" (1682), and his great "Illustrated Bible" (1672).

Caloyers, Greek monks, belonging to the order of St. Basil, who lead a very austere life. Their most celebrated monastery in Asia is at Mount Sinai; in Europe, at Mount Athos. They do not all agree as to their mode of life. Some of them are cenobites; that is, they live in common. Others are anchorites, living alone, or with only one or two companions; and others again are recluses, who live in grottoes or caverns in the greatest retirement, and are supported by alms supplied to them by the monasteries.

Calpe, one of the Pillars of Hercules.

Calprenede, Gautier de Costes de la (kal-pré-nād'), a French officer of the guards and royal chamberlain; born in 1610; wrote many tragedies, etc., but is best known as author of the heroic romances — clever, but endless and tedious — of "Cleopatra," "Cassandra," and others. He died in 1663.

Calpurnia, the fourth wife of Julius Cæsar, married to him 59 B. C. She was a daughter of L. Calpurnius Piso, who was consul in 58 B. C.

Calpurnius Siculus, Titus, a Roman poet, born about 30 A. D. He appears toward the commencement of Nero's reign with various eclogues and bucolics, palpable imitations of Vergil and of Theocritus, and conceived in a spirit of servile adulation of his imperial master. He died about 80 A. D.

Caltha, a genus of herbaceous plants belonging to the ranunculaceæ, distinguished from ranunculus by the absence of a green calyx, and from Helleborus by the absence of tubular petals. *C. palustris*, the marsh marigold, is a stout herbaceous plant with hollow stems, large glossy roundish notched leaves, heart-shaped at the base, and conspicuous bright yellow flowers, each of which is composed of five roundish petals or sepals.

Caltrop, a four-pronged piece of iron, each prong about 4 inches in length, for-

Calumba

merly thrown down in warfare to check the approach of the enemy's cavalry over a plain, or of besiegers in the ditch of a fortification.

Calumba, or **Colombo**, used in medicine, is the root of *Jateorhiza palmata*, a menispermaceous climber of Eastern Africa, which has been introduced into India. Sliced and dried, it has a greenish-yellow tint, a very bitter taste, and a faint aromatic odor. Its bitterness and other properties are ascribed to the presence of columbin, berberin, and columbic acid. It is a useful mild tonic and stomachic.—AMERICAN CALUMBA ROOT is obtained from *Frasera Walteri*, a gentianaceous biennial, and has properties like those of gentian.

Calumet, a kind of pipe for smoking, used by the North American Indians. The bowl is generally of stone, and the stem is ornamented with feathers, etc. The calumet is the emblem of peace and hospitality. To refuse the offer of it is to make a proclamation of enmity or war, and to accept it is a sign of peace and friendship.

Calumet, a town in Houghton county, Mich.; at the terminus of the Mineral Range railroad; 42 miles N. of L'Anse. It is the seat of the famous Calumet and Hecla copper mine, the richest in the world, producing 44,450 long tons in 1898. It is the trade and supply center of the Superior mining district, and has a National bank, several weekly newspapers, manufactories, and an assessed property valuation of \$26,000,000. Pop. (1890) 12,529; (1900) 25,991.

Calvados (käl-vä-dos'), a French department, part of the old province of Normandy, bounded on the N. by the English Channel, and E., W. and S. by the departments Eure, La Manche, and Orne. Area, 2,132 square miles. It is named from a dangerous ridge of rocks which extends along the coast for 10 or 12 miles. The department is undulating and picturesque, and possesses rich pastures. Chief town, Caen. Pop. (1906) 403,431.

Calvaert, **Dionys** (käl'värt), a Belgian painter; born in Antwerp in 1555. He went very young to Italy, and ultimately opened a school at Bologna, from which proceeded 137 masters, and among these Albano, Guido, and Domenichino. He died in Bologna in 1619.

Calvary, the English designation of the spot upon which the crucifixion of Jesus Christ is recorded as having taken place. It lay beyond but nigh to the city, and by Captain Conder is identified with the old House of Stoning, or place of public execution, according to the law of Moses, on the top of the remarkable knoll outside the Damascus gate, on the N. side of Jerusalem. It was from this cliff that the crim-

Calvi

inal used to be flung before being stoned (according to the Talmud), and on it his body was afterward crucified; for the spot commands a view all over the city, and from the slopes round it the whole population might easily witness the execution.

Calve, **Emma** (käl-vā'), a French opera singer; born in 1866. She made her début at Brussels in Gounod's "Faust." She has made successful tours of the United States in leading rôles, and in 1900 announced a determination to essay the drama.

Calverley, **Charles**, an American sculptor; born in Albany, N. Y., Nov. 1, 1833. He has won note with groups and figures and portrait busts of Greeley, Cooper, Howe, etc. He was elected to the National Academy of Design in 1875.

Calverley, **Charles Stuart**, an English poet and humorist; born in Martley, Worcestershire, Dec. 22, 1831; won a prize at Oxford with a Latin poem; afterward becoming a member of Cambridge, he was there made Fellow. He possessed an exquisite wit. His "Verses and Translations" (1862), have been often reprinted. His "Society Verses" are marked by great elegance and geniality. He died Feb. 17, 1884.

Calvert, **George**. See BALTIMORE (LORD).

Calvert, **George Henry**, an American writer; born in Baltimore, Md., Jan. 2, 1803; was a great-grandson of Lord Baltimore. After graduating at Harvard (1823), he studied in Germany; then returning to Baltimore, became editor of the "American" and a contributor to various periodicals. His published books include "Poems" (1847); "Joan of Arc" (1860); "Goethe, his Life and Works" (1872); "Brief Essays and Brevities" (1874), and "Wordsworth: a Biographic Æsthetic Study" (1875). He died in Newport, R. I., May 24, 1889.

Calves' Head Club, the name assumed by an English association instituted (and named) in express contempt of the memory of Charles I., and holding its principal meeting on January 30, the anniversary of that king's execution. After the Restoration this club met in secret and under difficulties, but seems to have continued in existence till 1734, when popular ill-will against some outrageous toasts proposed led to a serious riot. The club seems after this to have decayed.

Calvi, a seaport on the island of Corsica, on a peninsula in the Bay of Calvi. It was founded in the 13th century and early passed under Genoese control. It was so strongly fortified as to withstand several sieges, but in 1794, after a siege of 51 days, was taken by the English from the Corsicans who held it. The following year it was retaken.

Calvin, John (so called from *Calvinus*, the Latinized form of his family name, CAUVIN, or CHAUVIN), the second great reformer of the 16th century; born in Noyon, Picardy, July 10, 1509. His father, Gerard Chauvin, a cooper, dedicated him early to the Church. Calvin says in a letter to Claude d'Hangest, abbot of St. Eloi at Noyon, that he was indebted to the family of this prelate for his first instruction and a liberal education. When hardly 12 years old he received a benefice in the cathedral of his native city. Six years afterward he was appointed to a cure, which he soon exchanged for another. Thus by the means of his benefactors he enjoyed, even before his 20th year, several benefices, and even the title and income of a cure while he was yet pursuing his studies in Paris. Here he became acquainted with his townsman Peter Robert Olivetan, his senior by some years, from whom he received the first germ of the new doctrine, which was then beginning to spread in France. He was induced by this to renounce the study of theology, and to devote himself to law at Orleans, and afterward at Bourges. He made rapid progress therein, and at the same time studied the Greek language under Melchior Wolmar, a German, who strengthened the inclination for reformation already awakened in him by Olivetan. In 1532 he returned to Paris, and in the same year he published a Latin commentary on the two books of Seneca, "*De Clementia*," in which he called himself by his Latinized name, Johannes Calvinus. In 1533 he was obliged to flee from Paris because he had composed a bold address to the king, which was delivered by his friend Nicolas Cop, rector of the university. Calvin took refuge in the house of Du Tillet, a canon at Angoulême, with whom he quietly pursued his studies, and began to collect the materials for his "*Christian Institution*," which appeared two years afterward. Thence he went to Nérac to Queen Margaret of Navarre, the sister of Francis I., who, not so much from a decided inclination for the new doctrine as from love for science, afforded refuge to several learned men who were obliged to leave France on account of their opinions. Calvin was very well received by her, and here became acquainted with several men who, at a future time, were useful to his party. In May, 1534, he returned to Paris; but finding that the persecution against those who were inclined to the doctrines of the reformers was still raging, and more violently than ever, he retired to Basel in the autumn of the same year. Previously, on May 4, he had resigned his benefices at Noron.

At Basel he published in 1536 his "*Christian Institution*," as the confession of faith of those who were persecuted in France, and condemned to the stake; in which it was his design to free them from

the calumny which had been circulated from political motives, that they were rebels and Anabaptists, and had nothing in common with the Lutheran doctrine. It would be difficult briefly to relate how he went farther than Luther in regard to the doctrine of free-will, of imputative justice, and the merit of good works; but it is more easy to display the bold consequences which he drew from his doctrines. He attacked not only the supremacy of the Pope, but even the authority of general councils; he does not recognize the character of a bishop as belonging to a distinct order from that of presbyter; no vows but those of baptism, and no sacraments but those of baptism and the Lord's supper; and does not hold even these essential when involuntarily omitted. The mass is to him a profanation, and the honors paid to the saints idolatry. This work, "*Institutio Christianæ Religionis*," appeared afterward in French, and almost every year was published by him with emendations and additions. The most complete edition was published by Robert Stephens in 1559. The prefixed "*Præfatio ad Christianissimum regem, qua hic ei liber pro confessione fidei offertur*," could not, however, put an end to the religious persecutions in France; since Francis I., although far from being actuated by religious fanaticism, was influenced, by political views to continue them.

Calvin then went to Italy to preach his doctrine there, and met with a favorable reception from the Duchess Renata of France, the daughter of Louis XII., and wife of Ercole d'Este, who subsequently professed her belief in his doctrines. But he was obliged to save himself by a hasty flight from Aosta, where he was discovered. After a short visit to his native town, he resolved to return to Basel, and took the road through Geneva, where, a year before, the new doctrine had been introduced by a formal decree of the government, and Farel was very active in effecting its establishment. At the earnest entreaty of Farel, he consented to remain at Geneva and assist him in the work of reform there, although at first he was very unwilling to do so, being desirous of rest and of leisure for study. At first he undertook a course of theological instruction, to which he devoted himself exclusively, while he left the pulpit to Farel. Afterward he was obliged to assume also the office of a preacher. Farel and he attempted to reform the manners of the inhabitants; but this enterprise, in which they had connected themselves with an equally zealous, but less able preacher (Viret), drew upon them a crowd of powerful enemies, by whom they were at last overthrown. The cause of this was the following: The Genevan Church made use of leavened bread in the eucharist, and had removed the baptismal font from the church,

and, moreover, abolished all holy-days, except the Sabbath. These innovations were not approved by the synod of Lausanne. The magistracy of Geneva required Farel and Calvin to comply with the decision of the synod, and commanded them, on their refusal, to leave the city in three days. This happened in April, 1538. They went to Berne; and since the exertions of the magistracy of Berne and of the synod of Zürich could not effect their recall, Calvin went to Strasburg, where Luther's doctrine had been introduced by Bucer 10 years before. Bucer received him very kindly, and caused him to be appointed professor of theology. At the same time he obtained permission to erect a French church, which, on account of the great number of fugitives from France, was very important. Notwithstanding the great esteem in which he was held here, his views were still directed to Geneva; the inhabitants of which he exhorted, in two letters, to remain true to the new doctrine, when Cardinal Sadolet invited them to return into the bosom of the church. Here also, in 1540, Calvin published his work on the "Lord's Supper," in which he sought to refute both the opinion of Luther, who held a doctrine with regard to the real presence of Christ in the elements allied to the Romish one of transubstantiation, and that of Zwinglius, who rejected that doctrine entirely. Calvin maintained against both that Christ was spiritually present and spiritually received in the eucharist. In a conference held at Zürich in 1549, he presented a "Formula," which, by its wise moderation, restored concord.

At last, in 1541, his friends in Geneva succeeded in effecting his recall; a particular deputation besought the magistracy of Strasburg to restore him to his former flock. But as Calvin was appointed a deputy to the diet at Frankfort, and was afterwards obliged to be present at the conference at Ratisbon, he was not able to return to Geneva till September of the same year. He now laid before the council the draft of his ordinances respecting church discipline, which were immediately accepted, and published in November. In pursuance of the provisions of these, a consistory was formed, composed half of clergymen, half of laymen, in order to watch "over the support of the pure doctrine," and over morals. This tribunal called everybody, without exception, to account for their slightest words and actions, and referred cases where ecclesiastical censure was not sufficient, to the council, with an opinion upon them. Thus Calvin made himself director of the conduct, as well as of the opinions of the Genevese. His spirit governed exclusively in the council as in the consistory, and no one could hope to succeed who set himself in opposition to him. Thus a magistrate was deposed and condemned to two months' im-

prisonment "because his life was irregular, and he was connected with the enemies of Calvin." James Gruet was beheaded "because he had written profane letters and obscene verses, and endeavored to overthrow the ordinances of the Church." It is well known that Michael Servetus, passing through Geneva in 1553, was arrested, and on Calvin's accusation was burnt alive because he had attacked the mystery of the Trinity in a book which was neither written nor printed at Geneva. The friends of Calvin, naturally anxious to defend his memory, have sometimes endeavored to justify these proceedings, but would act more judiciously by candidly admitting that, when tested by the tolerant principles which now prevail, at least among Protestants, they cannot be justified, though at the time there was not a man among the Roman Catholics, and scarcely one among the Protestants, who would have acted differently. He also proposed alterations in the civil legislation of the Genevese, and in the form of their government, in which some French refugees were useful to him. For the advancement of useful studies he erected the academy so happily conducted by his friend Theodore Beza.

When we consider all that Calvin did during his continuance in Geneva, we can hardly conceive how he could have accomplished so much. He preached almost daily, delivered theological lectures three times a week, attended all deliberations of the consistory, all sittings of the association of ministers, and was the soul of all the councils. He was consulted, too, upon points of law as well as of theology. Besides this, he found time to attend to political affairs in the name of the Republic; to publish a multitude of writings in defense of his opinions, of which his commentaries on the Bible are the most important; and to maintain a correspondence through all Europe, but principally in France, where he labored incessantly to extend the new doctrine. Besides his printed sermons, the library of Geneva contains 2,025 in manuscript, and, like that of Berne, several theological treatises not printed. Although Calvin differed from Luther in essential points, yet his adherents were not distinguished from the Lutherans in the edicts of Francis I. and Henry II., nor even in the edict of Rouen in 1559. They themselves, indeed, regarded Calvin as their head, but without considering themselves as different, on this account, from the adherents of Luther. A formal separation first took place after the *colloquium* (conference) of Poissy in 1561, where they expressly rejected the 10th article of the Confession of Augsburg, besides some others, and took the name of Calvinists.

Calvin died May 27, 1564, in the 55th year of his age. He was of a weak constitution, and suffered from frequent sickness.

In Strasburg he had married a widow, Idette de Burie, in 1539; a son, the fruit of their union, died early. In 1549 he lost his wife, after which he never married again. He was temperate and austere, gloomy and inflexible. He knew nothing of friendship and had no other passion than to establish the opinions which he believed to be correct. His disinterestedness was rare. He had a yearly stipend of 150 francs, 15 measures of corn, and 2 casks of wine; he never received a larger one. The value of the whole property which he left in books, furniture, money, etc., did not exceed 125 crowns. His character was impetuous and impatient of contradiction. "I have," he writes to Bucer, "no harder battles against my sins, which are great and numerous, than those in which I seek to conquer my impatience. I have not yet gained the mastery over this raging beast." The tone of his controversies is always harsh, bitter, and contemptuous. He does not always succeed in concealing the feeling of his own superiority.

As a theologian, Calvin was equal to any of his contemporaries in profound knowledge, acuteness of mind, and, as he himself boasts, in the art of making good a point in question. As an author, he merits great praise. His Latin works are written with much method, dignity, and correctness. He was also a great jurist and an able politician. But all these qualities would not have been sufficient to make him the head of a distinct religious sect, had he not boldly rejected all religious ceremonies. By this means he gained, on the one side, the highly cultivated, who were induced to look upon visible forms in religion as something derogatory, and also gave the uneducated an easy means of distinguishing themselves from the opposite party without the necessity of examining the grounds of their faith, for which they were neither inclined nor qualified.

The chief doctrines of Calvin's system are those which were discussed at the famous synod of Dort, under the following heads: Predestination, particular redemption, total depravity, irresistible grace, and the certain perseverance of the saints. In succeeding controversies, these were denominated the five points. The doctrine of original sin, often set forth as peculiar to Calvin's system, is common to those of many Protestant sects. The followers of Calvin in Germany are called the Reformed, but the doctrine of predestination is said to be losing ground in that country. In France, it is well known, most Protestants are Calvinists. Calvinism is the professed belief of the greatest part of the Presbyterians, both of Europe and America; the Particular Baptists in England and India, and the Associated Baptists in America; the Independents of every class in England

and Scotland, and the Congregationalists of New England. The works of Calvin were first collected in the Geneva edition of 1617, in 12 vols. folio. The most complete is that published at Amsterdam in 9 vols. folio, in 1671. The collected works of Calvin have been published in English by the Calvin Translation Society of Edinburgh, in 52 volumes 8vo, completed in 1855. A critical edition of his collective works has been published in Germany by Baum, Cunitz, and Reuss (Brunswick, 22 vols. 1863-1881).

Calvin, Samuel, a Scotch-American scientist; born in Wigtonshire, Scotland, Feb. 2, 1840. He came to the United States when a youth and served in the Civil War. He studied geology as a life pursuit, and since 1874 has been Professor of Geology at the University of Iowa, and State Geologist of Iowa since 1892. He is an editor of the "American Geologist."

Calvinism. See CALVIN, JOHN.

Calvinistic Methodists, a section of the Methodists, distinguished by their Calvinistic sentiments from the ordinary Wesleyans, who are Arminian. Wesley and Whitefield, the colleagues in the great evangelistic movement in the 18th century, differed with regard to the doctrines of grace, Wesley being Arminian, and Whitefield Calvinistic; the latter may be called the founder of Calvinistic Methodism. The body exists in three divisions: the Whitefield Connection, 1741; Countess of Huntingdon's Connection (Huntingdonians), 1748; and Welsh Methodists (1750). In its distinctive form it dates from 1725, but did not completely sever its connection with the English Church till 1810. In government it is now Presbyterian. Its great seat is Wales.

Calvisius, Sethus, a German musician and chronologist; born in Gräschleben, Thuringia, Feb. 21, 1556. He studied the ancient classics, science and music and was twice offered a professorship of mathematics, which he declined in order to become the head of a school of music in Pforte. Later he filled a similar position in Leipsic. In 1585 he published his "Opus Chronologicum." His system of chronology was original and ingenious. In 1612 he published a work intended to demonstrate the imperfections of the Gregorian calendar and to introduce to the learned world his new method. He died in 1617.

Calx, properly lime or chalk (hence calcareous earth); but the term is more generally applied to the residuum of a metal or mineral which has been subjected to violent heat, burning or calcination, solution by acids, or detonation by niter, and which is, or may be, reduced to a fine powder. Metallic calces are now called oxides. See OXYGEN.

Calycanthus

Calycanthus, a genus of hardy American shrubs, of which one species, Florida allspice (*C. floridus*), has yellow flowers, and is sweet-scented.

Calycifloræ, a sub-class of exogenous or dicotyledonous plants, characterized by having both calyx and corolla, petals separate and stamens attached to the calyx.

Calydonian Boar. According to a Greek myth, Ceneus, King of Calydon, the ancient capital of Aetolia, omitted a sacrifice to Artemis, whereupon the goddess, when he was absent on the Argonautic expedition, sent a frightful boar to lay waste his fields. No one dared to face the monster, until Meleager, the son of Ceneus, with a band of heroes, pursued and slew him. The Curetes laid claim to the head and hide, but were driven off by Meleager. Later accounts make Meleager summon to the hunt heroes from all parts of Greece, among them the maiden Atalanta, who gave the monster the first wound.

Calymene, a genus of fossil trilobites, occurring in the Silurian rocks. They appear to have possessed the power of rolling themselves up into a ball, as some recent allied genera do, for the purpose either of safety or of concealment. *C. blumenbachii* is the well-known Dudley trilobite.

Calypso, (1) in Grecian legend, was, according to Homer, the daughter of Atlas, and inhabited the solitary wooded Isle of Ogygia, far apart from all gods and men. Ulysses being thrown upon her island by shipwreck, she treated him kindly, and promised him immortality if he would marry her. (2) The name given to the 53d of the asteroids discovered by Luther at Düsseldorf, April 4, 1858, the 7th of the small planets detected by him. (3) The same name was also given to the 4th, or outer, satellite of Jupiter, but the names of these are seldom used in speaking of these satellites, the numbers being generally employed instead. This is especially desirable in order to prevent confusion, as three out of the four names have also been assigned to asteroids.

Calyptra, the hood of the theca or capsule of mosses. The same name is given to any hood-like body connected with the organs of fructification in flowering plants.

Calyptræa, a genus of gasteropods, furnished with a patelliform shell, to the cavity of which a smaller conical one adheres, like a cup in a saucer. It is the typical genus of the family Calyptræidæ. The species are called cup-and-saucer limpets. Tate estimates the known recent species at 50, and the fossil at 31, the latter from the chalk, if not from the carboniferous formation on till now. They are called bonnet limpets.

Camargue, La

Calyx, in botany, the name given to the exterior covering of a flower, that is, the floral envelope consisting of a circle or whorl of leaves external to the corolla, which it incloses and supports. The parts or leaves which belong to it are called sepals; they may be united by their margins, or distinct, and are usually of a green color and of less delicate texture than the corolla. In many flowers, however (especially monocotyledons), there is little or no difference in character between calyx and corolla, in which case the whole gets the name of perianth.

Cam, in machinery, a simple contrivance for converting a uniform rotary motion into a varied rectilinear motion, usually a projecting part of a wheel or other revolving piece so placed as to give an alternating or varying motion to another piece that comes in contact with it and is free to move only in a certain direction.

Cam, or **Granta**, a sluggish river of England, which, rising in Essex, flows 40 miles N. W. and N. E. through Cambridgeshire, and falls into the Ouse 3½ miles above Ely. It gives name to the town of Cambridge, where it is barely wide enough for an eight-oar to turn.

Cam, Diogo, a Portuguese explorer of the 15th century, who followed up the course of Prince Henry of Portugal, and in 1484 discovered the mouth of the Kongo, near whose bank an inscribed stone erected by him as a memorial was found in 1887. He afterward examined the coast as far as 22° S. lat.

Cama, in Indian mythology, the god of love and marriage.

Camaldolites, Camaldulians, or Camaldunians, a nearly extinct fraternity of monks founded in the Vale of Camaldoli, in the Apennines, in 1018, by St. Romuald, a Benedictine monk. They were originally hermits, but as their wealth increased they associated in convents. They have always been distinguished for their extreme asceticism, their rules in regard to fasting, silence, and penances being most severe. Like the Benedictines, they wear white robes.

Cam and Isis, a familiar couplet by which the sister universities of Cambridge and Oxford are often mentioned. The allusion is to the rivers on which they are situated.

"May you, my Cam and Isis, preach it long;
The right divine of kings to govern wrong."
—POPE, "The Dunciad."

"The drooping Muses, (Sir Industry),
Brought to another Castalie,
Where Isis many a famous nursing breeds
Or where old Cam soft passes o'er the lea,
In pensive mood."
—THOMSON, "Castle of Indolence."

Camargue, La (kä-marg'), the delta of the Rhône, in Southern France, department of Bouches-du-Rhône. It is protected from

Camarilla

the inundations of the river by dykes, and is mostly an unhealthy tract of pools and marshes, only a small portion of it being cultivated.

Camarilla (a little chamber), a word first employed in the time of Ferdinand VII., of Spain (1814-1833), and which now signifies throughout Europe the influence exercised on the State by the court party, the favorites and sycophants of a pope or monarch, in opposition to the advice of his legitimate ministers.

Camayeu, or Camaieu, a term used in painting where there is only one color, and where the lights and shadows are of gold, wrought on a golden or azure ground. This kind of work is chiefly used to represent *bassi relievi*.

Cambaceres, Jean Jacques de (kon-bä-sā-rāz'), a French Senator; born in Montpellier, Oct. 18, 1753. When the Revolution broke out, he was chosen to represent the Order of the Nobles in the Legislative Assembly, and soon afterward as a Deputy to the Convention. During the reign of terror which followed the condemnation of Louis XVI. Cambacérès endeavored, though cautiously, to check the illegal and arbitrary measures of the Assembly. Subsequently he was a member of the Council of Five Hundred, and devoted much time and labor in the classification of the civil laws; and in 1796 drew up a "Plan of a Civil Code," which became the basis of the "Napoleonic Code," of which he was one of the compilers. He was a zealous supporter of Napoleon. On the abdication of Napoleon, in 1814, Cambacérès withdrew into private life, but on the return of the emperor from Elba, he was again promoted to the office of Minister of Justice. After the final overthrow of Napoleon, Cambacérès was banished from France on the ground of his having voted for the death of Louis XVI.; but in 1818 he was reinstated in all his civil and political rights, and permitted to return to Paris, where he died, March 8, 1824.

Cambaluc, or Cambalu, the name by which the city which we now know as Peking became known to Europe during the Middle Ages.

Cambay, a feudatory state in India, Bombay Presidency, lying at the head of the gulf of the same name in the W. part of Gujarāt. Area, 350 square miles; pop. 86,074. Also, chief town of above state, situated at the head of the Gulf of Cambay, formerly a flourishing port, but now decayed. Pop. 36,007. The gulf separates the peninsula of Kathiawar from the N. coast of Bombay, having a length of about 80 miles, and an average breadth of 25 miles.

Cambert, Robert (kon-bār'), a French musician; born in Paris about 1628. He

Cambodia

founded the Royal Academy of Music, now the Paris Grand Opera. He was the first French opera composer, his works including "Ariadne" and "Adonis." He died in London about 1677.

Camberwell, a suburb of London, on the S. side of the Thames, in the county of Surrey. Pop. (1891) 235,312. See LONDON.

Camberwell Beauty, a rare British butterfly, *Vanessa Antiopa*, so named from having been sometimes found at Camberwell, and from its great beauty. The wings are deep, rich, velvety brown, with a band of black, containing a row of large blue spots around the brown, and an outer band or margin of pale yellow, dappled with black spots. The caterpillar feeds on the willow.

Cambium, the viscid substance which appears, in the spring, between the wood and bark of exogenous trees when the new wood is forming, and again disappears as soon as the wood is completely formed. It reappears whenever the plant is again called into growth, as at midsummer, in those species which shoot twice a year.

Cambles, a gluttonous king of Lydia, who is said to have eaten his own wife, and afterward killed himself for the act.

Cambodia, or Camboja, nominally a State in Indo-China under a French protectorate, but practically a French dependency, on the lower course of the Mekong, 220 miles from N. E. to S. W., and 150 miles broad, comprising an area of 37,400 square miles; pop. (1896) 1,500,000. It is bounded on the S. E. and S. by French Cochinchina; on the S. W. by the Gulf of Siam; on the N. by Siam; on the E., toward Annam, where the frontier traversing imperfectly explored territories is vague, by the territories of independent Mois tribes. The coast, 156 miles long, indented about the middle by the Bay of Kompong-Som, offers but one port, Kampot. Among the numerous islands along the coast are Kong, Rong, Hon-Nan-Trung, etc., most of them inhabited. The principal river, the Mekong (in Cambodian, Tonlé-Tom—*i. e.*, "great river"), flows through Cambodia from N. to S. as far as Chen-Tel-Pho, and thence S. W. till, at the town of Pnom-Penh, it divides into two arms, the Han-Giang, or Bassac, and the Tien-Giang, or Anterior river, both flowing S. Above Pnom-Penh is a N. N. W. outlet for the surcharge of the Great river, the Tonlé-Sap (*i. e.*, "river of sweet water"), expanding into the Great Lake, 100 miles by 25 miles in area, with a depth of 65 feet at its maximum magnitude. France, on Aug. 11, 1863, concluded a treaty with the King of Cambodia, Norodom, placing Cambodia under a French protectorate. This treaty was superseded by that of June 17, 1884, under which the King

Cambon

of Cambodia accepted all the reforms, administrative, judiciary, financial, and commercial, which the government of France might institute. The Cambodians approach the Malay and Indian types, are less Mongoloid and more nearly resemble the Caucasian type than their neighbors. Capital, Pnom-Penh.

Cambon, Jules Martin, a French diplomatist; born in Paris, April 5, 1845. He studied law and fought in the Franco-Prussian War, and entering the civil service, became prefect of the Department of Constantine in 1878, prefect of the Department du Nord in 1882, prefect of the Rhone in 1887, Ambassador to the United States in 1897, and Ambassador to Spain in 1902. He represented Spain in drawing up the Spanish-American protocol in 1898.

Cambon, Paul, a French diplomatist; born in Paris, Jan. 20, 1843. He was graduated at the Ecole Polytechnique in 1863, and, after serving as Secretary to Jules Ferry, became Secretary of Prefecture for the Alpes-Maritimes, Prefect of the Aube, and French Resident-General in Tunis. After serving as Ambassador at Constantinople, he was transferred to London in 1898.

Cambray, or **Cambrai**, a fortified city of France, in the department of Nord, capital of the arrondissement, on the Scheldt, 32 miles S. S. E. of Lille. Its fortifications were improved by Vauban; the town is well built, and has a magnificent parade ground. Its principal public buildings are the Cathedral, the City Hall, and the Theater, and it has some good schools of art and a public library. Cambray was formerly an archbishopric, and has to boast of having had Fénelon, who died here in 1715, among its prelates. Cambray has long been famous for its manufacture of fine linens and lawns, whence all similar fabrics are called cambrics. It has also manufactures of thread, cottons, soap, leather, linens, etc. It is a very ancient city, having been an important place under the Romans. In 1508 the League of Cambray was concluded here. It was formed by Maximilian I. of Germany, Louis XII. of France, the King of Aragon, Ferdinand of Spain, and Pope Julius, against the Venetian Republic. In 1529 peace between Francis I. and Charles V. was also concluded here. This was called the Ladies' Treaty, being negotiated by Margaret of Austria, Charles V.'s aunt, and Louise of Savoy, Francis I.'s mother. In 1536 this treaty, which was disadvantageous to France, was broken. **Pop.** (1901) 26,586.

Cambria, the ancient name of Wales, the *Britannia Secunda* of the Romans. The name is derived from that of Cimbri, or Cymri, by which the Welsh have always called themselves.

Cambridge

Cambrian Rocks, in geology, an extensive series of gritstones, sandstones, conglomerates, slates, and shales, lying under the Lower Silurian beds, and above the Archæan, and divided into the Upper and Lower Cambrian. Many fossils occur in the series, including sponges, star-fishes, trilobites, brachiopods, lamellibranchs, pteropods, gasteropods, cephalopods, etc. They may be regarded as the bottom rocks of the Silurian system, and are well developed in N. Wales (hence the name), but can be recognized in many other regions.

Cambric, originally the name of a fine kind of linen which was manufactured principally at Cambrai (German *Kambryk*) in French Flanders, whence the name. It is now applied to a cotton fabric, which is very extensively manufactured in imitation of the true cambric, and which is in reality a kind of muslin.

Cambridge, a city, and one of the county seats of Middlesex county, Mass., on the Charles river and the Fitchburg railroad; opposite to and connected with Boston by four bridges. It was founded in 1630-1631, under the name of "Newe-Towne," or "Newtown," and did not receive its present name until several years later. In 1636 the General Court appropriated \$2,000 to locate a school in Old Cambridge, which later became Harvard College, now Harvard University. In 1631 Cambridge was 35 miles long and only 1 mile wide, including the townships now incorporated as Billerica, Bedford, Lexington, Arlington, Brighton, and Newton, all these having been gradually separated from it. The city was formerly divided into villages called Old Cambridge, Cambridgeport, East Cambridge, and North Cambridge, names which are still used. It has grown into a populous manufacturing center, where glass, furniture, organs, steam-engines, etc., are made, the value of which amounts annually to over \$35,000,000. Here also is located the massive stone Court-house of Middlesex county. The first printing office in the United States was located in Cambridge, and the "Bay Psalm-Book," published by Stephen Day and printed in 1640, was the first book from this press. Cambridge has now extensive printing establishments, including the Riverside Press and the University Press. For historical and literary associations, Cambridge is one of the most famous cities in the United States. The venerable Washington elm, under which Washington took command of the American Army, July 3, 1775, stands at the corner of Mason and Garden streets. "Craigie House," built by Col. John Vassall in 1759, was Washington's headquarters in 1775-1776, and afterward became the home of the poet Henry W. Longfellow until his death. On Elm avenue is "Elmwood," the

Cambridge

birthplace and home of James Russell Lowell, who lived here 1819-1891. A part of this place has been bought by public subscription, to be preserved as a public park. This city has been the home of such distinguished men as Oliver Wendell Holmes, William Henry Channing, Margaret Fuller Ossoli, Col. Thomas Wentworth Higginson, Louis Agassiz, John Fiske, and Charles Eliot Norton. The fine city-hall and land for a park was the gift of a former citizen, Frederick H. Rindge, who also presented the city with a public library, an institution now called the Rindge Manual Training School, and other benefactions which amounted to more than \$1,000,000. The beautiful Mount Auburn Cemetery is partly in Cambridge and partly in Watertown. Pop. (1900) 91,886; (1910) 104,839. See HARVARD UNIVERSITY.

Cambridge, a borough and county seat of Cambridge county, England, and seat of one of the most noted of English universities; on the Cam river; 48 miles N. by E. of London. The greater part of this town is embosomed in the foliage of the gardens of its numerous colleges. The streets are mostly narrow and irregular, houses ancient, and the place is well lighted, paved, and sewered. Of the fine churches here, St. Mary's, St. Sepulchre's, and Trinity are deserving of special mention. Cambridge derives a considerable trade from the agricultural products of the surrounding country; but its chief prosperity is derived from its university.

Cambridge University, a celebrated seat of learning and education, dating from certain public schools established in Cambridge in the 7th century. The first college was founded under royal charter in 1237. The number of colleges established are 20, viz:—Peterhouse, Clare Hall, Pembroke, Caius and Gonville, Trinity Hall, Corpus Christi, King's, Queens, St. Catherine's, Jesus, Christ's, St. John's, Magdalen, Trinity, Emmanuel, Sidney-Sussex, Downing, and Selwyn. Newnham and Girton Colleges are exclusively for women. The university statutes were confirmed by Victoria on July 31, 1858. Since 1881 women have been admitted on practically the same terms as men. There are 18 colleges and universities, scattered throughout the British possessions, in affiliation with the university, and the teaching staff aggregates over 150 and the undergraduates over 3,700.

Cambuscan, a prince of Cambaluc (Peking), whose name is a corruption of Genghis Khan, while the description applies apparently to his grandson, Kublai Khan. This was Milton's form of the Cambynskan of Chaucer's fragment of a metrical romance, "The Squieres Tale." Spenser continues and finishes the tale in his "Faerie Queen" (IV., ii and iii); and John Lane,

Camden

a friend of Milton's father, also wrote a continuation. Some of the romantic elements in it are widespread in Oriental story, occurring in the "Arabian Nights," the "Panchatantra," and elsewhere.

Cambyses, (1) a Persian of noble blood, to whom King Astyages gave his daughter Mandane in marriage. Astyages was dethroned by Cyrus, the offspring of this union. (2) The son of Cyrus the Great, and grandson of the preceding, became, after the death of his father, King of the Persians and Medes, B. C. 529. In the fifth year of his reign he invaded Egypt, conquering the whole kingdom within six months. But his expeditions against the Ammonites and Ethiopians having failed, his violent and vindictive nature broke out in cruel treatment of his subjects, his brother Smerdis and his own wife being among his victims. He died in 521 B. C.

Camden, city, port of entry, and county seat of Camden county, N. J.; on the Delaware river, opposite Philadelphia, with which it is connected by several ferries. The city is situated on a level plain and the streets cross one another at right angles. It is noted for its immense market gardens and manufactures, and is the site of several large shipbuilding concerns. Area 5 square miles.

Business Interests.—According to the Federal census of 1900 Camden had 817 manufacturing establishments, employing \$16,430,611 capital and 9,677 persons; paying \$4,540,032 for wages and \$11,499,151 for materials; and having an aggregate output valued at \$20,451,874. The most important industries were carpentry, foundry and machine-shop products, shipbuilding, worsted goods, oil cloth, boots and shoes, masonry, and textile fabrics. There were 3 National banks in 1899 with a combined capital of \$560,000 and surplus of \$315,000, and several private banking houses. The assessed valuation in 1900 exceeded \$16,000,000, and the tax rate was \$22 per \$1,000.

Public Interests.—In 1899 the city had 120 miles of streets, of which 55 miles were paved, 46 miles of sewers, 110 miles of water mains; and oil, gas, and electric street lighting and water-works plants, the latter owned by the city. The notable buildings are the City Hall, County Buildings, and the hospitals and churches. At the close of the school year 1898-1899 there were 21 public school buildings, 11,941 pupils, 241 teachers, and a public and a private high school.

History.—The city was chartered in 1828, and became an important commercial and business center with the incorporation of the Camden and Amboy railroad in 1833. Pop. (1900) 75,935; (1910) 94,538.

Camden

Camden, a town and county seat of Ker-shaw county, S. C.; on the Charleston, Cincinnati, and Chicago, the South Carolina and Georgia, and the Ohio river and Charleston railroads; 32 miles N. E. of Columbia. It has extensive cotton and grain interests and is a health resort for sufferers from throat and lung troubles. Camden was the site of three noted battles. On Aug. 16, 1780, the American forces under General Gates, 3,600 strong, chiefly militia, were totally defeated by Lord Cornwallis. This ended Gates's military career; he was removed from command and suspended from service pending an inquiry into his conduct. In this action Baron De Kalb, commanding the right wing, was mortally wounded. Congress erected a marble monument in his honor on the street which bears his name; La Fayette laid the corner stone in 1825. On April 25, 1781, Greene, who had succeeded Gates, was attacked and worsted by Lord Rawdon at Hobkirk's Hill, near Camden; 100 or more were killed on each side; the Americans lost 100 prisoners. On Feb. 24, 1865, Camden was taken by General Sherman after a lively skirmish. Two thousand bales of cotton and a quantity of tobacco were burned. Camden has several manufactories and newspapers, a savings bank, and an assessed property valuation of \$600,000. Pop. (1890) 3,533; (1900) 2,441.

Camden, Charles Pratt, Marquis, an English statesman, youngest son of Sir John Pratt, Chief Justice of the Court of King's Bench; born in 1714. After having studied for the law, he was called to the bar in 1738. After nearly 20 years devoted to close study and but little employment, he was appointed attorney-general, and later lord chief justice. In 1765 he was raised to the peerage as Baron Camden. He distinguished himself at once by his exertions in behalf of the American colonies, and in 1766 rose to the highest legal dignity, that of lord high chancellor. He died in London, April 18, 1794.

Camden, William, an English antiquarian; born in London, May 2, 1551; was renowned for his Anglo-Saxon learning, and wrote: "Description of Great Britain in Ancient Times"; "Annals of the Reign of Elizabeth," and other works. He died in Chislehurst, Nov. 9, 1623.

Camel, a genus of ruminant quadrupeds, characterized by the absence of horns; the possession of incisive, canine, and molar teeth; a fissure in the upper lip; a long and arched neck; one or two humps or protuberances on the back; a broad elastic foot ending in two small hoofs, which does not sink readily in the sand of the desert. The native country of the camel is said to extend from Morocco to China, within a

Camel

zone of 900 or 1,000 miles in breadth. The common camel (*Camelus Bactrianus*), having two humps, is only found in the N. part of this region, and exclusively from the ancient Bactria, now Turkestan, to China. The dromedary, or single-hump camel (*Camelus dromedarius*, or Arabian camel) is found throughout the entire length of this zone, on its S. side, as far as Africa and India. The Bactrian species is the larger, more robust, and more fitted for carrying heavy burdens. The dromedary has been called the race-horse of its species. To people residing in the vicinity of the great deserts the camel is an invaluable mode of conveyance. It will travel three days under a load and five days under a rider without drinking. The stronger varieties carry from 700 to 1,000 pounds burden.

The camel's power of enduring thirst is partly due to the peculiar structure of its stomach, to which are attached little



CAMEL.

pouches or water cells, capable of straining off and storing up water for future use, when journeying across the desert. It can live on little food, and of the coarsest kind, leaves of trees, nettles, shrubs, twigs, etc. In this it is helped by the fact that its humps are mere accumulations of fat (the back-bone of the animal being quite straight) and form a store upon which the system can draw when the outside supply is defective. Hence the camel driver who is about to start on a journey takes care to see that the humps of his animal present a full and healthy appearance. Camels which carry heavy burdens will do about 25 miles a day; those which are used for speed alone, from 60 to 90 miles a day.

The camel is rather passive than docile, showing less intelligent coöperation with its master than the horse or elephant; but it is very vindictive when injured. It lives from 40 to 50 years. Its flesh is esteemed by the Arab and its milk is his common food. The hair of the camel serves in the East for making cloth for tents, carpets and wearing apparel. It is imported into European countries for the manufacture of

Camel

fine pencils for painting and for other purposes. The South American members of the family Camelidæ constitute the genus *Auchenia*, to which the llama and alpaca belong; they have no humps.

Camel, a water-tight box or caisson used to raise a sunken vessel, or to float a vessel over a shoal or bar. It is let down with water in it, and is attached to the vessel, after which the water is pumped out, and the camel rises from its buoyancy.

Camellia, a genus of plants, order Ternströmiaceæ (theads). It is very near akin to thea, which contains the tea plant; indeed, some botanists combine the two genera into one. The native countries of the camellias are the E. side of the Himalaya mountains, Cochin-China, China, Japan and the Eastern Islands.

Camelopard, a name given to the giraffe (*Camelopardalis giraffa*), originally from the notion that it was a kind of hybrid between a camel and leopard. It constitutes the only species of its genus and family (Camelopardalidæ or Devexa).

Camelopardalis, one of the N. circumpolar constellations added by Hevelius in 1690. It is a large irregularly shaped constellation, something like the animal, and is more than 40° in length, with its head close to the North Pole. It contains no stars brighter than the fourth magnitude, and was put in to fill up a part of the sky otherwise uncovered by constellations. Being introduced later than Bayer's time, it has no letters except α , β and γ , which Baily introduced into the "B. A. C." in 1845. While these have not been universally accepted by astronomers, they will probably be adopted in a general revision of the N. constellations. Camelopardalis borders upon Ursa Minor, Draco, Ursa Major, Lynx, Auriga, Perseus, Cassiopeia, and Cepheus.

Camelot (kam'e-lot), a name applied in the mediæval romances to the splendid "City of Legions" which grew up out of the permanent quarters of the Second Augusta Legion at Caerleon-upon Usk, but was built earlier by the mythical Belinus. The name is familiar to readers of Tennyson.

Camel's Hump, one of the peaks of the Green Mountains, in Vermont, 17 miles W. of Montpelier.

Camel's Thorn, a name of several plants belonging to the natural order Leguminosæ, and the sub-order Papilionaceæ. They are herbaceous or half-shrubby plants growing in the deserts of Egypt and the East, and derive their name from the fact that they afford a food relished by camels. Some of the species yield a manna-like exudation from the leaves and branches.

Camera Lucida

Cameo, a term applied to gems of different colors sculptured in relief. The art of engraving on gems boasts of high antiquity, having been practised with various degrees of success by the Egyptians, Greeks, and Romans. It was revived in Italy in the 15th century, and is even at the present day cultivated with considerable success. The cameos of the ancients were usually con-

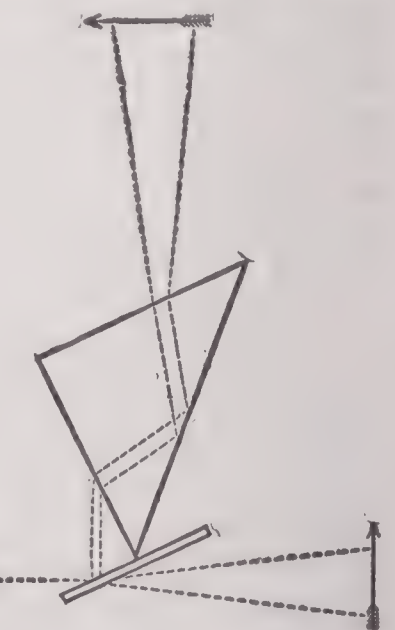


CAMEO.

fined to the agate, onyx, and sard, which, on account of the variety of their strata, were better suited to display the artist's talents; but they are also occasionally found executed on opal, beryl, or emerald,

and even on a sort of factitious stone, the *Vitrum obsidianum* of Pliny, distinguished by the moderns as the antique paste. One of the most famous cameos is the onyx at present in Paris called the "Apotheosis of Augustus." It is 1

foot in height, and 10 inches in width.



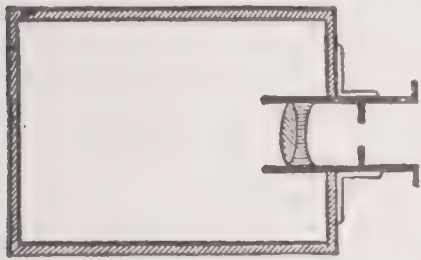
CAMERA LUCIDA.

Camera Lucida, an instrument invented by Wollaston in 1804; designed to produce on a plane surface a representation of a landscape or other visible object, which will enable one to delineate it with accuracy. It consists of a glass prism of such a form

Camera Obscura

that its base has the following angles: 90° , $67\frac{1}{2}^\circ$, 135° , and $67\frac{1}{2}^\circ$. An object placed at a proper distance, in a horizontal direction, from one of the planes inclosing the right angles, will send forth rays which in their passage through the prism will be twice totally reflected, and finally reaching the observer's eye, placed near one of the acute angles and looking downward, will enable it to see the object of which it is in quest depicted on a surface placed in proper focus beneath. Another form of the camera lucida consists of a piece of smooth glass set at an angle of 45° to the horizon. An image falling upon it is perfectly reflected, so that the observer looking vertically downward will see the image and will be able to trace it.

Camera Obscura, an optical instrument used to view or sketch objects at a short distance. It consists of a rectangular box, formed of two parts sliding in each other, like the joints of a telescope, so as to adjust the focus to bodies more or less distant. A tube with a lens is fixed in one side of it, and is turned to the object to be



CAMERA OBSCURA.

represented. The rays entering fall on a mirror sloped at an angle of 45° , which reflect them upward to the observer's eye. It is convenient that they may be made to

pass through a horizontal plate of glass, on which tracing paper may be placed so as to enable one to draw the figure if he be so disposed, but now this is generally done by photography. A lid to the box is of use in ridding the observer of superfluous light. It is supposed to have been invented by Baptista Porta in the 16th century, although it is said that Roger Bacon wrote a description of it 300 years before.

Camera, Photographic, a camera obscura so constructed that sensitized plates or films may be placed at the back and receive the image. There are many styles of camera in use, those of the tripod variety being used for portraits, and landscapes where a long exposure is required, and the hand camera used by tourists on account of its convenient shape and size. See PHOTOGRAPHY.

Camerarius, Joachim, a German scholar; born in Bamberg, April 12, 1500. He embraced the doctrines of the Reformation, was made professor of belles-lettres at Nuremberg, and afterwards removed to Leipsic to superintend the university of that city. He aided his friend Melancthon in drawing up the famous "Confession of Augsburg," and wrote some valuable books,

Cameron

mostly on classical and religious matters. He died in Leipsic, April 17, 1574. His



JOACHIM CAMERARIUS.

son, Joachim, born in 1554, made botany his favorite study. He died in Nuremberg in 1598.

Camerarius, Rudolph Jakob, a German botanist, in charge of the botanic garden at Tübingen; born in Würtemberg, Feb. 12, 1665. To him is ascribed the discovery of the sexual relation in plants. He was also a medical professor. He died in Tübingen, Sept. 11, 1721.

Camerlengo, (Ital. *camerlingo*, "a chamberlain") one of the highest officers of the Vatican court. A cardinal camerlengo, during a vacancy in the holy see, takes charge of all the temporalities, and presides over the apostolic chamber or palace.

Cameron, Arnold Guyot, an American educator; born in Princeton, N. J., March 4, 1864; was graduated at Princeton University in 1886, and during the next two years studied abroad. In 1888-1891 he was professor of French and German languages and their literatures in Miami University; in 1891-1897, assistant professor of French in the Sheffield Scientific School of Yale University; and in 1897 accepted the chair of French at the John C. Green School of Science of Princeton University. He is editor of the text books: "Daudet," "Mérimée," "Loti," "Coppée and Maupassant," and "The Goncourts."

Cameron, Sir Charles Alexander, an Irish physician; born in Dublin, July 16, 1830; was elected public analyst for the city of Dublin in 1862. He was the only one who succeeded in applying the Adulteration of Food Act of 1860. In 1867 he was elected Professor of Hygiene or Political Medicine in the Royal College of Surgeons, in Ireland. His lectures on Hygiene, open to ladies, were largely attended. He was knighted in 1886, in recognition of his services to public health. He wrote: "Chem-

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istry of Agriculture" (1857); "Lectures on Public Health" (1868); "History of the Royal College of Surgeons, Ireland, etc." (1886); "Elementary Chemistry and Geology" (1896); etc.

Cameron, Emily Lovett, an English novelist; born in Walthamstow. Her novels deal mostly with personal complications, and include: "The Cost of a Lie" (1886); "The Dead Past" (1886); and "Pure Gold" (1887) — all involving the somber side of sentiment.

Cameron, Henry Clay, an American educator; born in Shepherdstown, Va., Sept. 1, 1827. He was graduated at Princeton College in 1847, and at the Princeton Theological Seminary in 1855; and was connected with the department of Greek at Princeton in 1852-1902. He was twice sent to the Presbyterian General Assembly and wrote "Princeton Roll of Honor," "History of the American Whig Society"; "Old Princeton, its Battle, its Cannon, etc.," and other works. He died Oct. 26, 1906.

Cameron, James Donald, an American capitalist and politician; born in Middletown, Pa., May 14, 1833; oldest son of Simon Cameron; was graduated at Princeton College in 1852. He devoted himself to business pursuits and in 1861 was made vice-president and two years later president of the Northern Central Railroad. He remained in this office till 1874. In 1876 President Grant appointed him Secretary of War, and in 1877 he succeeded his father as United States Senator from Pennsylvania. He was reelected in 1885 and 1890.

Cameron, John, a Scotch scholar; born in Glasgow about 1579, and educated at the university of that city. In 1600 he went to the Continent, where his ability and erudition secured for him several appointments at Bergerac, Sedan, Saumur, and other seats of learning. Returning to Great Britain in 1620, he was two years later appointed principal of the university of Glasgow; but in less than a year he returned to Saumur, and thence to Montauban, where he received a divinity professorship. Here, as at Glasgow, his doctrine of passive obedience made him many enemies, by one of whom he was stabbed in the street, and he died from the effects of the wound in 1625. Sir Thomas Urquhart styles him a "walking library," and Milton, "an ingenious writer in high esteem." He was considered one of the best scholars of his day; in Biblical criticism he was inclined to be perverse; where there was a difficulty he usually chose the opposite view to that held by other divines, especially Beza. His theological opinions were of a somewhat lax character, his eight works, in Latin and French (10 vols., 1616-1642), being said to be the foundation of Moses Amyraut's doc-

Cameron

trine of universal grace (1634). His followers are sometimes called Cameronites.

Cameron, Richard, a Scotch Covenant-er; born in Falkland, Fife. Becoming an enthusiastic votary of the pure Presbyterian system, on June 20, 1680, at the head of a small band of followers, he entered Sanquhar, and formally renounced allegiance to the king (Charles II.) on account of his misgovernment. The little band kept in arms for a month in the mountainous country between Nithsdale and Ayrshire, but were at length surprised by a much superior force at Aird's Moss, and after a stubborn fight overcome. Cameron was among the slain.

Cameron, Sir Roderick William, a Canadian capitalist; born in Williamstown, Ontario, July 25, 1825. He entered mercantile life in New York as a youth and acquired a large fortune as an exporter and importer. He was knighted in 1883. He became prominent as a turfman and yacht owner, and was prominent in Canadian-American diplomacy. Died Oct. 24, 1900.

Cameron, Simon, an American statesman; born in Maytown, Lancaster co., Pa., March 8, 1799; began, when 9 years of age, to learn the trade of a printer. In 1820 he was editor of a paper in Doylestown, Pa., and in 1822 he held a similar post in Harrisburg. He then interested himself in banking and the building of railroads, and for a time served as Adjutant-General of Pennsylvania. From 1845 to 1849 he was United States Senator from Pennsylvania, elected by the Democratic party. He became a member of the Republican party on its formation, and in 1856 he was again elected United States Senator. He was unsuccessfully supported for the offices of both President and Vice-President in the National Convention of 1860, and in 1861 he was appointed Secretary of War by President Lincoln. He advocated the arming of fugitive slaves, and other extreme measures. In January, 1862, he resigned from the Cabinet, and was appointed minister to Russia. He succeeded in gaining the support of the Russian government for the Union. In November of the same year he resigned, and lived in retirement till 1866, when he was again elected to the United States Senate. In 1872 he became chairman of the Committee on Foreign Affairs. In 1877 he retired from the Senate in favor of his son, James Donald Cameron. His influence over the Republican party was strong, and his power in the politics of his State practically absolute. He died in Maytown (near Donegal), Pa., June 26, 1889.

Cameron, Verney Lovett, an English explorer and writer; born in Radipole, Dorsetshire July 1, 1844. Famed for his

Cameron

feats of travel, he turned them to account in "Harry Raymond" (1886), a tale of adventure among pirates; "The Cruise of the Black Prince Privateer" (1886); and "Across Africa" (1877). He died in Leighton-Buzard, March 26, 1894.

Cameron Highlanders, the 79th Regiment in the British Army, raised in 1793 by Allan Cameron of Erroch. It wears the Highland dress.

Cameronian Regiment, a British regiment, raised in 1689 among the Cameronians of the W. of Scotland to support William III., and long famous as the 26th Regiment. It forms now the first battalion of the Cameronians (Scottish Rifles).

Cameroon. See KAMERUN.

Camilla, a famous queen of the Volsci, who opposed Æneas on his landing in Italy.

Camillus, Marcus Furius, a Roman patrician, famous as the deliverer of the city of Rome from the Gauls. In B. C. 396 he was made dictator during the Veientine war, and captured the town of Veii by mining, after it had defied the Roman power for 10 years. In B. C. 394 Camillus besieged the Falerii, and by an act of generosity induced them to surrender. Three years after, the envy and jealousy of enemies caused him to exile himself for a time, and he was living in retirement when the Gauls, under Brennus, invaded and captured Rome, with the exception of the Capitol. Camillus was now appointed dictator a second time, and was successful in repelling the invaders. After having been four times appointed dictator, a new invasion of the Gauls called Camillus, now 80 years old, again to the front, and for the fifth and last time, being appointed dictator, he defeated and dispersed the barbarians. He died in B. C. 365. Probably there is a certain amount of myth in the story of his life.

Camisards, the title given to the Protestant insurgents in the Cévennes, after the revocation of the Edict of Nantes, from having worn their shirts over their dress by way of disguise, on the occasion of some nocturnal attacks. Their principal leader, Cavalier, succeeded so far as to effect a capitulation in their favor, with the French government. He subsequently entered the English service, and at his death was Governor of Jersey.

Camlet, originally a fabric made of camel's hair, is now as a rule made from the hair of the Angora goat, or even, in Great Britain, of wool, or of wool mixed with silk, cotton, or linen.

Camoens, Luis de (kam'ō-ens), a Portuguese poet; born in Lisbon, probably in 1524 or 1525. Disappointed in love, he became a soldier, and served in the fleet which the

Camomile

Portuguese sent against Morocco, losing his right eye in a naval engagement before Ceuta. An affray into which he was drawn was the cause of his embarking in 1553 for India. He landed at Goa, but, being unfavorably impressed with the life led by the ruling Portuguese there, wrote a satire which caused his banishment to Macao (1556). Here, however, he was appointed to an honorable position as administrator of the property of absentee and deceased Portuguese, and here, too, in what were the quietest and most prosperous years of his life, he wrote the earlier cantos of his great poem, the "Lusiad." Returning to Goa in 1561, he was shipwrecked and lost all his property except his precious manuscript. After much misfortune Camoens in 1570



CAMOENS.

arrived once more in his native land, poor and without influence, as he had left it. The "Lusiad" was now printed at Lisbon (1572), and celebrating as it did, the glories of the Portuguese conquests in India, acquired at once a wide popularity. The king himself accepted the dedication of the poem, but the only reward Camoens obtained was a pittance insufficient to save him from poverty; and it is said that his faithful Javanese servant had often to beg food for them both in the streets. The "Lusiad" is an epic poem in 10 cantos. Its subject is the voyage of Vasco da Gama to the East Indies; but many other events in the history of Portugal are also introduced. The other works of Camoens consist of sonnets, songs, epigrams, dramas, etc. He died June 18, 1579.

Camomile, or **Chamomile**, a genus of compositæ. The species are annual and

Camorra

perennial herbs, all palæarctic. The most important species of the genus is *A. nobilis*, which has long been known for the medicinal virtues of an infusion of its flowers (*Flores Anthemidis*) as a bitter stomachic and tonic. These properties seem mainly due to an essential oil which is prepared by distillation; a bitter principle is also present, but no alkaloid. The plant is chiefly cultivated at Mitcham, Surrey, England, and at Kieritzch and elsewhere in Saxony. Its flowers differ from the wild forms in being all more or less double, but those in which the conversion of tubular into ligulate florets has been less complete, leaving a somewhat yellow center, are called by druggists *single camomiles*. The largest, whitest, and most completely double flowers are most esteemed. The other British species are mere weeds; one of them, called stinking camomile (*A. cotula*), is so acrid as to blister the fingers. But the flowers of the Dyer's Camomile (*A. tinctoria*), common on the Continent, yield a beautiful dye.

Wild camomile (*matricaria chamomilla*) is the common camomile of German writers. It has long been employed as an adulterant or substitute for the other, and (illicitly) in brewing; its flowerheads are, however, easily distinguished, being quite single and not bitter; the receptacle is also hollow and devoid of the bracteoles which largely characterize the true camomile. A cultivated variety of *M. Parthenium* (Feverfew) has also to be distinguished. The camomile of the Indian bazars is said to be a variety (*M. suaveolens*) of the former species.

Camorra, a well-organized secret society, once spread throughout all parts of the kingdom of Naples. At one time the *Camorristi* were all-powerful, levying a kind of blackmail at all markets, fairs, and public gatherings, claiming the right of deciding disputes, hiring themselves out for any criminal service from the passing of contraband goods to assassination. It had central stations in all the large provincial towns, and a regular staff of recruiting officers. Though properly a secret society, it did not find it necessary under the régime of the Bourbons to conceal its operations; but under the present government of united Italy, the society, if it has not quite ceased to exist, has lost almost all its power, except in the wilder parts of S. Italy.

Camp, the space occupied by an army halted with tents pitched. (1) Old British Camp: A camp not angular occurring in England is, as a rule, of British origin; one with angles is presumably Roman. (2) Old Roman Camp: A Roman encampment was as a rule, a square, each side of it 2,150 Roman or 2,077½ English feet. Each of the sides had a gate. The

Campan

principia, or principal street, ran from side to side, not quite bisecting each of them. In the rear of it was another one parallel to the first. Behind this, part of the allied forces were encamped. In the center, between the two streets, were the quarters of the prætor commanding and his staff. Between the *principia* and the front of the camp the body of the troops were encamped. A street called *quintana* ran parallel to the others through the center of this main part of the camp, and five streets crossed it at right angles.

In modern camps, if not near the enemy, infantry are distributed on dry ground, the cavalry near water, the artillery near good roads, the hospital and transport in rear. If near the enemy, they are arranged in order of battle. An intrenched camp is one surrounded by earthworks. A flying camp is one to be occupied for a very brief period. A camp of instruction is one formed for the reception of troops to be maneuvered.

Camp, Walter, an American writer on athletics; born in New Haven, Conn., April 7, 1859. He was graduated at Yale (1880) and soon attained prominence with such writings as "Book of College Sports," "American Football," etc. He has edited various weekly papers devoted to sports.

Campagna di Roma (käm-pän'yä), the coast region of Middle Italy, in which Rome is situated, from 30 to 40 miles wide and 100 long, and forming the undulating mostly uncultivated plain which extends from near Civita Vecchia or Viterbo to Terracina, and includes the Pontine Marshes. The district is volcanic, and its lakes, Regillus, Albano, Nemi, etc., are evidently craters of extinct volcanoes. The soil is very fertile in the lower parts, though its cultivation is much neglected, owing to the malaria which makes residence there during midsummer very dangerous; and during the months of July, August, and September its inhabitants, chiefly herdsmen and peasants, seek refuge in Rome or the neighboring towns. In ancient times the Campagna, though never a salubrious district, was well cultivated and populated, the villas of the Roman aristocracy being numerous here. But inundations from the Tiber, and the discouragement of agricultural industry in the midst of wars and devastations, left the stagnant waters to become a source of pestilence, and the district became little better than a desert, nothing of its former prosperity being visible but the ruins of great temples, circuses, and monuments, and long rows of crumbling aqueducts overgrown with ivy and other creeping plants.

Campan, Jeanne Louise Henriette (kon-pon'), a French writer; born (Genest) in Paris, Oct. 6, 1752. Her "Memoirs of

the Private Life of Marie Antoinette" were based upon personal knowledge obtained in the capacity of lady-in-waiting; the "Correspondence with Queen Hortense" is a revelation of character of no small value; but the "Treatise on Education" is unimportant. She died in Mantes, May, 16, 1822.

Campanella, Tommaso (käm-pän-el'lä), an Italian philosopher; born in Stilo, Calabria, Sept. 5, 1568. At an unusually early age he had embraced the monastic life, astonishing his religious superiors with the precocious ripeness of his Thomistic scholarship, and writing poems and treatises that are still not beneath respect. For 27 years, however, he lay in a Spanish prison, because of his political indiscretions with the pen. During this period many of his treatises were compiled; but the ordeal broke his spirit and induced the impotence so characteristic of his thought in the very hour of its realization; the consequence being that even such great works as the "Treatise on Material Philosophy" (1623) and "Rational Philosophy" (1637) are painfully inadequate. Only his "Kingdom [or City] of the Sun" (1623), a work not unlike More's "Utopia," is very widely known. He died in Paris, May 21, 1639.

Campania, anciently a province on the W. coast of Italy, having Capua as its capital (now subdivided into the provinces of Benevento, Naples, Salerno, Avellino, and Caserta), lying between Latium, Samnium, and Lucania. It was one of the most productive plains in the world, yielding in extraordinary abundance corn, wine, and oil; and by both Greek and Roman writers is celebrated for its soft and genial climate, its landscapes, and its harbors. It was the *regio felix* of the Romans, who built here many of their most splendid villas, and made Baiæ, with its hot springs, the center of their fashionable world. The promontory Misenum, Mount Vesuvius, the river Volturnus, the towns Baiæ, Cumæ, Liternum, Puteoli, Naples, Herculaneum, Pompeii, Nola, Salernum, Capua, etc., belonged to Campania. In very early times the Greeks founded Cumæ, from which Puteoli, Naples, and other places were colonized. The district was next conquered by the Etruscans, by whom Capua, Nola, and other towns were founded, but who succumbed to the more warlike and hardy Samnites, who, in their turn, yielded to the irresistible valor of Rome. Through all these vicissitudes of conquest the substratum of the people remained as at the beginning. The mass of the Campanians were essentially of Oscan race, and Oscan they remained. Indeed it is mainly from them that our knowledge of the Oscan language is derived, and one of their towns, Atella, introduced to the early Roman stage a species of popular drama or comedy.

Campani-Alimenis, Matteo (käm-pän'e äl-ē-män'ēs), an Italian mechanician. In optics, his greatest achievement was the manufacture of the object-glasses, through which Cassini discovered two satellites of Saturn. He invented the illuminated dial for clocks.

Campanile, a tower for the reception of bells, principally used for church purposes, but now sometimes for domestic edifices. The campanile at Cremona is very celebrated, being 395 feet high. That at Florence, by Giotto, is 267 feet high, and 45 feet square. The most remarkable of the campaniles is that at Pisa, commonly called the "Leaning Tower." It is cylindrical in form, and surrounded by eight stories of columns, placed over one another, each having its entablature. The height is about 150 feet to the platform, whence a plumb-line lowered falls on the leaning side nearly 13 feet outside the base of the building.

The campanile of St. Mark, dominating all the surrounding buildings of St. Mark's Square, Venice, was the most conspicuous landmark of the city for over 1,000 years. It was begun by the Doge Pietro Tribuno about 900 and was finished in the 12th century, but received additions and restorations at various times. The tower was 325 feet high and 42 feet square at the base. The upper part was an open lantern with pyramidal roof surmounted by the colossal figure of an angel in gilt bronze. The campanile was built on a foundation of 10-foot piles of white poplar, close driven into the stiff clay. Above was a double layer of oak planks, and above these rough footings of trachyte and other volcanic stones. The ascent of the tower was made by a winding inclined plane of 38 bends with a few steps at the top. The view from the summit was well known to tourists, as it afforded a very extensive view of the city and the surrounding country, but no one was allowed to ascend unaccompanied. In former times the campanile was used by watchmen on the lookout for home-coming vessels, and from its top the news of victory was signaled to the citizens. In modern days the watchman of the campanile has carried a telescope to detect fires which might break out in the city.

On the morning of July 14, 1902, the campanile of St. Mark collapsed and fell with a great crash into the square. The church of St. Mark and the palace of the Doges were not hurt, but the campanile in falling carried away the Sansovino Loggetta and the library of the Royal Palace.

Campanulaceæ, a natural order of plants chiefly natives of this country, of the N. of Asia and Europe. More than 200 species of this family are known.

Campanulariadae, a family of marine polypes belonging to the order Hydroida.

Campanularida

Cells terminal, stalked campanulate; polypes with a large trumpet-shaped proboscis. There are six genera.

Campanularida, an order of hydroid zoöphytes. They are closely allied to the sertularida, but their hydrothecæ, with their containing polypites, are supported on conspicuous stalks, and are terminal, while those of the sertularida are sessile or subsessile and placed laterally. Nicolson thinks the two orders not properly distinct.

Campbell, Alexander, an American clergyman, originator (with his father, Thomas Campbell) of the religious body known as the Disciples of Christ (*q. v.*); born in the county of Antrim, Ireland, Sept. 12, 1788. He studied at the University of Glasgow, and came to the United States in 1809, settling with his father, who had preceded him, at Washington, Pa. He early adopted the opinions of his father, opposing creeds and basing religious authority on the Bible alone. Though at first a Presbyterian, in 1812 he formed a connection with the Baptists, and for some time he was an itinerant preacher, mainly in western Pennsylvania, Virginia, and Ohio. In 1826 he published a translation of the New Testament, in which the words "baptism" and "baptist" gave place to "immersion" and "immerser." By his discussions on public platforms, debates with prominent advocates of different views, and his serial publications, the "Christian Baptist" and the "Millennial Harbinger," as well as by his zeal in preaching and in training young men for the ministry, he gathered numerous followers, who began about 1827 to form themselves into the denomination above named. In 1841 he founded Bethany College, at Bethany, W. Va. His published works include about sixty volumes, among which his "Christian System" and "Remission of Sin" especially represent his doctrinal teaching. He died in Bethany, March 4, 1866.

Campbell, Alexander, an American politician; born in Concord, Pa., Oct. 4, 1814. He received a common-school education and entered the iron business, removing to Illinois and attaining prominence in local politics. He was mayor of La Salle, Ill., in 1852, a member of the Illinois Legislature in 1858 and a member of Congress in 1875. He was widely known as the "father of the Greenback party." He died in La Salle, Ill., Aug. 9, 1898.

Campbell, Sir Alexander, a Canadian statesman; born in Yorkshire, England, March 9, 1822. He was educated at Lachine, near Montreal, and at Kingston, Ontario. Began the practice of law in 1843, and in 1856 became Queen's counsel. In 1858 he was made a member of the legislative council, and in 1862 was elected Speaker. In 1864-1867 he was commissioner of Crown

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Lands. He was a member of the Quebec Conference in 1864 and received an appointment to the Dominion Senate (1867), where he was the Government leader. In 1867 he became a member of the Queen's Privy Council, and was Postmaster-General in Sir John Macdonald's first Federal Cabinet. In 1873 he became Minister of the Interior. With the other Cabinet officers, he resigned in the same year, because of the Pacific Railroad scandal. On the return of Macdonald to power, he was Minister of Militia and Defense and again Postmaster-General. In 1881 he was Minister of Justice, and in 1887 Lieutenant-Governor of Ontario. In politics he was a Conservative, and represented Canada in the imperial federation conference held at London in 1887. He died in Toronto, May 24, 1892.

Campbell, Allan, an American civil engineer; born in Albany, N. Y., in 1815. He laid out the route of the New York and Harlem railroad; built a railroad from Callao to Lima, Peru (1855); was appointed engineer of the harbor defenses of New York in the early part of the Civil War; was chief engineer in the construction of the Union Pacific railroad; superintended the Harlem railroad improvement, and became commissioner of public works in New York (1876). He died in New York city, March 18, 1894.

Campbell, Bartley, an American dramatist; born in Allegheny City, Pa., Aug. 12, 1843; established the "Evening Mail" in Pittsburg (1868); the "Southern Magazine" in New Orleans (1869). His first drama that met with success in New York city was "My Partner," appearing in 1879. "Fairfax, or Life in the Sunny South," and "The Galley Slave," were on the metropolitan boards during the same season. Included in his plays are: "Matrimony," "The White Slave," "Siberia," and "Paquita." Several of his plays were brought out in England. He died in Middletown, N. Y., July 30, 1888.

Campbell, Charles, an American historian; born in Petersburg, Va., May 1, 1807. Among his publications are: "The Bland Papers" (1840-1843); "An Introduction to the History of the Colony and Ancient Dominion of Virginia" (1849); "Genealogy of the Spotswood Family" (1868). He belonged to the Historical Society of Virginia; was a contributor of the "Historical Register" and the "Southern Literary Messenger"; and editor of the "Orderly Book" of Gen. Andrew Lewis in 1776 (Richmond, 1860). He died in Staunton, Va., July 11, 1876.

Campbell, Sir Colin, Lord Clyde, a British military officer; born in Glasgow, Oct. 20, 1792. His father was a carpenter, named Macliver, but Colin assumed the

name of Campbell. He was severely wounded at the siege of San Sebastian and the passage of the Bidassoa. He took part in the expedition to the United States (1814), and then passed nearly 30 years in garrison duty at Gibraltar, Barbadoes, Demerara, and various places in England, in 1837 becoming lieutenant-colonel of the 98th foot. On the outbreak of the Crimean War, in 1854, he was appointed to the command of the Highland Brigade; the victory of the Alma was mainly his; and his, too, the splendid repulse of the Russians by the "thin red line" in the battle of Balaklava. When, on July 11, 1857, the news reached England of the sepoy mutiny, Lord Palmerston offered him the command of the forces in India. He effected the final relief of Lucknow, and on Dec. 20, 1858, having five months earlier been created Lord Clyde, announced to the Viceroy that the rebellion was ended. Returning next year to England, he was made a field-marshal, and received a pension of \$10,000. He died Aug. 14, 1863.

Campbell, Douglas, an American lawyer and writer, son of W. W. Campbell; born in Cooperstown, N. Y., July 13, 1840; practised law in New York (1865-1890). He wrote "The Puritan in Holland, England, and America" (1892), considered an authoritative work. He died in Schenectady, N. Y., March 7, 1893.

Campbell, Douglas Houghton, an American educator; born in Detroit, Mich., Dec. 16, 1859; was graduated at the University of Michigan in 1882; then studied in Europe for four years. Returning he was Professor of Botany in the University of Indiana till 1891, when he was called to the similar chair in Stanford University. He is author of "Elements of Structural and Systematic Botany," "Structure and Development of Mosses and Ferns," and "Lectures on Evolution of Plants."

Campbell, George, a Scottish clergyman and writer; born in Aberdeen, Dec. 25, 1719. In his "Dissertation on Miracles" (1762) and "Philosophy of Rhetoric" (1776), he shows learning, ingenuity, and grace. He died in Aberdeen, April 6, 1796.

Campbell, Sir George, an English writer; born in 1824. He is best represented by his "Modern India" (1852); "White and Black in the United States;" and "The British Empire" (1889). He died in London, Feb. 18, 1892.

Campbell, Helen Stuart, an American sociological writer; born in Lockport, N. Y., July 4, 1839. Her early writings were published in newspapers and magazines. She has given close attention to the study of social problems in such works as "Prisoners of Poverty." From 1881 till 1884 she was literary editor of "Our Continent," Phila-

delphia. Her style is serious, witty, and emotional. Among her published books are "The Problem of the Poor" (1882); "The What-to-do Club" (1884); "Miss Melinda's Opportunity" (1886); "Ballantyne" (1901); etc.

Campbell, Henry Donald, an American scientist; born in Lexington, Va., July 29, 1862. He was graduated at Washington and Lee University in 1882; later studied at Berlin and Heidelberg, and in 1887 became Professor of Geology and Biology at Washington and Lee University.

Campbell, John, a British historian; born in Edinburgh, March 8, 1708. His writings before 1742 were published anonymously. From 1755 to the close of his life, he was agent of the British government for the province of Georgia. His works are in part: "Concise History of Spanish America" (1741); "Lives of the English Admirals" (1744); "A Survey of the Present State of Europe" (1750), and "Trade of Great Britain to America" (1772). He died Dec. 28, 1775.

Campbell, John Baron, a British jurist; born in Springfield, Fifeshire, Scotland, Sept. 15, 1779; was Lord Chancellor of England (1859-1861), and wrote "Lives of the Lord Chancellors" (1845-1848), and "Lives of the Chief Justices" (1849-1857), both well known and authoritative works. He died in London, June 23, 1861.

Campbell, Sir John Douglas Sutherland. See LORNE.

Campbell, John Francis, a Scotch folklorist and descriptive writer; born about 1822. His first success was "Popular Tales of the West Highlands" (1860-1862), an accurate and discriminating compilation; to which succeeded "Frost and Fire" (1865), a volume of semi-scientific and semi-descriptive miscellany. He died in Cannes, France, February, 1885.

Campbell, John M'Leod, a Scottish theologian; born in Kilninver, Argyll, May 4, 1800. Sent to Glasgow University at 11, he was licensed to preach by the presbytery of Lorne in 1821. His views on salvation and the atonement brought upon him a charge of heresy, which led to his deposition in 1831. For years he labored in the Highlands and preached without remuneration. When his health broke down he advised his people to attach themselves to the church of Norman Macleod. He spent the remainder of his life in retirement. In 1868 his university gave him the degree of D. D., and in 1871 a testimonial and address was presented to him by men of nearly every religious denomination in Scotland. From 1870 he lived at Roseneath, and here he died, Feb. 27, 1872. He wrote "Christ the Bread of Life" (1851); "The Nature of the Atonement" (1856), and "Thoughts on Revelation" (1862).

Campbell, John Pendleton, an American scientist; born in Cumberland, Md., Nov. 20, 1863. He studied at Johns Hopkins University, and in 1888 became Professor of Biology at the University of Georgia.

Campbell, John TenBrook, an American scientist; born near Montezuma, Ind., May 21, 1833. A carpenter in early life, he enlisted as a private at the outbreak of the Civil War, and rose to the rank of captain. He studied engineering and physical science, and has perfected many surveying implements. He has written "National Finances," and pamphlets on mathematical science and astro-physics.

Campbell, Loomis J., an American philologist; born in Oneonta, N. Y., in 1831; was author of a "United States History," also of the popular "Franklin Series" of school-books; and edited a "Young Folks' Book of Poetry" and a "Hand-Book of Synonyms." He died in Oneonta, Nov. 6, 1896.

Campbell, Thomas, a Scotch poet; born in Glasgow, July 27, 1777; educated at its university. After leaving the university he resided for a short time in Edinburgh, and all at once attained the zenith of his fame by publishing, in 1799, his "Pleasures of Hope." It produced an extraordinary sensation, and soon became a familiar book



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at almost every nearththrough-out the kingdom. In 1803, after spending some time in Germany, Campbell published an edition of the "Pleasures of Hope," with the addition of some of the finest lyrics in the English language, including "Hohenlinden," "Ye Mariners of England," and the "Exile of Erin." In 1803 he went to London, and in 1806 obtained a pension of £200 through the influence of Mr. Fox. After this he appears for a time to have given his attention less to poetry than prose, and wrote various compilations, articles for Brewster's "Edinburgh Encyclopædia," etc. In 1809 he again made his appearance as a poet, and published "Gertrude of Wyoming," "Lord Ullin's Daughter," and the "Battle of the Baltic." After publishing "Specimens of English Poets," accompanied by critical essays, he became editor, in 1820, of the "New Monthly Magazine." He took an

active part in the foundation of London University, and in 1827 was elected rector of Glasgow University. After this, though he continued to occupy himself with literature, and published his "Letters from the South," a "Life of Mrs. Siddons," and a "Life of Petrarch," his productions were much inferior to his earlier efforts. He died in Boulogne, June 15, 1844, and was interred at Poets' Corner, in Westminster Abbey, close to the tomb of Addison.

Campbell, Thomas W., a Canadian clergyman; born in Three Rivers, Quebec, Canada, Sept. 24, 1851. He was graduated at Victoria University in 1879, and became a Methodist missionary. Joining the Reformed Episcopal Church, he was elected a bishop in 1891, and Presiding Bishop in 1894, and resigned to enter the Presbyterian Church in 1898.

Campbell, William W., an American lawyer and historian; born in Cherry Valley, N. Y., in 1806. Settled in New York city, he was a judge of the State Supreme Court. He wrote "Annals of Tryon County" (reissued as "Border Warfare"), "Life and Writings of De Witt Clinton," "Sketches of Robin Hood and Captain Kidd," etc. He died in Cherry Valley, Sept. 7, 1881.

Campbell, William Wilfred, a Canadian poet; born in Western Ontario, Canada, in 1861. He has published "Lake Lyrics" (1889); "The Dread Voyage" (1893); "Mordred, a Tragedy," and "Hildebrand" (1895), the two latter being dramas in blank verse, and numerous separate poems, among them "England" (1897).

Campbell-Bannerman, Sir Henry, a British statesman, born in Stracathro, Scotland, Sept. 7, 1836; was educated at Glasgow University and Trinity College, Cambridge; entered Parliament when 32 years old, and his official career, as Financial Secretary of the War Office, under Mr. Gladstone, when 35; was subsequently Chief Secretary for Ireland, Secretary of State for War, Liberal leader in the House of Commons, and Prime Minister (1905-1908). He died April 22, 1908.

Campbellites, followers of the Rev. John McLeod Campbell (*q. v.*), who in 1831 was deposed from the Church of Scotland on account of his teachings concerning the atonement. He established a church at Glasgow in 1833. The name is sometimes also applied to members of the denomination founded by Thomas and Alexander Campbell. See DISCIPLES OF CHRIST.

Campbell's Station, a town in Knox county, Tenn., noted for the battle fought (Nov. 16, 1863) between a Federal army under Burnside and a Confederate one under Longstreet, in which the Confederates were repulsed at nightfall, after sharp fighting.

Campbeltown, a royal burgh and seaport of Argyllshire, Scotland, on the peninsula of Kintyre.

Campe, Joachim Heinrich (käm'pe), a German lexicographer and writer of juvenile tales; born in Deensen, Germany, June 29, 1746. His educational works were long widely read and highly esteemed; especially "Robinson the Younger" (1779; 115th ed. 1890), an adaptation of Defoe's "Robinson Crusoe," which was translated into every European language. Next in popularity came a "History of the Discovery of America" (1781). He died near Brunswick, Oct. 22, 1818.

Campeachy, or SAN FRANCISCO DE CAMPECHE, a seaport on the W. side of the peninsula of Yucatan, on a bay of the same name. It has a citadel, university, naval academy, and shipbuilding docks. The haven is safe, but very shallow, and the trade, principally in logwood and wax, has greatly fallen off, while cigars and palm-leaf hats are almost the only manufactures. Founded in the middle of the 16th century, it was taken, occupied, and burned by buccaneers in 1685. Estimated pop. (1890) 18,730. Campeachy gives name to a state of Mexico.

Campeggio (käm-ped'jō), **Cardinal Lorenzo**, an Italian clergyman; born in Bologna in 1472. He studied law, and married early, taking holy orders after his wife's death. He was made Bishop of Feltri, and sent by Leo X. on a mission to the Emperor Maximilian, being created a cardinal in his absence (1517). Next year he visited England as papal legate to incite Henry VIII. against the Turks, and was well received. In 1524 he obtained the bishopric of Salisbury and the archbishopric of Bologna, and he presided the same year at the Ratisbon diet; in 1528 he was despatched to England to hear the famous divorce suit of Henry VIII. against Catharine of Aragon. Perplexed betwixt his own private instructions, pity and regard for the unhappy queen, the dubious counsels of Wolsey, and the imperious impatience of the King, and racked the while by the pains of a severe gout, the cardinal ended by displeasing all parties; and his final revoking of the cause to Rome led ultimately to the King's rupture with the papal court. He died in Rome, July 19, 1539.

Camper, Peter, a Dutch physician and anatomist, Professor of Medicine, successively at Franeker, Amsterdam, and Groningen; born in Leyden, May 11, 1722. His contributions to anatomy and physiology were valuable. He was also skillful in drawing and painting, and rendered important services to art in his work on the relations of anatomy and art. One of his doctrines is that of the facial angle. He died in The Hague, April 7, 1789.

Camperdown, or **Camperduin**, sandy hills or downs on the coast of Holland, S. of the Helder, off which the British, under Admiral Duncan, gained a hard-won naval victory over the Dutch, under De Winter, Oct. 11, 1797.

Campero, Narciso, a Bolivian statesman and soldier; born in Tojo (now in Argentina), in 1815. He studied and traveled in Europe, and on his return entered the Bolivian army, and rose to the rank of Brigadier-General. He was minister of war in 1872. After the overthrow of Diaz (1880), he was chosen President of Bolivia. He commanded the combined forces of Peru and Bolivia in the Tacna campaign, but was defeated at Tacna, May 26, 1880. Internally, his administration was quiet.

Camphausen, Wilhelm (kämp'houz-en), a German painter; born in Düsseldorf, Feb. 8, 1818; was from 1859 professor in the art academy there. He was specially famous for battle-pieces—scenes from Cromwell's battles, the Thirty Years' War, the wars of 1866 and 1870—and painted many notable portraits of soldiers and equestrian figures. He died in Düsseldorf, June 16, 1885.

Camphene, the commercial term for purified oil of turpentine, obtained by distilling the oil over quicklime to free it from resin. It is used in lamps, and gives a very brilliant light; but, to prevent smoking, the lamp must have a very strong draught. With oxygen it forms camphor.

Camphol, sym. $C_{10}H_{17}(OH)$, a monatomic alcohol; there are several modifications, distinguished by their action on polarized light, as, Borneo camphor or Borneol, obtained from dryobalanops camphora, dextro 34.4° . Another dextro 44.90 , is formed together with camphic acid by the action of alcohol potash on common camphor. A third dextro, 4.5° , by distilling amber with potash. A fourth, called lævo-camphol lævo 33.40 , is found in the alcohol obtained by the fermentation of madder-root sugar. Dextro-rotary camphol forms small transparent colorless hexagonal prisms, which melt at 198° and distill at 212° ; soluble in alcohol and ether, insoluble in water. Lævo-rotary camphol forms a crystalline white powder slightly soluble in water. Camphol distilled with P_2O_5 gives a hydrocarbon, $C_{10}H_{16}$. Boiled with nitric acid it is reduced to common camphor, giving off two atoms of H.

Camphor, a powerful diffusible stimulant and antispasmodic, very useful, combined with extract of henbane, in genito-urinary irritation. It enters into union with opium, as a sedative, under the name of compound tincture of camphor or pargoric. It is useful in adynamic fevers, and has been employed in the treatment of hysteria, epilepsy, chorea, and whooping-cough and externally as a stimulant to stiff and

Campi

painful parts, as a liniment. Official preparations: Aqua camphoræ, linimentum C., linim. C. comp., spiritus camphoræ, and tinctura camphoræ composita. Camphor is a poison to the lowest forms of animals and plants. It is antiseptic. In large doses it lowers the pulse and temperature, and produces headache, sickness, coldness of the extremities, feeble circulation, unconsciousness, and even death. Undiluted, it is a powerful irritant to mucous membranes and raw surfaces. "An artificial camphor can be made by passing hydrochloric acid gas through volatile oil of turpentine" (*Garrod*). The virtue imputed to it of preventing infectious diseases is not founded on correct observation. Borneo or Sumatra camphor is a kind of camphor made from *Dryobalanops aromatica*, or *Dryobalanops camphora*, a genus of the order Dipteraceæ, or Dipterads. It differs from ordinary camphor in having six-sided crystals.

In chemistry, the symbol of camphor is $C_{10}H_{16}O$. It is called also laurel camphor. Camphor is obtained by distilling with water the leaves and wood of the camphor tree, *Camphora officinarum*, formerly called *Laurus camphora*. It is a solid white volatile crystalline mass, tough and difficult to powder, has a peculiar odor; thrown on water, it revolves and is slightly soluble. It is very soluble in alcohol, ether, and strong acetic acid. It has a dextro-rotary action on polarized light. Many essential oils deposit an inactive variety. Most of the camphor of commerce comes from Formosa. It is used to preserve natural history collections and clothes in drawers from the ravages of insects.

Campi (käm'pē), a family of Italian artists who founded what is known in painting as the school of Cremona. Of the four of this name, Giulio, Antonio, Vincenzo, and Bernardino, the first and the last are the best known. Giulio (1502-1572), the eldest and the teacher of the others, was a pupil of Giulio Romano, and acquired from the study of Titian and Pordenone a skill in coloring which gave the school its high place. Bernardino (1525-1590), was the greatest of the school. He took Romano, Titian, Correggio in succession as his models, but without losing his own individuality as an artist.

Campion, Edmund, an English Jesuit; born in London, Jan. 25, 1540. He was educated at Oxford, and distinguished himself greatly. Though at first a Roman Catholic, he adopted nominally the Reformed faith, and took deacon's orders in the Church of England; but he afterward recanted, became a Jesuit, and attacked Protestantism, especially in his work "Decem Rationes" ("Ten Reasons"). He was found guilty of conspiring to raise sedition, and was executed at Tyburn, Dec. 1, 1581.

Campobello

Campion, Thomas, an English poet; born between 1570 and 1580; was by profession a medical man.⁸ He wrote a volume of "Poems" (1595), being Latin elegies and epigrams. He published (1610-1612) four "Books of Airs," containing songs written by himself to airs of his own composition: the first book contains "Divine and Moral Songs"; the second, "Light Conceits of Lovers"; the third and fourth are not distinguished by any separate sub-title. In his songs the verse and the music are most happily wedded. He died in London, March 1, 1619.

Camp Meetings, gatherings of devout persons, held usually in thinly-populated districts, and continued for several days at a time, with the view of securing prolonged and uninterrupted religious exercises. Assemblies of a like kind have been more or less usual at various periods in the history of the Christian Church: but it was in connection with Methodism in the United States that such meetings became especially prominent. The introduction of the protracted camp-meetings into England in 1799 by Lorenzo Dow led to the separation of the Primitive Methodists from the Wesleyans.

Campobasso, formerly **Molise**, a province of Abruzzi, Central Italy; is a very mountainous and sterile region; has comparatively little industry. There are some iron and steel manufactures; and grain, wine, and vegetables are produced. Area, 1,691 square miles; pop. (1901) 366,571.

Campobasso, Niccolo, Conte da, a commander of Italian mercenaries; lived in the latter half of the 15th century. He had first supported the house of Anjou, in the kingdom of Naples, but afterward transferred his services to their opponent, Charles the Bold, Duke of Burgundy. By pandering to the prejudices and caprices of that headstrong prince, he acquired great influence over his mind, and in the end availed himself of the confidence placed in him by the Duke to sell him to his enemies. While the Duke was engaged in the siege of Nancy, in 1477, on the approach of a superior force under Ferrand, Duke of Lorraine, to relieve the place, Campobasso deserted to the enemy immediately before battle. The Burgundians were, in consequence, defeated, and the Duke himself slain. The treacherous Italian was supposed to be the murderer, as the bodies of some of his men were observed near the spot where the unfortunate prince was found killed and stripped the day after the battle.

Campobello, an island in Passamaquoddy Bay, in Charlotte county, New Brunswick. It is noted as a summer resort. Though copper and lead ores exist, the inhabitants are chiefly engaged in the

Campo-Formio

herring, mackerel, and cod fisheries. The island is 8 miles long.

Campo-Formio, a town in Italy, 66 miles N. E. of Venice, famous for the treaty of peace between Austria and France, which was signed in its neighborhood on Oct. 17, 1797. Its chief provisions were that Austria should cede the Belgian provinces and Lombardy to France, receiving in compensation the Venetian states.

Campos, Arsenio Martinez, a Spanish military officer; born in Cuba in 1834. He was graduated at the Military Staff School in Madrid and appointed a lieutenant in the army in 1858; served on the staff of General O'Donnell and became chief of the battalion in the Morocco campaign of 1859;



ARSENIO MARTINEZ CAMPOS.

was on duty in Cuba with the rank of colonel in 1864-1870; took part in suppressing the Carlist insurrection and was promoted brigadier-general in 1870; opposed the republic after the abdication of King Amadeus, and was imprisoned as a conspirator. Under a plea for permission to be allowed to serve as a private, he was released and given command of a division in the Third Army Corps in 1874. In the next two years he was constantly fighting the Carlists, distinguishing himself at Las Muncas and Galdames and causing the noted siege of Bilbao to be raised. With General Jovellar, he called Alphonso XII. to the throne; was made commander-in-chief of the Catalonia district, and crushed Don Carlos at Pena de la Plata in 1876. For these services he was promoted captain-general. In 1877 he was appointed commander-in-chief in Cuba, and brought the revolution to a close chiefly by means of concessions which, as minister of war and premier in 1879, he endeavored unavailingly to carry out. He was minister of war in 1881 and 1883, commander of the Army of the North of Spain in 1884-1885, president of the Spanish Senate in 1885,

Campus Sceleratus

and captain-general of New Castile in 1888. In April, 1895, he was appointed governor-general and commander-in-chief in Cuba, and in January, 1896, he was recalled to Spain. He found the insurrection more formidable than he had anticipated, and his failure to pursue a vigorous war policy caused much dissatisfaction in Spain. On his arrival in Madrid he repeated his belief that the trouble in Cuba could only be ended by granting reforms. He died Sept. 23, 1900.

Campo Santo (lit. "Holy Field"), the name given to a burying-ground in Italy, best known as the appellation of the more remarkable, such as are surrounded with arcades and richly adorned. The most famous Campo-Santo is that of Pisa, which dates from the 12th century, and has on its walls frescoes of the 14th century of great interest in the history of art. Among more modern Italian cemeteries, that of Genoa is distinguished for its magnificence.

Campo Santo of Dissenters, Bunhill Fields burying-ground, in London; so named by Southey, and with good reason. Among those who lie buried there are John Bunyan; George Fox, the founder of the Quakers; Dr. Thomas Goodwin, who attended Cromwell on his death-bed; Dr. John Owen, who preached the first sermon before Parliament after Charles I. was executed; Susannah Wesley, the mother of John Wesley; Dr. Isaac Watts, William Blake, the painter and poet; Daniel De Foe, and Horne Tooke. On a remnant of land in the neighborhood the Friends have built a coffee tavern and memorial hall.

Campra, Andra, a French composer; born in Aix, Provence, Dec. 4, 1660. He ranks among the most distinguished composers of operas, his themes being classical love stories, notably "The Triumph of Love," "The Amours of Mars and Venus," "Hippodamia," etc. He died in Versailles, July 29, 1774.

Campus Martius (the "Field of Mars"), an extensive plain or meadow without the walls of Rome, and adjoining the Tiber, where the levies of troops were made by the tribunes selected to command the legions, where the ballöt for the conscription was drawn, and where all military exercises, drills, and evolutions were performed. It was also a gymnasium for the Roman youths, where they threw the discus and javelin, practised their horses, and competed in foot and chariot races. It was here that the great assemblies of the people took place to elect their public officers, military and civil tribunes, and other magistrates of the city.

Campus Sceleratus, a name given to a spot within the walls of Rome, and close by the Porta Collina, where those of the vestal

Campvere

virgins who had transgressed their vows were entombed alive, from which circumstance it took its name.

Campvere (kämp'-vār), now called VERE, VEERE, or TER-VERE, and formerly often written CAMPHIRE, a small fortified town on the N. E. of the island of Walcheren, in the Netherlands province of Zeeland, with a port on the Veergat, which separates Walcheren from North Beveland. The town has fallen into decay; but its former prosperity is indicated by such large edifices as the town-house and cathedral church. In 1304 Campvere was the scene of a battle between William, Governor of Holland, and Guy, Count of Flanders; in 1572 the Spaniards were driven away; and in 1809 the town was bombarded and occupied during the disastrous Walcheren expedition.

Camtoos, a river of Southern Africa, in Cape Colony, which falls into the sea W. of Algoa Bay; length, 200 miles.

Camuccini, Vincenzo, an Italian historical painter; born in Rome about 1775. He followed the pseudo-classical style, and his pictures are of large size. Among his best-known works are "Death of Cæsar," "Death of Virginia," "The Incredulity of Thomas," "Horatius Cocles," and "Death of Mary Magdalene." He was also excellent in portraits. He died in 1844.

Camus, Armand Gaston (kä-mü'), a French revolutionist; born in Paris, April 2, 1740. A zealous and ascetic Jansenist, and a master of ecclesiastical law, he was elected Advocate-General of the French clergy, and in 1789 member of the States-General by the people of Paris. He now appeared as the resolute foe of the ancient régime, gained possession of and published the so-called "Red Book," with its details of expenditures so disadvantageous to the court and its ministers. He was absent in Belgium during the King's trial, but sent his vote for death. He was made member, and afterward president, of the Council of Five Hundred, but resigned in May, 1797, and devoted his time to literature. He died Nov. 2, 1804.

Camus, Antoine de, a French physician, born in 1722; became professor in the University of Paris, 1762; was noted for the original character of his technical publications and his literary ability, and was the author of a comedy, "Love and Friendship"; a poem, "The Medical Amphitheater" (1745); "Maladies of the Region of the Heart;" and "The Medicine of the Mind" (1753). He died in 1772.

Cam Wood, a wood produced by a leguminous plant, *Baphia nitida*. It is a dye-wood, used with alum and tartar as a mordant; but the color is not permanent. It is employed for dyeing bandana handkerchiefs, the hue being deepened by the addi-

Canada

tion of sulphate of iron. Turners use it for making knife-handles, and cabinet-makers for ornamental knobs to furniture. Camwood is called also Barwood and Ringwood.

Cana (called by the natives *Kefr Cana*; or *Kana-el-Jelil*), a town of Palestine, celebrated in Scripture as the scene of our Lord's first miracle, when he turned water into wine, is now a small village of a few hundred inhabitants, who are principally Greek-Christians, or Nazarenes, situated about 13 miles W. of the Sea of Galilee, and 6 miles N. of Nazareth.

Canaan (kā'nan), the country W. of the Jordan, called also Chanaan, and the Land of Canaan, after one of the sons of Ham. The Greeks applied the term *Cana* to the entire region between the Jordan and the Mediterranean up to Sidon, afterward termed by them Phenicia, a name which by degrees came to be confined to the N. coast district, or Phenicia proper. Canaan is generally considered equivalent to the Land of Israel or Palestine.

Canaanite, a grayish-white or bluish-white rock, occurring with dolomite in Canaan, Connecticut, and referred to as massive scapolite by some authors, is massive whitish pyroxene, a mineral common in crystals in the dolomite of the region.

Canaanites, The, a word used in two senses: (1) For the tribe of the "Canaanites" only—the dwellers in the lowland. The whole of the country W. of Jordan was a "lowland" as compared with the loftier and more extended tracts on the E. (2) Applied as a general name to the non-Israelite inhabitants of the land, as we have already seen, was the case with "Canaan." Instances of this are: Genesis xii: 6; Numbers xxi: 3; Judgments, i: 10; and Genesis xiii: 12. See also Genesis xxiv: 3, 37; comp. xxviii: 2, 6; Exodus, xiii: 11; comp. 5. Like the Phœnicians, the Canaanites were probably given to commerce; and thus the name became probably in later times an occasional synonym for a merchant.

Canada, Confederation in. Although the confederation of the Canadian provinces was not consummated until 1867, the history of the genesis and development of the idea reaches back earlier than the beginning of the century, for in 1784 Col. Morse proposed a union of all British North America as being necessary in order to "the preservation of the fragments of British power on the continent," and in 1809 Mr. R. J. Uniacke advocated in the legislature of Nova Scotia a federal union not differing greatly in character from that which was subsequently effected. The scheme thus brought before public attention was never altogether quiescent, but continued to crop up from time to time, until we come to Lord Dur-

ham's celebrated report, in 1839, when he proposed a union of the colonies, distinguishing clearly between a federal and legislative union, and thus dividing those in favor of the movement into two parties, the Federalists and the Legislative Unionists. No definite action, however, came of this, and 10 years later we find the British North American League adopting the principle of confederation as an important plank in their platform. (It is interesting to note that we have it on the testimony of the Hon. Mr. Morris that this league was composed for the most part of young and enthusiastic members of the Conservative party belonging to the advance wing that rallied round the banner of John A. Macdonald.) Not only in Upper and Lower Canada, but also in the provinces of Nova Scotia and New Brunswick, was the question of confederation brought before the attention of the legislature and the people by such statesmen and publicists as the Hon. Charles Tupper, the Hon. James W. Johnston, Mr. P. S. Hamilton, the Hon. J. H. Grey, the Hon. A. G. Archibald, and others. It was not, however, until 1864, in spite of all that had been said and written on the subject, that the question really found its way into the arena of practical politics, and in order to a clear understanding of how it attained this position it will be necessary to go back a little into the history of what was then known as Canada, now known as the provinces of Ontario and Quebec. In 1841 a union of the two provinces of Upper and Lower Canada had been effected with no small trouble, and in the earnest hope that many of the difficulties which had threatened the peace and prosperity of the colony would thereby be set at rest. Unhappily, the opposite proved to be the case. From the very outset the arrangement worked badly. There was much friction and still more of petty jealousy and internecine strife.

Not simply one, but three burning questions kept the political atmosphere in a state of disturbance, and threatened inevitable disruption if some satisfactory basis of settlement could not be found. These three questions were *the choice of a permanent capital, representation by population, and government by double majority*. A few words as to each: Since the two provinces had been united in legislative wedlock the country had been without a fixed capital, simply because no government had the courage to decide which of four jealous rivals for the honor should be preferred. Toronto and Kingston in Upper Canada and Montreal and Quebec in the lower province vigorously asserted their respective claims to the coveted privilege—Toronto as having the most wealth and culture, Kingston as being the strongest

strategically, Montreal as the most convenient and Quebec as the richest in historical associations. The dilemma proved a very difficult one, and many were the shifts resorted to by the legislature to effect an amicable solution. In 1841 Kingston was made the capital, but soon gave deep dissatisfaction, and in 1844 Montreal obtained the privilege, only to forfeit it again in 1849, when the passage of the Rebellion Losses Bill so infuriated a Tory mob that they pelted Lord Elgin, the governor-general, with paving stones, smashed his carriage in the street and wound up by burning the Parliament buildings to ashes. This little ebullition the sapient lawmakers very properly construed as a pointed notice to quit, and therefore shook the Montreal dust off their feet for evermore. It was then arranged that Toronto and Quebec should be the capital alternately, each for four years at a time, but this peripatetic system being found neither pleasant nor profitable, Mr. John A. Macdonald, who then controlled the destinies of the country, suggested to his colleagues that the best way out of the difficulty would be to have the whole matter referred to the Queen for her arbitrament. This was accordingly done, much against the grain of the Opposition party, and in 1858 Her Majesty, to the surprise of all and the consternation of many, adopted a course similar to that often pursued at presidential conventions, where there happen to be so many candidates possessing practically equal claims and chances that it is impossible to decide between them, and some "dark horse" is consequently chosen by way of compromise. For, putting aside all the jealous aspirants, Her Majesty decided that a little country town in the province of Ontario, having no other pretensions than the extraordinary beauty of its site and its magnificent water-power, should be the capital of Canada. This decision was made the ground of a want of confidence motion by Mr. George Brown against the Macdonald government, that was carried by a vote of 64 to 50; and although the vote for adjournment for the House, taken almost immediately afterward, showed 61 for the government and only 50 against it, Mr. Macdonald insisted upon resigning. Mr. Brown was thereupon sent for to form an administration, but no sooner had he done so, and come before the House with his new cabinet, than a want of confidence vote was moved by a leading Conservative, and after an exciting and acrimonious discussion the short-lived ministry found themselves in a minority of 50. In these circumstances they could do nothing but resign, which they accordingly did forthwith, after having been in office hardly 48 hours, Mr. Macdonald then returning to power, supported by an even

larger majority than before, and having the perplexing question of a permanent capital settled for all time. The second troublesome question, namely, that of representation by population, arose out of the wide differences of race and religion existing between the two united provinces. Ontario was mainly English and Protestant, while Quebec was overwhelmingly French and Roman Catholic. When they united, in 1841, although Quebec had then the larger population, it was stipulated for harmony's sake that both provinces should send an equal number of representatives to the general Parliament, and this arrangement for a time worked well enough. But as years went by, the English province outstripped in wealth and population her slower sister, and came to feel that the representation should be readjusted so as to bear an equitable relation to the respective populations. Seeing that year after year Ontario increased her lead over Quebec, the movement naturally gained power and popularity within her borders, its leading champion being Mr. George Brown, editor of the most influential newspaper in the country, and a public man of great energy and integrity. But whatever headway this agitation might make in Ontario, there could be no hope of its meeting aught save the most determined opposition in Quebec. As to the third question, to wit, that of the double majority, this was simply the assertion of the principle that no administration should continue to hold office which did not command a clear majority of the representation from both provinces, a mere majority of the whole House not being considered sufficient. The lapse of time, instead of settling these points of dispute harmoniously, served only to accentuate them, and in 1864 matters reached a very serious and perplexing pass. Four administrations had been formed and had fallen within the brief space of two years, and all public business save mere routine was at a standstill.

There could be but one way out of this critical *cul-de-sac*, namely, by a coalition between the Conservatives and Liberals, who divided the country so evenly, and this, in view of the bitter antagonism between the two parties, seemed so impracticable as to be hardly worth discussing. Yet it is often the improbable that happens. To the profound surprise of supporters and opponents alike, and to his own infinite credit, Mr. George Brown, then leading the opposition, realizing the need of decisive action if the Union was to be preserved, made overtures to Mr. Macdonald, which, being cordially entertained, resulted in Mr. Brown consenting to enter the cabinet with two of his followers on the express understanding that as a substitute for the representation by population

he had so consistently and persistently championed, Parliament would, at its next session, undertake the confederation of the Canadian provinces. As this scheme already formed one of the principal planks in the Conservative party platform, there was no difficulty in accepting the Liberal leader's conditions. A coalition was accordingly formed, the two lifelong opponents took counsel together, and vied with each other in the energy and eloquence with which they advocated the great undertaking. Associated with them were the French leaders, Messieurs Cartier and Taché, whose hearty co-operation was of inestimable service. Their attention was first drawn to the Maritime Provinces, Nova Scotia, New Brunswick, Newfoundland and Prince Edward Island. As it chanced, the time was particularly opportune, for these provinces had just arranged for a convention at Charlottetown, Prince Edward Island, of delegates appointed to arrange the terms of a legislative union among themselves. The coalition government asked permission to be represented in this convention, which being granted, Messrs. Macdonald, Brown, Cartier, Galt, D'Arcy McGee and other delegates went down on behalf of the Canadas. The result of their presence was to give a wider scope to the character and aims of the convention, and, as the delegates from the Maritime Provinces had no authority to discuss the larger union, it was decided to adjourn the convention to meet again at Quebec upon a date to be subsequently fixed, steps to be taken in the meantime to commend the scheme of confederation to those provinces which had not yet committed themselves to it. In execution of this understanding the Canadian representatives made a tour through the Maritime Provinces, in the course of which they did much to influence public opinion by means of eloquent speeches delivered at banquets given in their honor. In October, 1864, the conference upon which the fate of Canada depended assembled in Quebec, in the historic old Parliament buildings. The provinces of Ontario, Quebec, Nova Scotia, New Brunswick, Prince Edward Island and Newfoundland were represented by delegates. Sir Étienne Taché was chosen president, and the sittings were held with closed doors. The leading members of this remarkable conference, to whom the name of the Fathers of Confederation has since been generally applied, were as follows: Representing the united Canadas were Sir E. T. Taché, Messrs. Macdonald, Brown, Cartier, Galt, Mowat, McGee and others; from Nova Scotia came Messrs. Tupper, Henry, Archibald, McCulley and Dickey; from New Brunswick, Messrs. Tilley, Johnston, Mitchell, Gray and Fisher; from Prince Edward Island, Messrs. Palmer, Pope, Grey and

Haviland; from Newfoundland, Messrs. Carter and Shea. The conference continued for nearly three weeks, with the result that resolutions embodying the principal points of confederation were adopted, and that each group of provincial delegates stood pledged to use their utmost endeavors to secure the concurrence of their respective legislatures in the project. (It is interesting to know that just about this time there had been introduced into the United States Congress a bill providing for the admission of British North America into the American Union as four separate States, the public debt of which would be assumed by the federal government.)

The delegates to the Quebec conference from Ontario and Quebec had no difficulty in carrying out their part of the bargain. At the meeting of the Canadian legislature in February, 1865, the union resolutions were carried by a large majority. The problem had been a familiar one with them for years past, and they looked hopefully to its satisfactory solution as a way of release from their embarrassing political deadlock. Not so, however, was it among the Maritime Provinces; with one accord they kicked up their heels. Nova Scotia, at the next meeting of the legislature, adopted a resolution in favor of the union of the Maritime Provinces alone. In New Brunswick a general election resulted in the return of a majority hostile to confederation; Newfoundland dropped the project altogether; and Prince Edward Island not only passed resolutions antagonistic to the scheme, but even went the length of repudiating altogether the action of her delegates at the Quebec conference. The Canadian administration nevertheless did not lose heart, but persevered steadily in their endeavor. Messrs. Macdonald, Brown, Cartier and Galt went to England, and succeeded in obtaining many important concessions from the imperial authorities, including the guarantee of a loan for the construction of the Intercolonial Railway uniting New Brunswick and Nova Scotia with Canada. Better terms as to the assumption of debt and the allotment of revenue were also secured, and in the end a change of feeling was wrought which secured a majority for confederation in the legislatures of the two largest Maritime Provinces, the other two continuing to hold aloof. In December, 1866, a general conference of delegates from Ontario, Quebec, Nova Scotia and New Brunswick met in London, many of those who were present at Quebec being also present on the second occasion. The Hon. J. A. Macdonald was chosen president, and they sat until the day before Christmas, by which time all the important details of the union had been discussed and finally settled. The fruit of this conference was an act passed in the following month of

March, entitled the British North America Act of 1867, wherein it was provided that the four provinces heretofore known as Ontario, Quebec, Nova Scotia and New Brunswick should, on the 1st day of July following, form and be one dominion under the name of *Canada*. In this act it was not forgotten to make provision for the admission of the other provinces when they saw fit to change their minds, and thereby we see in 1870 the admission of Manitoba, in 1871 of British Columbia, and in 1873 of Prince Edward Island into the Dominion — Newfoundland remaining irreconcilably hostile to admission. As was only natural, the promoters and framers of the union profited by the example of the United States, so near at hand, and Sir John Macdonald, in moving the resolution in favor of the union in the Legislative Assembly of Canada, said: "We can now take advantage of the experience of the last 78 years during which the United States Constitution has existed, and I am strongly of belief that we have in a great measure avoided in this system which we propose for the adoption of the people of Canada the defects which time and events have shown to exist in the American Constitution." The system of government established in Canada under the Confederation Act of 1867 was that of a federal union, the first of the kind in the British Empire, having a central government controlling all matters essential to the general development and permanent unity of the whole Dominion, and a number of provincial governments having the control and management of matters naturally and conveniently falling within their defined jurisdiction, while each government was administered in accordance with the British system of parliamentary institutions. In fact, by this act the Imperial Parliament gave to Canada the largest possible rights of legislation on all matters of importance which could be exercised by a dependency, so that the position which Canada occupies is really that of a semi-independent power. A significant provision, as showing the consideration allowed to the French portion of the Canadian population, was that of permitting the use of either the English or French language in the debates in Parliament and in the legislatures of Quebec, Manitoba, and the Northwest Territories, and also the use of both languages in the respective records and journals of those houses. The first governor-general of the new Dominion of Canada was Lord Monck, and he called the first Parliament to meet on Nov. 6, 1867; Sir John A. Macdonald, whose splendid and patriotic services in connection with the promotion and completion of confederation are fully pointed out in his biography in this work, being the first prime minister.

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The first administration under the new *régime* was as follows: The Hon. Sir John A. Macdonald, Premier and Minister of Justice; and holding other portfolios, Messrs. Blair, Langevin, Galt, Macdougall, Campbell, Chapais, Kenny, Cartier, Tilley, Haveland, Mitchell and Archibald. With booming of cannons and beating of drums and much official and private rejoicing the new Dominion of Canada entered upon its career with many auguries of a brilliant and harmonious future, but no sooner had the first flush of enthusiasm died away than the conflicting interests and opposing influences which had for the time been silenced began to make themselves again heard. First from one province and then from another came protests and appeals, protests because of what were deemed to be invasions of provincial rights by the federal authority and appeals for a larger measure of financial support from the central government. Prominent in this chorus of dissatisfaction was the province of Nova Scotia, where the absence of a municipal system of the same sort as in the other provinces seems to have made the matter of adjusting the financial claims of the province exceptionally difficult. The agitation for better terms on the part of this province continued until 1869, when a rearrangement was effected in its favor, which gave general satisfaction, and opened the way for the entrance into the federal cabinet of Mr. Joseph Howe, the renowned orator and statesman, who had been the forefront of the movement, and who thereupon ceased his opposition and exerted himself as strenuously toward securing contentment as he had previously striven for discontent. Coincident with the ushering in of confederation was an unfortunate period of financial depression, the severity of which was augmented by the suspension of the Commercial Bank, one of the oldest monetary institutions in the country, whose downfall was made the occasion of such severe adverse criticism of the fiscal administration of the government that the Hon. A. T. Galt, then finance minister, resigned his office, and was succeeded by the Hon. John Rose. In the month of November Lord Monck, governor-general, having witnessed the successful inauguration of the new constitution, returned to England, being replaced by the Rt. Hon. Sir John Young, Baron Lisgar. In the month of April following the country was thrilled with horror by the assassination of the Hon. Thomas D'Arcy McGee, who had been one of the ablest and most earnest advocates of confederation, and who, although not a member of the cabinet, was one of the strongest supporters of the government. He was followed from the House of Commons in the early hours of the morning by a Fenian fanatic named Patrick Whelan and shot down in the public street.

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The sorrow of the nation was manifested by the imposing obsequies given the murdered statesman and by its generous sympathy toward his bereaved family. The murderer was subsequently arrested, tried and convicted, and expiated his guilt on the gallows. The most important political event of 1868 was unquestionably the passing by the imperial government of the Rupert's Land Act for the acquisition by the Dominion of Canada of the Northwest Territories, hitherto the private fur preserve of the famous Hudson's Bay Company. This act was the result of an agitation on the part of Canada dating as far back as 1857, when, as the license granted to the Hudson's Bay Company was shortly to expire, the Imperial Parliament had appointed a select committee to inquire into the company's affairs in order to be prepared intelligently to consider the renewal of the license for which the company was applying. The Canadian Government, on being apprised of this action of the British Parliament by the secretary of state, appointed as their representative before this committee Chief Justice Draper of Ontario. The chief justice, on appearing before the committee, made a claim based on the old French occupation that those vast territories should be thrown open to survey and settlement right to the Rocky Mountains, enforcing his contention by such considerations as that American encroachment from the border States would be dangerous to British interests if the country should be permitted to remain unsettled; that young and enterprising Canadians in considerable numbers were already seeking new homes in the United States and were thus lost to Canada; and that the people of the Red River Settlement, who had reached the number of nearly 10,000, should have properly organized government.

These claims had already been vigorously urged in Canada by Mr. William Macdougall, who, through the columns of his own newspaper, "The North American," had for several years been strenuously advocating the acquisition of the Northwest Territories by Canada; but although Chief Justice Draper largely advanced Canada's contention by his visit, it took 10 years for his efforts to bear practical fruit. Mr. Macdougall, being a member of the first Dominion Parliament, lost no time in having a motion adopted that, in accordance with the provisions of the British North America Act, steps be promptly taken to bring Rupert's Land into the Dominion, and an address to this effect to the Queen was forwarded. In pursuance of this motion Mr. Macdougall and Sir George Cartier were in 1868 appointed a deputation to visit England in connection with the cession of the Northwest. The deputation, on their visit,

found that the Hudson's Bay Company, however, were not to be satisfied with a moderate compensation for their rights, but demanded such excessive terms that Messrs. Macdougall and Cartier were about returning home discouraged, when it is said Mr. Gladstone brought pressure to bear upon the Fur Company to be less exacting in their demands, and after further negotiations, it was agreed that for a payment of £300,000, the retention of one-twentieth of the territory and the possession of certain lands about their trading-posts, the Hudson's Bay Company would surrender all exclusive claims to the country. The necessary legislation having been effected, the time of transfer was fixed for the following year, 1869, and preparations made for the organization of the Northwest Territories under a regular form of government. There is no doubt that, with regard to this transfer of the Territories to the Canadian Government, there was a great deal of mismanagement, which it is now needless to detail. In recognition of his services in the matter Mr. Macdougall was appointed the first lieutenant-governor of the Territories, to enter upon his duties from the date of the formal transfer of that country to Canada. Without waiting, however, for this formal transfer to take place, he entered the Territories in December, 1869, and some time previous to his entry a number of Canadian surveying and working parties had been sent in to complete the Dawson Road from the Lake of the Woods to the Red River, and to lay out the country in sections for settlement. These parties were very unwise in their bearing toward the natives, the majority of whom were half-breeds, or "Métis," as they are locally termed, who thought that their own rights had not been properly considered in the matter of transfer. Becoming greatly alarmed for their own interests, and being incensed by the undisguised contempt shown by the surveyors and engineers, they rose in rebellion under one Louis Riel, and on the arrival of Mr. Macdougall at the boundary line he found himself faced by Riel and his fellow-rebels, who had seized Fort Garry, the capital of the Red River Settlement, and formed a provisional government. Not content with making such a show of opposition that Mr. Macdougall was compelled to retire before it and to return to Ottawa, where he laid down his commission in disgust, Riel went so far as to arrest those who were opposed to his usurpation of authority and to imprison them in Fort Garry, treating them in a contemptuous and inhuman manner. Not only so, but he dared publicly to execute by shooting a young Canadian named Thomas Scott, who had refused to acknowledge his authority. This was in March, 1870. The news of the murder of Scott, on its reaching Canada, set the

country in a flame, and the cry for vengeance upon the rebels was heard from all sides. Thousands of volunteers offered their services, of whom some 700 were accepted as sufficient, and these, being strengthened by 500 regular soldiers, comprised the Red River Expeditionary Force which, under the command of Col. Garnet Wolseley, made the long and toilsome journey to Lake Superior and thence by the old fur-traders' route, by rapid and portage, and lake and stream, until the little army reached Fort Garry, on Aug. 24, 1870, to find the rebel leader fled and the rebellion at an end. It was the skill and courage of the Canadian voyageur soldiers as witnessed by him at this time that led Gen. Wolseley in 1884, on the occasion of the British expedition to Upper Egypt, to send to Canada for some hundreds of these incomparable boatmen to work his boats through the difficult and dangerous navigation of the upper Nile.

Peace having been restored in the Northwest, the organization of these Territories went on apace, and the new province of Manitoba was created out of a portion of them and added to the confederation. Another military event of this year, which, however, assumed only small proportions, was an attempt by the Fenians upon Canada; they crossed the frontier from the United States at Trout river, in Quebec Province, and also in the Northwest, but were promptly and easily driven back by the volunteers without loss on either side of any consequence. The year 1871 was made notable by the beginning of the Pacific Railway survey; by the signing of the Treaty of Washington in the month of May; by the admission of British Columbia into the confederation in July; and by the completion of the first census of Canada, showing the total population to be 3,485,761. With regard to the railway surveys, these were made in fulfillment of the obligation under which British Columbia entered the union, namely, that the railway should be finished in 10 years, Parliament having appropriated a money grant of \$30,000,000 and a land grant of 50,000,000 acres for this purpose, the construction to be begun at both ends simultaneously. As to the Treaty of Washington, this was the outcome of the joint high commission which met at Washington for the settlement of matters in dispute between Great Britain and the United States in the month of February, Sir John A. Macdonald being the imperial representative. It was known as the Reciprocity Treaty, and continued in force until 1885, and besides the regulations about the much-vexed fisheries question, it provided for settlement of the boundaries of Alaska and of the dispute as to the island of San Juan. The clauses in the treaty relating to the fisheries allowed citizens of the United

States the use of the British American fisheries for 12 years in return for the use of their fisheries, the reciprocal admission of fish and fish oil free of duty, and the payment of a sum equivalent to the excess in value of the British over the American concessions, this amount to be fixed by a commission to meet subsequently at Halifax for that purpose. In compensation for the Canadian claims for damages inflicted by the Fenian raids that had originated in the United States and for which no provision was made by the treaty, Great Britain guaranteed Canada a loan of £2,500,000. The year 1872 was marked by the arrival of the Rt. Hon. the Earl of Dufferin, the most brilliant of the occupants of the viceregal chair, who assumed the duties of governor-general in June. Before the end of the year the German emperor, to whom the matter had been referred, gave his decision in the San Juan case, awarding that island to the United States, to the great disappointment of the people of British Columbia in particular and of Canadians generally. The year 1873 opened with a general election, at which Sir John Macdonald's government was again returned to power, but with a majority somewhat reduced from that which they had commanded in the previous House. Parliament opened in March, and in the following month what has gone into history as the Pacific Railway scandal was opened by the Hon. Mr. Huntingdon, who charged the ministry and their supporters with malfeasance of office in connection with negotiations for the charter for the building of the Canadian Pacific Railway, Mr. Huntingdon's charges being based upon papers stolen by a confidential clerk from the desk of the solicitor of the company formed for the purpose of obtaining the charter. On the charges being preferred, Sir John A. Macdonald moved for a committee to examine into them. For this purpose Parliament was adjourned from May until August. On its reassembling, the governor-general announced that a royal commission would be appointed to sit during the recess of Parliament, and to take evidence as to the charges of corruption. He also promised to summon Parliament as soon as the report of the said commission should be received. Accordingly in September the commission began to sit at Ottawa.

The second session of this Parliament opened in October, and on the 27th of that month the Hon. Alexander Mackenzie moved a resolution that the administration deserved severe censure, and as public opinion, both within and outside Parliament was very strong against the ministry, Sir John A. Macdonald announced that he and his ministry would resign. Accordingly, the governor-general, Lord Dufferin, called upon the Hon. Alexander Mackenzie

to form a cabinet. He accepted the responsibility, and early in 1874 became premier. The administration of the Hon. Mr. Mackenzie, being the first lease of power enjoyed by the Liberal party for many years, continued until 1878. This period, unfortunately for those who held office, and were, therefore, in the popular mind, held responsible to some extent at least for the condition of things, was marked by the wide prevalence of severe financial depression—the government balance sheet year after year showing an unwelcome deficit, and the condition of trade and commerce being such as to cause great concern to all who had the welfare of the country at heart. In spite, however, of these unpropitious circumstances, the government did not fail to show great energy and enterprise in the promotion of public works and in otherwise advancing the public interests; thus the Intercolonial Railway, the construction of which had been one of the chief inducements whereby Nova Scotia and New Brunswick were caused to change their mind with regard to confederation, was successfully completed for the entire distance from Quebec to Halifax, thus uniting the Maritime Provinces with the Canadas and opening up a new highway along which trade might flow freely between them without having to depend upon communication through the United States, as had been previously necessary. Not only was this great work brought to a successful issue, but the government set themselves loyally to the fulfillment of the promise of a transcontinental railway which had been made to British Columbia. It will be convenient at this point to present a brief history of the gigantic enterprise known as the Canadian Pacific Railway. The splendid conception of an iron road from ocean to ocean went back much farther than the negotiations for the addition of British Columbia to the confederation. So early as 1829 one Mr. McTaggart, a Scotch engineer, advocated a route whereby the teas and silks of China could be transported direct from the shores of the Pacific to those of the Atlantic by river, lake and rail, and from that time hardly a year passed without some contribution being made to the fast-growing literature on the subject. In 1841 a Canadian Pacific Railway Bill was introduced into the Canadian Parliament, but reported on adversely, and it was not until 1871 that any definite steps were taken by Parliament toward carrying out the undertaking. Sir John A. Macdonald was then in power, and under his direction a preliminary survey of the route was made by Mr. Sandford Fleming, and this work of survey was continued under the same direction until the resignation of the Macdonald government in 1873. In the following year the work of construction was really commenced by the Macken-

zie government as a public work, and during the four following years a considerable amount of progress was made on different portions of the road. Sir John Macdonald, on regaining power at the general election of 1878, continued the construction as a public work, and at the close of 1879 some 710 miles had been completed, at a cost of \$10,000,000; but in 1880, reverting to his original policy of construction by a private corporation, he entered into a contract with the Canadian Pacific Railway Syndicate. This contract provided, on the part of the government, for a cash subsidy of \$25,000,000 and a land grant of 25,000,000 acres; for the admission of all construction materials free of duty; that for 20 years from the date of the contract no line of railway should be authorized to be constructed south of the Canadian Pacific line; and that the several sections of the railway already constructed by the government, or under contract, should, when completed, become the property of the company. The company on its part contracted that it should complete the railway according to a fixed standard, that the line should be equipped and in running order not later than May 1, 1891, and that the company should thereafter and forever efficiently maintain it. The contract having been approved by Parliament, the first sod was turned on May 2, 1881. When the company started out it had about 2,000 miles of railway to complete. At the close of the first year 163 miles had been constructed west of Winnipeg; in 1882 a farther distance of 423 miles was laid with rails; in 1883 Laggan, not far from the summit of the Rocky Mountains, and nearly 1,000 miles from Winnipeg, was reached by the railway. Meanwhile the government was prosecuting the work on the line eastward from Winnipeg, and by May, 1883, Port Arthur, 430 miles from that city, was connected with it by rail. During 1884 the company attacked and mastered that tremendously difficult section north of Lake Superior, which was completed in the following year and opened for traffic in the autumn. Simultaneously with that on the sections north of Lake Superior work was energetically prosecuted in the mountains of British Columbia, and in less than a year the enormous difficulties of the Kicking Horse Pass were overcome. Near the close of 1884 the government had completed the line from Burrard Inlet to Savona's Ferry (210 miles), and the company were thus able to attack the west end of their section; and thus, thanks to the immense energy and undaunted enterprise shown by the company and government alike, the last spike was driven at Craigellackie, in the Rocky Mountains, by Sir Donald Smith, on Nov. 7, 1885. The stupendous work had, therefore, been completed within the astonishingly short

time of 54 months instead of the 120 months allowed under the contract. The first train to make the complete journey from Montreal to Vancouver, a distance of 2,905 miles, passed over the road in June, 1886, and since that date the line has been uninterruptedly operated. Of course, the resources of the company alone were very far from being adequate to meet the demands involved by so vast an undertaking, and in spite of the liberal provisions of the contract the constructors were, from time to time, compelled to come to the government seeking aid. It is not necessary to enter into the details of these financial transactions; suffice it to say that out of the total cost of the 3,243 miles forming the Canadian Pacific proper, which is stated to have been over \$150,000,000, the amount contributed to the enterprise by the government of Canada was not less than \$62,605,000.

Among the notable events of 1877 was the great fire in St. John, New Brunswick, whereby a large portion of that fine and flourishing city was reduced to ashes, and an admirable opportunity afforded for the manifesting of that generous spirit on the part of her sister cities which has never failed upon such occasions. It took the capital of New Brunswick some time to recover from this terrible blow to its prosperity, but the energy and faith of its people proved equal to the occasion, and the city was presently rebuilt in a much improved manner. During this year the Halifax Fishery Commission, which had been provided for in the Treaty of Washington already referred to, held its meeting at Halifax, Nova Scotia, and after lengthy deliberations awarded the sum of \$5,500,000 to be paid by the United States to Canada for the superiority of her fisheries over those of the United States. The commercial condition of the country having gone from bad to worse during the Mackenzie régime, Sir John Macdonald came before the people with a proposition for a national policy of a protective character, whereby heavy customs duties were to be levied upon goods not manufactured in Canada, in order that the manufacture of these articles in the Dominion might be stimulated, and thereby a double beneficial result would be attained; firstly, by largely increasing the revenue and at the same time multiplying the demand for labor at home. The people eagerly listened to him, and those who assisted him in the propagation of these new fiscal doctrines, with the result that at the general election of 1878 the administration of Mr. Mackenzie was left in a large minority, and resigned without waiting for the assembling of Parliament. Sir John Macdonald returned to the premiership at once, and shortly afterward Lord Dufferin, who had filled the exalted office

of governor-general with remarkable brilliancy and popularity, was recalled by the imperial government for service elsewhere, being succeeded by the Rt. Hon. the Marquis of Lorne, whose coming to Canada, accompanied by his royal wife, the Princess Louise, was made the occasion of a universal outburst of loyal feeling and hearty rejoicing. The first session of the fourth Parliament was opened by the Marquis of Lorne in February, 1879, the Princess Louise also being present. The speech from the throne upon this occasion was one of more than ordinary interest. It conveyed the thanks of Her Majesty to the people of Canada for their loyal reception of her daughter, and congratulated the country on the success of Canadian exhibitors at the Paris Exposition of the previous year, when not less than 225 prizes were won by Canadian exhibitors. Reference was also made to the measures to be taken for the vigorous prosecution of the Canadian Pacific Railway, and it was further announced that Her Majesty's government had arranged for the payment to Canada and Newfoundland of their respective shares of the fishery award of \$5,500,000 which had just been paid by the United States into the imperial treasury. The most important clause of the speech, however, was that which stated that the revenue of the country being insufficient to meet the demands upon it, such a readjustment of the tariff would be made as would, it was confidently expected, restore the equilibrium between revenue and expenditure and at the same time develop and encourage the various industries of the country. Parliament had no sooner got down to work than it was plunged into the consideration of a question which proved to be one of great difficulty, and at times seemed to threaten the integrity of the union, namely, the dismissal of the Deboucherville ministry of Quebec Province by the lieutenant-governor, Lettellier de St. Just, which had taken place in March, 1877. This matter had been previously brought up by Sir John A. Macdonald in the last session of the third Parliament, and he had introduced a resolution of censure of the dismissal as being unwise and subversive of the position accorded to the advisers of the Crown since the concession of the principle of responsible government to the British North American colonies; but although he and his followers were very determined and eloquent in their support of the motion, after an exciting and long-continued debate they were defeated by a vote of 112 to 70. The facts of the case were that although the Deboucherville ministry had a majority in both chambers of the legislature, much popular discontent had been aroused by the government policy in regard to the construction of railroads, and by the manner in which the providing for the bonuses

granted was arranged. They had also passed a Stamp Act without the lieutenant-governor's authority or consent, which allowed a heavy charge upon all business contracts. For this and other reasons the lieutenant-governor had assumed the responsibility of dismissing them from office, thereby incurring the condemnation of the Conservative party, not only in Quebec, but throughout Canada, because, having been appointed under Mr. Mackenzie's administration, he was considered to have been actuated by political animus and party spirit in his course of action.

The lieutenant-governor had called upon the Hon. H. G. Joly to form a new cabinet, which he soon succeeded in doing, and being met by a vote of want of confidence, immediately asked for the dissolution of the House and an appeal to the country. The election contest that followed was very keen and close, the result being that when the legislature met the two parties were of equal strength, and throughout the session Mr. Joly was sustained in almost every division only by the casting vote of the speaker. Such, in brief, were the circumstances in connection with this most troublesome question, and when the matter was again brought up in the House of Commons at Ottawa it was at once seen that it would inevitably provoke an acrimonious and heated discussion. The debate on the question continued for three days, with the result that a resolution of censure upon the lieutenant-governor's conduct was carried by the large majority of 136 to 51. Shortly afterward Sir John Macdonald informed the House that the government had advised His Excellency the governor-general that in the public interest it was expedient that Mr. Lettellier should be removed from office. The governor-general, however, expressed his wish, as the case was one in which there were no precedents for guidance, to refer the whole matter to the home government for their consideration and instruction. The opposition contended that such a reference, after the ministers had tendered their advice, was unconstitutional, but the ministers assumed the responsibility, and the matter was accordingly submitted to the home authorities. In the meanwhile the Quebec Assembly had passed an address to the governor-general vehemently protesting against what it considered an infringement of the constitutional rights of that province by the action of the Dominion government. The home government, without entering into the discussion of the expediency of removing Lieutenant-Governor Lettellier, expressed the opinion that it was the constitutional right of the governor-general, acting on the advice of his ministers, to remove him. The Dominion cabinet, after due consideration, assumed full

responsibility for their advice, and on July 25 Mr. Lettellier was informed that he was removed from office on the ground that his usefulness as lieutenant-governor was gone. This act caused considerable excitement. An immense mass meeting held at Quebec protested against the removal of Mr. Lettellier, but after a while the agitation subsided without any serious results, and the appointment of Dr. Theodore Robitaille as lieutenant-governor was submitted to quietly. It may be here noted that 12 years later Lieutenant-Governor Angers of Quebec felt it incumbent upon him to dismiss from office the Hon. Honoré Mercier and his cabinet, because of what was deemed to be an unduly lavish expenditure of the public funds. In this instance, on an appeal being made to the country, the action of the lieutenant-governor was indorsed by an overwhelming majority of the voters, thereby amply sustaining him in his proceeding. Great as was the interest felt in the Lettellier affair, that in the financial policy of the government was still greater. The burden of forming a new fiscal system fell upon the Hon. Mr. Tilley, the minister of customs, and he gave himself to the task with unsparing assiduity. He received suggestions on all sides from deputations representing the commercial and manufacturing interests of the Dominion, with the design of making the new tariff aid the development of its industries so far as was consistent with the public welfare. In pursuance of this policy he arranged to select for the higher rates of duty those articles which could be, but were not yet, manufactured in Canada. In 1880 the lamentable murder of the Hon. Thomas D'Arcy McGee at the hands of a Fenian fanatic was painfully recalled by the death of the Hon. George Brown, the great Liberal leader, in consequence of a gunshot wound inflicted by a discharged employee of the "Globe" newspaper, of which Mr. Brown was editor and proprietor. In that year all the British possessions on the North American continent, excepting Newfoundland, were committed to the control of Canada by an imperial order in council, as was also the Arctic Archipelago, thereby making the Dominion very much the largest of the British colonial possessions, even if a considerable portion of her territory could never by any possibility be adapted to settlement. The Marquis of Lorne, who took perhaps a deeper interest in the intellectual than in the political or commercial development of the country over which he presided, in this year founded the Royal Canadian Academy of Arts, and in the following year the Royal Society of Canada was established at his inspiration. These institutions have both rendered good service in fostering art and literature in Canada, although at the time

of their foundation there were many who looked askance at them as being foreign to the genius of a people whose spirit was distinctly democratic rather than aristocratic. The census taken in 1881 showed a very gratifying increase of population as compared with the census of 1871, the increase per cent. being as follows: In Ontario, 18.6; in Quebec, 14; in Nova Scotia, 13.6; in New Brunswick, 12.4; in Manitoba, 247.2; in British Columbia, 36.4; and in Prince Edward Island, 15.8. The Northwest Territories for the first time appeared on the census returns, contributing 56,446. The grand total was 4,324,810 as compared with 3,635,024, the total increase per cent. being 18.97. In the following year those portions of the Northwest Territories not included in the province of Manitoba, and lying between that province and the Rocky Mountains, were erected into provisional districts under the names of Assiniboia, Saskatchewan, Alberta and Athabasca, with the seat of government at Regina.

The fourth session of the fourth Parliament closed in May of this year and was followed by the dissolution of Parliament. At the general election which followed the Conservatives were returned to power without loss of strength. In April of this year the old Parliament House and Library in Quebec City were unfortunately destroyed by fire, occasioning a loss of records and documents that could not be replaced, the historical value of which was beyond compute. Toward the close of the year the Marquis of Lorne's term as governor-general of Canada came to an end, and he was succeeded by the Hon. the Marquis of Lansdowne, who assumed office in October. Earlier in the year Sir Alexander Galt, who had filled the office of high commissioner for Canada in England with distinction and usefulness, was succeeded by the Hon. Sir Charles Tupper. In this year the various divisions of the Methodist Church in Canada, following the excellent example set them by the Presbyterian Church some years previously, were united into one body, to be known henceforth as the Methodist Church in Canada. The principal political event of 1884 was the settlement by the decision of the Judicial Committee of the English Privy Council of the boundaries between Ontario and Manitoba, disputes as to which had occasioned considerable friction and many complications almost ever since the erection of Manitoba into a separate province. The year 1885 will remain ever memorable in the history of Canada as being the year of the Northwest Rebellion. The causes which led to this lamentable affair were to some extent the same as those which had stirred up that earlier rebellion, which vanished into thin air at the approach of the Wolseley expedi-

tion, and the rebels, this time, as before, had for their leader the notorious Louis Riel. This man, after having been forgiven for his first offense, and having had the impudence to contest a seat for the House of Commons, and, on being elected, to present himself in the chamber, whence he was promptly and indignantly expelled, had, after various vicissitudes, crossed the border to the United States, where he had been lost sight of for a time. Now the rapid influx of settlers into the Northwest, and the eagerness with which they took up great tracts of land, far larger than many of them were competent to cultivate and care for, had naturally a very disturbing effect upon the Métis, who desired to go on in their own old-fashioned ways without being brought into competition with modern men and machinery. Not only so, but the Indian population, on account of the destruction of the buffalo and continued encroachment of the whites upon the territories which had been theirs from time immemorial, came to be in a very troubled state of mind, and were ripening for mischief. On the Saskatchewan, in the neighborhood of Prince Albert and Batoche, the half-breed settlers were particularly restless and ill at ease. No doubt they had genuine grievances, which the government would have been glad enough to redress if they had had time and opportunity to properly understand them, but the world was moving too fast for the Métis, and, in despair of getting what they felt to be their rights, they were foolish enough to send for Louis Riel to return and lead their agitation. Riel responded to the call of his countrymen, and, not content with posing as the liberator of his race, even had the impious audacity to promulgate a new religion, with himself as high priest. At first little danger was apprehended from the fervent harangues of this unprincipled adventurer or the enthusiastic cheers with which they were greeted; but suddenly the country was convulsed by the news, telegraphed from within a few miles of the scene, that an attack in force had been made by Riel and his followers on the Mounted Police and Prince Albert Volunteers at Duck Lake on March 26, 1885, and that the latter had been routed with loss of life. The excitement throughout Canada was intense. The rebels had intrenched themselves at a point 200 miles from the Canadian Pacific Railway, and Riel, who had again formed a provisional government, had sent runners out among the Indian tribes urging them to cast in their lot with him, saying that the only protection the settlers throughout the Territories had was what they could furnish themselves in the way of volunteers and a few hundred mounted police. The situation was serious in the extreme. If the Indians were to re-

spond in numbers to the appeal the fertile prairies would inevitably become the scene of heartrending massacre and destruction. At once the whole military force of the Dominion was drawn upon to meet the emergency. The 90th Battalion from Winnipeg and a volunteer field battery were hurried to the scene of action, and from all parts of Canada, not even excepting Halifax in the far East, thousands of the volunteer militia were summoned to the campaign. It was not so much the overcoming of Riel and his little band of rebels that was aimed at as the prompt marshaling of so strong and well-organized a force upon the scene that the Indians would be overawed and would not dare to take part in the conflict, and in the issue this was precisely what was achieved. In brief outline the course of events was as follows: The commencement of hostilities at Duck Lake was on March 26. On April 2 the rebels fell upon the settlement of Frog Lake and cruelly massacred a number of the inhabitants, including two Catholic priests. Two weeks later Fort Pitt, a station of the mounted police, was abandoned by its garrison, who were compelled to retire southward. On the 24th of that month the first engagement between the volunteers and the rebels took place at Fish Creek, on the Saskatchewan, where the French half-breeds held a strong position among the ravines with their skillfully arranged rifle-pits; but so gallantly did the volunteers press forward that their opponents were compelled to retire with loss of life. In another portion of the country farther north the Queen's Own, of Toronto, carried an intrenched camp of Cree Indians under Chief Pound-maker and inflicted severe loss. After the defeat at Fish Creek the rebels, with their Indian allies, fell back to their stronghold at Batoche. Now came the critical time. It was absolutely necessary that Riel should be overcome without further delay. The Canadian forces, under the command of Sir Frederick Middleton, advanced to the attack with the courage of veterans tried in the field, and on Tuesday, May 12, despite the fierce fire from the rifle-pits, charged down upon the rebel intrenchments, carrying everything before them, and winning the victory, not, however, without deplorable loss of life. The rebellion was crushed, and Riel and his lieutenant, Gabriel Dumont, were helpless fugitives; but while the latter got safely over the border into the United States, the former was captured a few days later. This was practically the end of the trouble, although Pound-maker, the Indian chief, did not surrender until May 26, and Big Bear, who had also co-operated with Riel, was not captured and his band dispersed until July 2. In this service the total loss of militia and volunteers under

fire was in killed 38 and in wounded 115. As for the rebel loss, that could not be ascertained. Throughout the whole campaign the volunteers bore their hardships and perils with a fortitude and undaunted courage deserving of the highest praise, and showing conclusively that the country would never lack for gallant defenders. On being captured, Riel was taken to Regina, tried by civil process, and, being condemned to death, expiated on the scaffold his heinous crimes.

At the meeting of Parliament in the following year the action of the government in executing Riel was vigorously attacked, and one of the most prolonged and exciting debates in the history of the House of Commons ensued, in the course of which the Hon. J. S. D. Thompson, who had recently been appointed minister of justice, and who was subsequently to become premier, made his *début* in a speech in reply to the Hon. Edward Blake's unsparing arraignment of the government. He thus ventured at the start to cross swords with the most redoubtable gladiator in the political arena, but by general consent he came off victorious, and thereby established beyond cavil his right to a place in the front rank of parliamentary orators. The motion of censure was defeated by a large majority, and thenceforth Riel disappeared from public attention. The year 1886 was signalized by the holding of the first Colonial Exposition in London, which was opened by Her Majesty in person, and proved a brilliant success. At this exposition Canada was admirably represented, and the resources and products of the country made known to the world as they had never been before. In June of this year the first passenger train over the Canadian Pacific Road left Montreal for Vancouver City, arriving on July 4, having traversed the 3,000 miles in 140 hours. By an unfortunate coincidence Vancouver City was found in ashes, a tremendous fire having just occurred, which left only four houses standing and cost some 50 lives. The fifth Parliament having been dissolved in the month of June, a general election was held in February following, in which the Conservatives again proved victorious. The fact is worth noting that at this time, although they carried the country on the strength of their protective policy, the local Houses in the larger provinces were in the control of the Liberals. In the year 1887 the first conference between the imperial government and the colonies was held in London, Canada being represented by Sir Alexander Campbell and Mr. Sandford Flemming. At this conference many questions of importance in regard to the relations between the home government and the colonies were discussed, and it was felt that much was accomplished

toward bringing about a closer union for purposes of strength and defense, if not along commercial lines. In the same year an inter-provincial conference was held at Quebec, with Sir Oliver Mowat as president, at which some 21 resolutions, mainly affecting matters relating to the Dominion government and provincial legislatures, were passed; but what attracted particular attention was one declaring for unrestricted reciprocity in trade with the United States. In June of this year the first Canadian Pacific steamship arrived at Vancouver from Japan, thus completing the communication between farthest East and farthest West. In the autumn there was considerable disaffection aroused in Manitoba because of the Canadian government disallowing an act of the provincial legislature authorizing new lines of railway to be built between Winnipeg and the United States boundary, thereby infringing upon the monopoly originally granted to the Canadian Pacific Railway Company. So vigorous and determined was the agitation on the part of Manitoba that the act had subsequently to be allowed, the Canadian Pacific Company being recompensed for the infringement upon their legal rights by a grant of money and land. Toward the close of the year there took place at Washington a meeting of the Fisheries Commission, whose purpose was to arrive at an amicable adjustment and settlement of the long-disputed and complicated fisheries question. The result of their deliberations was a treaty, completed in February, 1888, which was regarded as an equitable arrangement, but unfortunately the Senate of the United States refused to ratify it, and it was rejected in the month of August, so that the admirable work of the commission went for nothing, and the question continued in its unsatisfactory condition. About this time an Imperial or Britannic Confederation began to be agitated both in Great Britain and in her colonies, and although nothing practical has as yet been evolved, there is no doubt that advantageous of this nature will be accomplished many years shall pass something accomplished. It will be remembered that Newfoundland alone of all the British colonies in America had remained outside the confederation, and now, in March, 1888, overtures were made on behalf of Canada to the legislature of Newfoundland looking toward the admission of that colony into the Dominion. Considerable correspondence ensued, in which both the Canadian and the imperial governments took part, but in the end definite action was postponed on the ground that Newfoundland was not yet ready to come to a decision. In the month of June the Marquis of Lansdowne resigned the governor-generalship, and was replaced by the Rt. Hon. Baron Stanley of Preston, now the Earl of Derby. In the month of

August following, Sir Charles Tupper, who was doing splendid service as high commissioner for Canada in England, was made a baronet.

The third session of the sixth Parliament opened in June and closed in May of the year 1889. A notable incident of this parliamentary session was the debate with regard to the Jesuit estates. Valued in the year 1888 at some \$2,000,000, these estates had been confiscated by the Crown on the suppression of the Order of Jesus by Clement XIV. in 1773. In the year 1831 they were set apart to constitute a Superior Education Fund for both Roman Catholics and Protestants. After the restoration of the Order of Jesus by Pius VII., in the year 1814, the Jesuits and Roman Catholic bishops had with increasing insistence advanced their claim of resumption of the estates, not on legal grounds, but on those of equity. This claim made the property unsalable, and various attempts were made to arrive at a satisfactory settlement, which object was at last sought to be effected by an act of the Quebec government, known as the Jesuits' Estates Settlement Act. The strongest objection on the part of the Protestant population of the Dominion to this act was based upon the fact that the name of Pope Leo XIII. appeared as the official representative of the Roman Catholic Church in Canada, to which the sum of \$400,000 was granted by the Quebec legislature in satisfaction of its equitable claim to the major portion of the Jesuits' estates. This reference to the pope was by many deemed to be an infringement on the authority of their sovereign and a violation of the statute of *præmunire*. Another objection was that the Settlement Act transferred the whole of the estates to the public domain, and thus terminated and destroyed the fund created in 1831 for the superior education of Protestants and Catholics alike. The Protestants of the Council of Public Instruction of Quebec accordingly insisted on the government restoring the trust. The government yielded to this demand, and the sum of \$60,000 was allotted to the Council of Public Instruction for the advancement of Protestant higher education, which was accepted by the council, although strong protests were made by many Protestants against its being received. The whole subject had been vigorously debated throughout the country before it appeared in Parliament. Shortly after Parliament met, a motion was proposed asking for the disallowance of the Settlement Act on the double ground of papal interference in the provincial legislation, and of the endowment of the Jesuit order (to which the sum of \$140,000 had been allotted) as being a menace to the liberties of the people. In this discussion party lines were obliterated,

Liberals and Conservatives speaking and voting according to their convictions in the matter, and after a long and heated debate the motion was rejected by the overwhelming vote of 118 to 13. Nevertheless, the agitation against the bill continued, and out of it grew what was popularly known as the Equal Rights Movement, which, under the leadership of the Hon. Dalton McCarthy, promised to become an important factor in political life. A large convention which met in Toronto under these auspices sent an urgent remonstrance to the governor-general asking him to disallow the objectionable act. This, however, His Excellency, in view of the overwhelming vote of Parliament against such disallowance, quite properly declined to do, and although the agitation was continued for some time thereafter, it ultimately subsided without anything definite being accomplished. The month of September of this year was marked by a terrible disaster in the city of Quebec, where a large portion of the cliff suddenly fell upon the Lower Town, destroying a number of houses and causing the death of 45 persons. In February of the year 1890 a disastrous fire destroyed the library and museum and other portions of the Toronto University buildings, occasioning a loss in some respects irreparable, but calling forth a display of practical sympathy on the part of the Canadian public that was highly commendable, the legislature of Quebec, among other public bodies, generously voting a substantial sum to help in the rebuilding of the edifice. The same month was rendered memorable by the act of the legislature of Manitoba abolishing the separate schools of that province. A few months after the fire at Toronto University which caused so much damage, but cost no lives, the vast Longue Pointe Lunatic Asylum, near Montreal, was totally destroyed by fire, causing a loss of nearly \$1,000,000; and, what was still more deplorable, of over 70 lives. In the month of April, 1891, the third census since confederation was taken, and the result was not altogether satisfactory, the percentage of increase being much smaller than was anticipated. The total population of Canada was found to be 4,833,239, the increase per cent. of population being 11.76, to which naturally the largest contributors were the provinces of Manitoba, British Columbia and the Northwest Territories.

Parliament having been dissolved in the month of February, a general election was held shortly after, at which the Conservatives, although apparently threatened with defeat, were once more returned to power, this time, however, with a much reduced majority. The first session of the seventh Parliament opened in April and closed in September, and on June 6 the Rt. Hon. Sir John Macdonald, Premier of

Canada, passed away after a brief illness, in his 76th year, amid the universal regret of the Canadian people. Sir John Thompson was thereupon called to form a ministry, but declined in favor of Sir John J. C. Abbott, who had no difficulty in fulfilling the charge, there being little change in the cabinet from that of his predecessor. During the long-protracted session charges of corruption were made against the Department of Public Works. A parliamentary investigation was held, the result of which was that Sir Hector Langevin, who presided over the department, had to resign his portfolio, and Mr. Thomas McGreevy, one of the representatives from Quebec, was expelled from the House of Commons. In September of this year Lieutenant-Governor Angers of Quebec dismissed the Mercier cabinet and dissolved the legislature. In the election which shortly followed the majority against Mr. Mercier was so decided as thoroughly to justify the lieutenant-governor in the drastic course he had pursued. The early part of the year 1892 was marked by the death of two distinguished figures in the political arena, namely, the Hon. Alexander Mackenzie and Sir Alexander Campbell, lieutenant-governor of Ontario. During the summer the Hon. Edward Blake, who had some years before succeeded Mr. Mackenzie as leader of the opposition in the House of Commons, withdrew altogether from the field of Canadian politics, and offered himself as a candidate for the Imperial Parliament in the constituency of South Longford, Ireland, for which he was triumphantly elected, his successor as leader of the opposition at Ottawa being the Hon. Wilfred Laurier. Toward the close of the year Sir John Abbott, whose health had been steadily failing, resigned the premiership, and was succeeded by Sir John Thompson, who, on assuming office, made some important changes in the personnel of the cabinet.

The year 1893 was marked by the sitting of a very notable body, namely, the Court of Arbitrators for the settlement of the questions in dispute between Great Britain and the United States with regard to the Behring Sea seal fisheries. This court held its sessions in Paris from April to August, and it was of especial significance to Canada, not only because important interests of the province of British Columbia were involved, but also because the premier of Canada had been honored by being chosen as one of the arbitrators, the composition of the court being as follows: Baron de Courcel (Belgium), Lord Hannan (Great Britain), Sir John Thompson (Canada), John M. Harlan and J. P. Morgan (United States), Marquis Visconti Venosta (Italy), and M. Gramm (Norway and Sweden). In this august tribunal the Canadian repre-

sentative bore himself with a degree of dignity and ability that reflected the greatest credit, not only upon himself, but upon the country from which he had come, and whose rights he was there to maintain. In Sept. of this year the Rt. Hon. the Earl of Aberdeen replaced Lord Stanley of Preston in the office of governor-general. At the Columbian International Exposition held at Chicago during this year Canadian exhibitors were awarded no less than 2,126 prizes, a record of which the country had good reason to be proud. The year 1894 was signalized by the holding at Ottawa of the second Britannic and Intercolonial Conference, at which the imperial government, New South Wales, Cape Colony, New Zealand, Victoria, Queensland and Canada were represented. The subjects of discussion were the means of bringing into a still closer union and community of interest the different portions of the British empire. In December of this year the country was shocked and saddened by the news of the tragically sudden death of the premier, Sir John Thompson, at Windsor Castle shortly after he had been sworn in as a Privy Councillor in Her Majesty's presence. Sir Mackenzie Bowell was at once called upon by the governor-general to undertake the reins of office, which he did, with a cabinet practically the same as that of his predecessor. The principal political event of 1895 was the conference between representatives of the Dominion and representatives of Newfoundland with a view of arriving at a basis satisfactory to both countries upon which the union might be perfected. It was held in Ottawa in the month of April, Canada being represented by Sir Mackenzie Bowell, Sir Adolphe Caron, Hon. G. E. Foster and Hon. John Haggart, and Newfoundland by the Hon. Messrs. Bond, Morris, Emerson and Harwood. After a number of meetings terms were proposed by the Canadian government in their details similar to those already enjoyed by the other provinces of the Union, but these not proving satisfactory to the Newfoundland representatives, the conference adjourned without any definite result being attained, and Newfoundland still continues to hold aloof from confederation, although she would surely have everything to gain by casting in her lot with the other provinces.

The political events of 1896 were full of interest. The Hon. Sir Mackenzie Bowell, who had at no time been altogether firm in the premier's chair, owing to the feeling on the part of the bulk of the Conservative party that a more strenuous leader was required for the occasion, after some disturbing experiences (such as the resignation of no less than seven of his cabinet in the month of January, this action being called "the Bolt," and their return to their

portfolios only upon certain unwelcome conditions), finally resigned as premier and president of the Council in April. The Hon. Sir Charles Tupper was thereupon sent for to form a new ministry, which task he promptly accepted. The personnel of this cabinet differed in some particulars from that of the one it succeeded, the most important addition being that of Hugh John Macdonald, only son of the great Conservative chieftain, who took office as minister of the interior. After a somewhat stormy session, and considerable friction between the premier and the governor-general, who withheld his sanction from certain proceedings of the cabinet, Parliament was dissolved in the month of June and a general election followed. The chief issues before the country were the Manitoba school question in particular and the record of the Conservative party in general. The campaign was conducted on both sides with unsparing vigor, and the result awaited with exceptional interest. Hopeful as the Liberals were, it is yet not too much to say that the outcome proved a very gratifying surprise to them, since in spite of the brave and enlightened stand upon the school question, the Hon. Sir Wilfrid Laurier secured such a majority in the province of Quebec that with the aid given in less degree by the other provinces he was able to claim an undoubted victory. Thus, after nearly twenty years' patient endurance of the cold shades of opposition, the Liberal party returned to power in July, 1896. The celebration of Queen Victoria's Diamond Jubilee throughout the British Empire was an important event of the year 1897, and in no country was it more enthusiastically honored than in Canada. For the second time in its history the great British Association for the Advancement of Science met in Toronto. Two events of international interest were the proposal on the part of the United States for a joint commission to settle the different questions in dispute between the Dominion and the Republic, which proposal was accepted; and the award by the Bering Sea Commission of the sum of \$464,000 to Canadian sealers, as recompense for losses sustained through the action of the United States. The budget of 1898, when brought down by Hon. W. S. Fielding, minister of finance, contained an important feature, to wit, provision for the admission of all articles manufactured in other parts of the British Empire (excepting spirituous liquors and tobacco) at a rate of duty 25 per cent. lower than articles from other countries, this being known as the British Preference, whose effects have been so far-reaching.

In June of this year the Yukon district in the far north, whose vast mineral wealth had been attracting so much attention, was

constituted a separate territory and given representation in the Canadian Parliament. In the month of August the joint high commission for the settlement of questions in dispute between the United States and Canada held its first meeting at Quebec, Lord Herschell being appointed chairman. Sir Wilfrid Laurier, Sir Richard Cartwright and others represented the Dominion, while for the Republic were the Hon. C. W. Fairbanks, John W. Foster, T. J. Coolidge, and others. The sessions of this commission were continued at intervals until the close of the year. At the request of the temperance advocates, a plebiscite on the question of the legislative prohibition of the liquor traffic was taken, which resulted in a majority for prohibition, but no definite steps to carry this out have yet been made. In November the Earl of Minto succeeded the Earl of Aberdeen as governor-general of the Dominion. The new year (1899) was marked by the introduction of a two-cent postage rate on letters not only throughout the Dominion, but also between Canada, Great Britain, and several of the British colonies. Early in the year arrived the first batch of Doukhobors from Russia, nearly 10,000 of whom have settled in the Northwest, where they have been allotted good lands. On May 23 the first celebration of "Empire Day" took place. In June Sir Wilfrid Laurier submitted to Parliament the latest proposal of the Anglo-American commission relative to the Alaska-Canada boundary question, thus advancing the settlement of this troublesome matter one stage nearer. During the session a resolution moved by Sir William Mulock was unanimously adopted for the construction of a Pacific cable under the joint ownership and control of Great Britain, Australia, and Canada. A bond of empire still more significant, however, was the assistance rendered by Canada to Great Britain in connection with the war in South Africa. Between October, 1899, and January, 1902, many thousand soldiers were furnished, whose services proved of great value, and were highly appreciated by the imperial authorities. The year 1900 was notable for the political activity which prevailed throughout the Dominion. In Manitoba the Liberals, under Thomas Greenway, were, in January, replaced by the Conservatives, under Hon. Hugh J. Macdonald, who, however, in his turn, resigned ere many months, and was succeeded as premier by the Hon. R. P. Roblin. In British Columbia one administration was dismissed from office by the lieutenant-governor, and its successor resigned after a general election had been held which resulted adversely. In the provinces of Quebec and Prince Edward Island elections were held which continued the Liberals in power, and then, in November, the general election for the whole Do-

minion took place, and the Laurier administration was triumphantly sustained. In the early part of 1901 the death of Her Majesty Queen Victoria was mourned throughout Canada, and on this account the visit of the Prince and Princess of Wales, who came over from Australia in the autumn, was all the more warmly appreciated. The manifestations of loyalty and affection by the people at large were of the heartiest possible character. On April 1, 1901, the decennial census was taken throughout the British Empire, and the results showed that Canada had a population of 5,371,315, being an increase of 11.14 per cent. over the total of 1891. The principal increases in population were, of course, in British Columbia, Manitoba, and what are now Alberta and Saskatchewan. Among the events of 1902 were the opening of the great Bessemer steel works at Sault Ste. Marie and the establishment of the Marconi wireless telegraph station for transoceanic messages at Table Head, Cape Breton. In June the boards of trade of the Dominion held a conference at Toronto for the discussion of the relations of Canada with the Empire. In October the first message from Australia to England over the Pacific cable was transmitted through Canada, signaling the completion of another bond of union between the Empire and the colonies. Early in 1903 the Alaskan boundary treaty, providing for the reference of this troublesome question to arbitration, was ratified by the United States Senate, and before the close of the year the arbitrators rendered their decision, which was extremely unsatisfactory to Canada, but was loyally accepted. In the month of March postage on all newspapers and periodicals forwarded from Canada to Great Britain was reduced to domestic rates, but this good example still awaits imitation by the British postal authorities. In August a congress of the chambers of commerce throughout the Empire was held in Montreal, when questions of vital significance were discussed by representative men. The appointment of a transportation commission in the same month manifested the desire of the government to obtain a full understanding of the problems of transportation, upon the proper solution of which the growth and prosperity of the country so greatly depend. In November the Canadian mounted police took possession of Herschel Island, on the Arctic coast, and hoisted the British flag. The outstanding subject of the year, however, was the project for a new transcontinental railway running from Moncton, New Brunswick, to Prince Rupert, British Columbia, to be constructed in part by the government and the remainder by the Grand Trunk Company, and the whole line when completed to be managed by a company

called the Grand Trunk Pacific, wherein the Grand Trunk would hold a controlling interest. The scheme was most fully discussed in Parliament and by the press, and many modifications in the terms were made, but it was finally approved, and the building of the road entered upon with a degree of energy that insures its completion at a comparatively early date. The Canadian Northern line also made such marked progress as to indicate that ere long the Dominion would have three great transcontinental systems aggregating many thousands of miles of railway. So far as domestic affairs were concerned, the year 1904 was singularly uneventful, the most important political occurrence being the federal elections held in the autumn, at which the Laurier administration was sustained by a substantial majority. The Northwest produced a splendid harvest, and the influx of new settlers broke all records. In September Earl Grey succeeded the Earl of Minto as governor-general. In 1905 there were several notable and interesting events, and the material progress of the Dominion was very marked. During the parliamentary session several important laws were passed. Of these the chief were the Alberta and Saskatchewan acts, creating two large provinces in the northwest and providing for their government. Inauguration ceremonies, in which the governor-general and the prime minister of the Dominion participated, were held at Edmonton, the capital of Alberta, on Sept. 1, and at Regina, the capital of Saskatchewan, on Sept. 4. The first ministries of the new provinces were Liberal in politics, and the first premiers were Hon. Alexander C. Rutherford, of Alberta, and Hon. Walter Scott, of Saskatchewan. The area of the two provinces is 504,190 square miles, which equals the combined areas of Great Britain, France and Germany; the combined areas of Michigan, Iowa, Wisconsin, Minnesota and the two Dakotas, and more than twice the combined areas of the six States of New England, together with New York, New Jersey, Pennsylvania, Ohio, and Indiana. These provinces are destined to be the great granaries of Canada in the future. Another important enactment was the Census and Statistics Act, passed not only to provide a permanent organization for the taking of the general census of the Dominion in the first year of each decade, but also to take a census of population and agriculture for the provinces of Alberta, Manitoba and Saskatchewan in the middle year of each decade. The reason for the special census of these northwest provinces was that to them the new tide of immigration is flowing, and it was expedient to procure more frequent returns of settlement and agricultural development. The year was

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also notable for a general increase in the salaries of the judges of the Supreme Court at Ottawa, as well as of the judges of the provincial and county courts. There was also a liberal increase in the allowances of members of the Senate and the House of Commons, but a system of annuities for those members of the Privy Council who had been members of the Cabinet occasioned so much dissatisfaction that it was repealed.

Perhaps the most significant event of the year was the withdrawal of British troops from Canada and the assumption by the Dominion government of the burden of maintaining the garrisons and fortifications at Halifax and Esquimalt. This was another step toward military independence, although no feeling for political independence prompted it. At the same time the administration of the militia was reorganized by the establishment of the Militia Council and the abolition of the office of general officer commanding. Negotiations were carried on during the year with the object of establishing preferential trade relations between Canada and Australia, and of extending those already existing between Canada and South Africa. Another proposal indorsed by the Militia Council was the introduction of a system of interchange of imperial and colonial military officers, the proposal at present being limited to three officers, one with the army, either in Great Britain or one of the colonies; one with India and one with Australia. The work of construction on the eastern and western divisions of the National Transcontinental Railway was carried on vigorously during the year. There were only eighty-seven industrial disputes in 1905, but of these the strike of between 700 and 800 coal miners at Nanaimo, B. C., was serious, affecting many interests of that province. It lasted for four months. The Liberal government of the province of Ontario, after being in power for thirty-three years, was defeated in January, and a Conservative government, under the premiership of Hon. J. P. Whitney, was returned to power by a large majority. There were 144,621 immigrants in 1905. Of these, 64,863 were from the United Kingdom, 44,427 from the United States and 35,331 from the continent of Europe and elsewhere. Canada's foreign trade for the calendar year 1905 amounted to \$495,010,028, an increase of thirty-six per cent. over that of 1900. By far the most important event of 1906 was the revision of the tariff. When Sir Wilfrid Laurier came into power in 1896 it was expected that the distinctively protective character of the tariff would be changed. This did not prove to be the case. The leading industries built up under the tariff of 1879 were not seriously disturbed.

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Under the revised general tariff of 1906 the rates of duty previously in force were not radically changed; the British preference, altered in a few items which did not affect its average, was continued; and a new principle was introduced in the form of an intermediate tariff, with rates somewhat below those of the general tariff and above those of the British preference. It is intended to be used as an instrument by which the Canadian government may from time to time negotiate with any country willing to give Canada favorable conditions. It was not framed to go into effect at once, but to await the offer of any foreign country to take advantage of its terms. For fuller details of the new tariff see CANADA—*Tariff System*. The question of Asiatic immigration into British Columbia again became prominent. In addition to the Japanese, a number of East Indians were admitted, and conflicting views were expressed as to their fitness for the heavy work of railway building or other tasks demanding physical energy. Immigration for 1906 amounted to 215,000. During the latter part of the year and the early part of 1907 much was done in the way of informal conferences to prepare the way for settlement of outstanding questions between Canada and the United States. Elihu Root, the American Secretary of State, visited Ottawa in January, 1907, and discussed with Earl Grey and Sir Wilfrid Laurier the more important matters awaiting adjustment; and shortly afterward the Right Hon. James Bryce, British Ambassador to the United States, also visited Ottawa and other cities for the purpose of acquainting himself with the Canadian point of view. This was the first visit of the kind ever made by a British ambassador, and it was referred to by Sir Wilfrid Laurier as making a new departure in the history of British diplomacy so far as Canada is concerned. A beneficial measure for the prevention of strikes and lock-outs was passed. In April, 1907, Sir Wilfrid Laurier and four other members of his ministry attended the Colonial Conference in London. By resolution the name of the conference was changed and it is henceforth to be known as the Imperial Conference. The attitude of Canada as outlined by her representatives was more conservative in regard to the institution of an imperial council than was that of the other self-governing colonies. It was felt that the word "council" would give rise to misapprehension as to the functions of this body, which are purely advisory and consultative. Many important measures were discussed, and the offer of preference formerly made by Canada, Australia, New Zealand and South Africa was continued; but the British prime minister, Sir Henry Campbell-Bannerman, and the Chancellor of the Exchequer, Right

Hon. H. H. Asquith, held out no hope that Britain would admit colonial products on preferential terms to the British market. The elections held in October, 1908, resulted in the retention of the liberal party in power. The growth of the Dominion of Canada during the period 1868-1905 may be most readily grasped by means of a few statistics. In 1868 the population was a little over 3,000,000; by 1905 it had risen to about 6,000,000. The revenue in 1868 was \$13,687,928 and the expenditure a little less; in 1905 the totals were \$71,186,073 and \$63,319,683. In 1868 the post offices numbered 3,638; in 1905, 10,460. In 1868 the total imports were \$73,460,000 and the exports, \$57,567,000; in 1905 they were, respectively, \$261,925,554 and \$203,316,872. In 1868 there were 2,270 miles of railway in operation and in 1905, 20,487 miles. In 1868 the chartered banks had a paid-up capital of \$30,290,000 and in 1905 of \$82,655,828. In 1868 the public debt stood at \$96,896,000 and in 1905 at \$377,678,580. See also the articles CANADA, DOMINION OF; CANADA, GROWTH OF CONSTITUTIONAL GOVERNMENT IN; CANADA AND THE EMPIRE; and the various articles on the provinces and territories.

J. MACDONALD OXLEY.

Canada, Dominion of, a federal union of provinces and territories, comprising all the British possessions in North America, excepting Newfoundland; bounded on the N. by Beaufort Sea and the Arctic Ocean, on the E. by Davis Straits, Labrador coast, and the Gulf of St. Lawrence; on the W. by the Pacific Ocean and the Territory of Alaska, and on the S. by the United States. It includes nine provinces; Yukon Territory, and the Northwest Territories, which comprise the districts of Mackenzie, Franklin, Keewatin, and Ungava. The provinces of Alberta and Saskatchewan, which were proclaimed in 1905, were formed out of the four provisional districts of Alberta, Assiniboia, Saskatchewan, and Athabasca. The total area of the Dominion is 3,745,574 square miles, of which the land area is 3,619,818 square miles, and the water area 125,756 square miles.

Physical Characteristics.—Extending over so large a territory, Canada presents a great variety of surface. There are four main physical divisions, each with a distinctive geological and topographical character. The Rocky mountain region of the West stretches from Alaska through the Yukon Territory, British Columbia, and the S. W. part of Alberta to California. It is about 400 miles wide, and in British Columbia imparts so striking a physical configuration to the surface that that province has been characterized as a "sea of mountains." The greatest average elevation is in the south. Besides the main chain of the Rocky mountains,

there are smaller ranges between it and the coast, the most westerly being those of the Queen Charlotte Islands and Vancouver Island. Others are the Coast range, which extends from the N. to the S. boundary of British Columbia, and is continued southward through the State of Oregon; the Selkirks, which have a glacier region of greater extent than that of Switzerland; the Cariboo mountains, and the Gold range. The Canadian Pacific railway crosses the Rockies through the Kicking Horse Pass, just S. of Mt. Murchison, at an altitude of 5,300 feet. Some of the Rocky mountain peaks attain a height of more than 16,000 feet. Among the highest are Mt. Hooker, 16,760 feet; Mt. Brown, 16,000 feet, and Mt. Murchison, 15,700 feet. There is also an interior plateau, with an average width of 100 miles, which runs about 500 miles northwesterly from the S. boundary of British Columbia and contains the chief part of the farming and ranching lands. In strong contrast to the great Rocky mountain region is the vast, undulating central plain immediately to the E. It is about 800 miles wide along the boundary line between Canada and the United States, gradually narrowing toward the N. and extending to the Arctic Ocean. The S. part contains the vast wheat region of Manitoba, Saskatchewan, and Alberta, and S. of the Saskatchewan river the plains are practically treeless. The wooded country is N. of that river. The whole region consists of three plateaus, of which the most westerly, which extends about 450 miles E. of the Rocky mountains, has an average elevation of 3,000 feet. The middle plateau has an average elevation of 1,600 feet, and includes the Qu'Appelle and Assiniboine river valleys; and the most easterly, known as the Red river valley and Lake Winnipeg region, has an average height of 800 feet. The whole central plain slopes downward, from the W. and S. W., toward the N. and E. The third great surface division is the Laurentian plateau, a shield-shaped region of an average elevation of about 1,500 feet, although it rises to 1,700 feet in the interior of the district of Ungava, and reaches more than 2,000 feet along parts of the rocky Atlantic coast of the Labrador peninsula. Geologically, it is chiefly composed of crystalline rocks. It comprises the Labrador peninsula and the basin of Hudson bay, extending around the S. and W. shores of the latter and northwesterly to the Arctic Ocean. Numerous rivers drain from the plateau into Hudson bay. The fourth and most easterly of the great surface divisions is the Appalachian, and is the extension northward of the Appalachian region which runs along the Atlantic coast of the United States. It comprises Nova Scotia, New Brunswick, Prince Edward Island, and the S. E. part of Que-

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bec. The chief mountain range, the Notre Dame, runs through S. E. Quebec at an average elevation of 1,500 feet and extends into the Gaspé peninsula, where it is called the Shicksock mountains. These attain an elevation of more than 3,000 feet. The Cobequid mountains, some of which attain a height of 1,100 feet, extend in a line parallel to the coast from the bay of Fundy, through Nova Scotia to Cape Canso. Nova Scotia is a long fertile plain. A third mountain range crosses New Brunswick from the Gulf of St. Lawrence to the State of Maine. The valley of the St. Lawrence, extending about 600 miles between the city of Quebec and Georgian bay, comprises the most fertile agricultural land in E. Canada. The coasts of the Dominion have numerous indentations. The Pacific coast has a large number, the majority of which are excellent natural harbors. Between Vancouver Island and the British Columbia coast is the Gulf (or Strait) of Georgia. On the Atlantic coast are the Gulf of St. Lawrence, the bay of Fundy and the bay of Chaleur. In the N. are many large bays or inland seas, of which Baffin bay, in the N. E., and Hudson bay, near the center of the Dominion, are the chief.

The lakes of Canada are the most extensive in the world. The great Laurentian lakes are Superior, Huron, Michigan, Erie, and Ontario. Lake Michigan is wholly within American territory. These lakes form, with their connecting rivers and canals, a complete system of navigation from the head of Lake Superior to the Atlantic Ocean, a distance of 2,384 miles. Other large lakes in the Northwest Territories and provinces and Manitoba are Great Bear, with an area of 11,200 square miles; Great Slave, 10,100; Winnipeg, 9,400; Athabasca, 4,400; Winnipegosis, Manitoba, and Reindeer lakes. The principal rivers flowing into the Atlantic Ocean are the St. Lawrence (with its tributaries, the Ottawa, the St. Maurice, the Richelieu, and the picturesque Saguenay, which flows from Lake St. John between somber cliffs varying in height from 500 to 1,500 feet), the St. John, the Restigouche, and the Miramichi. Flowing into the Arctic Ocean are the Mackenzie (with its tributaries, the Athabasca and Peace rivers), Coppermine, and Great Fish; emptying into Hudson bay on the W. are the Saskatchewan, the Red river of the North (with its tributary, the Assiniboine), the Churchill, and the Nelson. The Albany empties into James bay, the southern prolongation of Hudson bay, on the W., while on the E., also emptying into James bay, are the Rupert, East Main, and Big rivers. The Moose, Abitibi, Harri-canaw, and Nottoway rivers flow northward into the S. part of James bay. Into Hudson bay on the E. flow the Great Whale and

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Little Whale rivers. The Fraser and the Columbia are the chief rivers flowing into the Pacific Ocean, and farther N. are the Skeena and the Stickeen. Part of the Yukon river is in the Dominion.

Soil and Climate.—The soil of a large part of the Dominion is well suited for agriculture. Generally speaking, it is clay, beneath a rich vegetable loam. The St. Lawrence valley and the S. part of Ontario, the island of Prince Edward, and a considerable part of Nova Scotia and New Brunswick are very fertile and well adapted to grain-growing and the production of root crops and fruit. The so-called "barren lands," extending on both sides of Hudson bay, have little or no soil fit for agriculture, and the same may be said of a portion—much smaller than was originally supposed—of N. Ontario and N. Quebec; but in the S. part of the great central plain region there is a rich, black loam of unsurpassed fertility. It extends throughout the S. part of Manitoba and the larger part of Saskatchewan and Alberta. It is characteristic also of the coast land and valleys of British Columbia. The extremes and varieties of a continental climate are found in Canada, complicated by the influence of Hudson bay, a vast inland sea occupying a nearly central position, and of the great Laurentian lakes. The cold waters of the North Atlantic flowing past Hudson Strait and the Labrador coast are the chief cause of the sub-arctic climate of the adjacent region, and of the fogs and dampness of Newfoundland, and, in a lesser degree, of the Maritime Provinces. The latter have, nevertheless, a healthy and bracing climate, and the sheltered valleys of Nova Scotia are famous for their orchards. The E. part of the great central prairie region has warm summers and dry, cold winters, in which the mercury sometimes falls to 50° below zero, but as the air is dry and very bracing, much less discomfort is felt than is commonly supposed. In the W. the modifying influence of the Chinook wind (*q. v.*), a powerful air current of local origin, caused by the descent and condensation of rarified air from the Rocky mountains, imparts warmth over a large area and allows successful agriculture and comfortable living in latitudes in which these would be impossible in E. Canada. In S. Alberta horses and cattle are allowed to graze through the winter. In S. Ontario and S. Quebec warm summers and cold though not exceptionally severe winters make a healthy, vigorous climate. The Ontario peninsula between lakes Huron and Erie has a summer temperature favorable to the growth of peaches, grapes, and other fruits. British Columbia has an equable and pleasant climate, although some districts have a heavy rainfall. Above the sixtieth parallel of latitude short summers and long, severe winters make the





**DOMINION OF CANADA
AND NEWFOUNDLAND**

ENGLISH STATUTE MILES

Hammond's 8" x 11" map of Dominion of Canada.
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growth of cereals and root crops increasingly difficult as cultivation proceeds northward, until almost all vegetation dies out in the Arctic waste. In the W. provinces of Alberta, Saskatchewan, and Manitoba the growth and quality of wheat and other cereals are greatly benefited by the N. latitude and consequent increased duration of sunshine, while the retained moisture of the soil is to a considerable extent a safeguard against drought. The abundant snowfall over a large area in most of the provinces is not only a protection to the soil but a valuable aid in transportation.

Minerals and Mining.—Canada is very rich in mineral deposits. The most important are coal, iron, gold, silver, copper, nickel, and lead; there are also asbestos, gypsum, manganese, antimony, molybdenum, cobalt, chromium, platinum, zinc, pyrites, phosphates, petroleum, natural gas, mineral waters, and salt. Mica, corundum, chromite, graphite, feldspar, and arsenic are also found. Building stones, marble, brick clay, and limestone occur in abundance. The area of gold production thus far known is confined to the Klondike district of the Yukon, British Columbia, Nova Scotia, Ontario, Quebec, Saskatchewan, and Alberta. In 1905, of the total value of gold produced, the Yukon Territory contributed 57 per cent., British Columbia nearly 40 per cent., and the rest of the Dominion a little more than 3 per cent. Silver is mined chiefly in British Columbia, which furnished the greater part of the Canadian output in 1905, and in recently discovered cobalt-silver-nickel deposits at Cobalt (*q. v.*), near the N. end of Lake Temiskaming in Ontario. This discovery promises a great extension of the industry in Canada. The proportion of silver obtained from the other provinces is very small. Iron ore is obtained in the Michipicoten district and other parts of Ontario, in Nova Scotia, British Columbia, and Quebec. Steelmaking is progressing rapidly, but there are few districts thus far known—Sydney, Cape Breton Island, is one—where the assemblage of all the materials necessary is economically made. The industry there is of rapidly growing importance. Great furnaces and works have also been built at Sault Ste. Marie, but the ore and coke are imported. In British Columbia similar natural advantages in steel manufacture to those existing in Cape Breton are reported. The Dominion government grants a bounty on the production of iron and steel, and in order to encourage the production from native ore gives a bounty of one dollar per ton in excess of that given on the production from foreign ores. Copper is mined chiefly in British Columbia and Ontario, but Nova Scotia, New Brunswick, and Quebec produce moderate quantities. The nickel mines of the Sudbury district in On-

tario are famous, and produce more than half of the world's supply of this metal. Practically all of the Canadian lead supply is from the mines of British Columbia, where it is always found in conjunction with silver. Bituminous coal is mined chiefly in Nova Scotia and British Columbia, and is also found in Alberta and Saskatchewan. Anthracite is found in Alberta, and its discovery has been reported in portions of British Columbia and the Northwest. Lignite is mined at many points in Alberta and Saskatchewan, and often is apparent on the surface of the soil. It is estimated that the coal-bearing area of Canada exceeds 100,000 square miles. Petroleum and natural gas are found in S. W. Ontario, although the supply is steadily diminishing. They have both been discovered in the northwestern provinces, especially in Alberta, but little has thus far been done toward their development. The decline in value of the Canadian mineral output in recent years is due to the gradual exhaustion of the placer gold mines in the Klondike, although the profitable working of lower grade ores in that region, and the increase of the gold output in British Columbia, are expected to increase the total annual value of mineral production. In 1905 this was \$68,574,707. The value of gold produced in 1905 was \$14,486,833. In 1904 the coal production was valued at \$17,658,615; nickel, \$7,550,526; copper, \$7,420,451; silver, \$3,605,957; lead, \$2,634,084; Portland cement, \$1,913,740; asbestos, \$1,486,359; pig iron, \$1,047,860; petroleum, \$849,687. The output of silver has recently been much increased by the development of the rich new mines at Cobalt. Official figures for the first six months of 1905 give shipments of ore from six mines of 891 tons, valued at \$688,004, or a little more than \$772 a ton. Carloads of ore valued at from \$60,000 to \$100,000 each have not been uncommon. Cobalt has become a mining center of world-wide fame, and speculation in its mining shares has affected the Wall street market. Another discovery of rich silver deposits in the region a little farther N. was made in 1907. In 1905 the exports of Canadian mineral produce amounted to \$31,932,329, of which \$28,764,461 worth was sent to the United States.

Forests and Fauna.—The forests of Canada are not exceeded in extent and value by those of any other country. Their area is estimated at about 1,325,000 square miles, of which 742,000 square miles are under Dominion and 506,000 square miles are under provincial jurisdiction. This estimate does not include the forests in the various Indian reservations. The Crown forests under Dominion jurisdiction are those of Manitoba, Saskatchewan, Alberta, the Northwest Territories, and the railway belt, 40 miles wide, in British Columbia. The most valua-

ble Canadian trees are the spruce, pine, hemlock, cedar, poplar, birch, oak, beech, maple, elm, hickory, ash, basswood, walnut, and tamarack. In E. Canada, below the watershed which divides the St. Lawrence valley from the Labrador and Hudson bay region, forests of hardwood and coniferous trees are widely distributed. N. of this watershed, on either shore of Hudson bay and to the N. and N. W., is a vast expanse of barren land in which there is little or no vegetation except mosses and lichens; but vast herds of the caribou and musk-ox roam there. W. of Hudson bay and N. of the Saskatchewan river a broad forest belt begins and stretches across the continent as far as the Rocky mountains. It is composed chiefly of spruce, aspen (poplar), and tamarack. S. of the Saskatchewan is the vast, gently undulating plain of the rich prairie region, almost treeless except along certain parts of the river courses, but covered with a variety of rich grasses which formerly supported countless herds of buffalo and are now the basis of a great ranching industry. In many places, however, the rancher is being driven out by the development of mixed farming. The forests of the Rocky mountain areas vary chiefly according to the rainfall, which is abundant, and even excessive, in many parts of the coast region, but scanty in the interior, notably in the valleys of the Fraser and Thompson rivers. The trees on the western declivities of the main range of the Rockies are stunted and meager compared with the dense, full-grown, gigantic forests of spruce, cedar, and hemlock which cover the coast region and the western slopes of the coast ranges. In these there is an almost inexhaustible supply of valuable timber. The pulp industry can draw for many ages to come upon the spruce which grows throughout nearly all the forest area, and the white pine of eastern Canada is also an important source of wealth. Lumbering is one of the most important industries, and its operations are facilitated by the large number of rivers and streams on which the timber cut during the winter is floated down to the sawmills. In 1901 the total value of forest products (timber, logs, wood, etc.) was \$50,805,084; in 1906 it was \$68,229,920, an increase of 34 per cent. In 1905 the total exports of forest products amounted to \$33,235,683, of which \$12,214,007 went to Great Britain, \$17,837,049 to the United States, and \$3,184,627 to other countries.

The wild animals of Canada include the caribou and musk-ox of the barren lands of the North; the caribou of the more southerly and better wooded regions, the Virginia and the black-tailed deer, the Rocky Mountain sheep, Rocky Mountain goat, the moose, the bison (a few herds of which survive, being maintained by the Dominion government and by private persons), the wapiti, the prong-horn antelope, the polar, the black, the grizz-

ly, and the cinnamon bear, the gray wolf, the coyote or prairie wolf, the puma or panther, besides the red fox, silver fox, seal, lynx, otter, beaver, marten, skunk, wolverine, mink, and other animals which have for so long sustained the fur trade. In 1901 the value of the fur production of Canada amounted to \$899,645, to which the unorganized territories of the far North contributed \$262,951, British Columbia \$201,398, the Territories \$146,517, Quebec \$138,408, and Ontario \$112,467. In 1906 the value of dressed furs amounted to \$1,970,190. Immense numbers of wild geese and ducks are found, especially in the western provinces; and there are also partridges, quails, wild turkeys, and a large variety of birds of prey and sea birds.

Fisheries.—The fishing industry ranks next to mining in importance, while the political complications and disputes arising from it, especially with the United States and France, have long been a cause of friction and anxiety. The most important fisheries, which yield about two-thirds of the total product, are those of the Atlantic division, including the bay of Fundy and the Gulf of St. Lawrence, and those of the Pacific coast, which include the famous salmon fisheries of British Columbia and the fur seal fishery. Next to these in importance are the fisheries of the Maritime Provinces, the Great Lakes, the Northwest Territories, and the interior of British Columbia and the Yukon Territory. The principal products in order of commercial importance in 1904 were: salmon, \$4,511,096; lobster, \$3,691,151; cod, \$3,643,654; herring, \$2,156,489; whitefish, \$1,058,812; sardine, \$790,441; halibut, \$784,564; trout, \$782,140; mackerel, \$750,397; pickerel, \$638,567; haddock, smelt, hake, pollock, sturgeon (for caviare), and pike. In 1904 the fur and hair of seals caught amounted in value to \$224,190. The total catch for 1904 amounted in value to \$23,516,439. More than 80,000 persons are engaged in the fisheries, and their bravery, skill, and endurance have drawn political attention to their value as a British naval reserve. A bounty to encourage deep-sea fishing is paid by the Dominion government, which also aids the industry in all its branches by the establishment of hatcheries, marine stations for the practical investigation of fish life, and the maintenance of small armed cruising vessels to enforce the fishery laws. Refrigerators have also been built for the storage of fresh bait by the government, in coöperation with associations of fishermen along the coast.

Agriculture.—According to the census of 1901 there were in Canada 63,422,301 acres of occupied land; and 544,688 occupiers (excluding those holding less than 5 acres), of whom 474,441 were owners, 47,744 tenants, and 22,503 part owners and part tenants. Of improved land there were 30,166,033

acres, of which 19,763,747 were under field crops. The acreage under pasture and in orchards and gardens amounted to 16,138,505. The value of farm property was \$1,787,102,630; and of farm products, \$364,906,866. Of the leading crops in 1901 there were produced 55,572,368 bushels of wheat; 151,497,407 bushels of oats; 25,875,919 bushels of corn; 22,224,366 bushels of barley; 13,208,270 bushels of peas and beans; 55,362,635 bushels of potatoes; 76,075,642 bushels of field roots; 1,251,327 tons of forage crops; and 20,668,460 bushels of tree fruits. The number of horses was 1,577,493; of dairy cows, 2,408,677; of other cattle, 3,167,774; of sheep, 2,510,239; of swine, 2,353,828; of poultry, 17,922,658. The production and export of animal products were commensurate with the other evidences of agricultural wealth. All these figures, while showing a substantial increase beyond those for the two preceding decades, are interesting points of departure with which to contrast the immense agricultural development of the six succeeding years, the dramatic feature of which is the growth and settlement of the new western provinces of Manitoba, Saskatchewan, and Alberta. The primacy in wheat production formerly held by Ontario has been taken by these provinces, with such possibilities and promise of increase as indicate an eventual superiority in this respect over most other countries. For example, the three provinces above mentioned produced in 1906 110,837,949 bushels of wheat, which was not only nearly 5 times as much as in 1900, but almost double the total production of all Canada in 1901. Similarly, the three provinces had in 1906 682,919 horses, as compared with 1,577,493 for all Canada in 1901; but the increase in other varieties of live stock as compared with the totals for the Dominion was not so marked. The great increase of emigration to those provinces in the last few years, and the unmatched fertility of the soil, are certain to produce important consequences to the world's grain trade. In the older provinces of Ontario, Quebec, Nova Scotia, New Brunswick, and Prince Edward Island, the cultivation of wheat and other grains, which was at first the chief occupation of the people, has to a considerable extent given place to mixed farming. In British Columbia, ranching, fruit cultivation, and mixed farming, although important, are secondary to the mining, lumbering, and fishing interests; but in Manitoba, Alberta, and Saskatchewan, the production of wheat, oats, and barley is the predominant industry. In Alberta, however, mixed farming has begun to be of considerable importance. The Dominion government has encouraged scientific cultivation of the soil by establishing experimental farms at Ottawa, Ontario; Nappan, Nova Scotia; Agassiz, British Co-

lumbia; Brandon, Manitoba; and Indian Head, Saskatchewan. Its policy of free homesteads for those who comply with the easy conditions of obtaining them, and the aid it affords to tree planting, dissemination of agricultural information, transportation and marketing of farm products, securing the best seed-planting, and protection from noxious weeds, have done much to attract an increasing number of the best class of settlers, and to direct their efforts wisely. For example, many immigrants have gone to northern Ontario and to parts of Quebec where the existence of good land was not widely known until recently, and farms in the older part of Ontario that were sold or vacated by owners who went to the Northwest were likewise taken up by immigrants. For fuller details of the agricultural production the articles on the different provinces should be consulted. Dairying and the raising of live stock in the older provinces, especially in Ontario, have been for many years important industries. The results are shown in the large production and export of bacon, beef, and cheese, the last-named of which was exported in 1905 to the value of \$20,300,500. The total export of agricultural produce in 1905 amounted to \$29,994,150, of which \$18,884,067 went to Britain and \$5,034,640 to the United States. Of animals and their produce the total export in 1905 amounted to \$63,337,458, of which \$56,097,451 went to Britain and \$5,906,259 to the United States. The disparity in amount of these two items results from the protective tariff of the latter country. Besides the cheese already mentioned, other leading articles of agricultural and animal produce exported in 1905 were: cattle, \$11,338,431; bacon, \$12,194,458; canned meats, \$3,538,976; butter, \$5,930,379; undressed furs, \$2,358,880; hides and skins, other than fur, \$2,709,772; wheat flour, \$5,877,607.

Manufactures.—In most of the elements of permanent manufacturing power Canada is strong. The water power furnished by the lakes and rivers is unsurpassed by that of any other country, and in natural resources of the great staples of agriculture, forest and mineral wealth, and fisheries the Dominion also takes very high rank; but in the production of iron and coal only a good beginning has been made, while the location, so far as known, of the iron ore and coal-bearing areas in relation to steel manufacturing leaves something to be desired. Ontario, the leading manufacturing province, has no coal, and the long haul from the Nova Scotia mines so handicaps industry that coal for Ontario is imported from Pennsylvania. Except in a few districts in Cape Breton and British Columbia, there is not close proximity of most or all of the materials necessary to steel-making. But

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no definite adverse assertion as to possibilities in this respect can be made, because new areas of coal and of iron ore are being discovered and still more are likely to be; while the development of electric power from the numerous waterfalls has abundant promise. Already a great electric power supply of about 425,000 horse power is being obtained from Niagara Falls on the Canadian side, and is to be transmitted to Toronto and other points. The electric energy that is capable of being developed from the St. Lawrence system and from the waterfalls of Quebec, northern Ontario, and the Northwest cannot easily be computed. The manufactures are mainly based on the agricultural, forest, mining, and fishing interests. In 1901 Canada had 14,650 industrial establishments (having five wage-earners and over), with an invested capital of \$446,916,487, employing 313,344 wage-earners, paying \$89,573,204 in wages, and with a product valued at \$481,053,375. This was more than twice the value of the product and of the wages paid in 1871, and between five and six times the amount of capital invested in that year. Making allowance for the fact that in 1871, 1881, and 1891 all industrial establishments were enumerated, irrespective of the number of persons employed, yet the comparatively small number of establishments in 1901, which was 14,650 as compared with 41,259 in 1871, 49,928 in 1881, and 75,964 in 1891, shows that the rapid concentration of capital and industrial direction which has marked most manufacturing nations during recent years has also taken place in Canada. According to the census of 1901 the various classes of manufactures in order of importance were: Food products, \$125,202,620; timber and lumber and their manufactures, \$80,341,204; textiles, \$67,724,839; iron and steel products, \$34,878,402; leather and its finished products, \$34,720,513; paper and printing, \$20,653,028; vehicles for land transportation, \$19,971,605; metals and metal products other than steel, \$19,561,261; tobacco and its manufactures, \$11,802,112; chemicals and allied products, \$11,437,300; liquors and beverages, \$9,191,700; clay, glass, and stone products, \$7,318,582. Since 1901 there has been a great increase in the output of Canadian manufactures, although, owing to the demands of the home market and the large growth of the population by immigration, the increase is not fully manifest in the manufactured exports. These, nevertheless, increased from \$16,012,208 in 1901 to \$21,191,333 in 1905. During that time there was also an increase in the value of the exports to the United States as compared with Britain. In 1901 the exports of manufactures to Britain were \$6,652,336 and in 1905 they were \$6,378,419, while the exports to the United States increased from \$4,963,247 in 1901 to \$8,280,842 in 1905.

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According to the returns of the Dominion census for 1906, the value of manufactured products for the calendar year 1905 was \$715,035,965, an increase of 59.99 per cent. over that of 1900. In 1905 the number of wage-earners had increased to 391,489 and the amount paid in wages to \$140,718,344. The values of leading articles of manufacture were as follows: log products, \$68,229,920; flouring and grist mill products, \$56,703,289; butter and cheese, \$32,344,513; smelting products, \$28,426,328; slaughtering and meat packing, \$27,220,363; foundry and machine-shop products, \$24,013,094; boots and shoes, \$20,264,686; lumber products, \$20,128,295; refined sugar, \$18,268,260; bread, biscuits, and confectionery, \$16,992,605; leather, tanned, curried, and finished, \$15,142,217; cars and car works, \$14,430,190; cottons, \$14,223,447; printing and publishing, \$13,011,604; plumbing and tinsmithing, \$11,406,671; iron and steel products, \$9,881,385; hats, caps, and furs, \$9,026,020; malt liquors, \$8,567,789.

Commerce.—The outstanding feature of Canadian commerce is the fact that about 85 per cent. of it is carried on with Britain and the United States. Britain is for Canada the country of export, and the United States the country of import. The trade with other countries is, however, growing, and an attempt has been made to foster it by the enactment of an intermediate tariff (see the section on *Tariff System*). The total exports of Canada have increased from \$57,567,888 in the fiscal year 1868 to \$256,586,630 in the fiscal year 1906. During the same period the imports increased from \$71,985,306 to \$294,267,616. A remarkable expansion of foreign trade took place during the calendar years 1900-05. The value of dutiable and free goods entered for consumption in the latter year was \$262,373,570, and the value of domestic produce exported was \$210,806,459, being an increase in five years of \$89,472,912, or 51.75 per cent., on imports, and \$43,046,237, or 25.66 per cent., on exports. The increase of agricultural produce exported in the five years was 61 per cent., of animals and their products 21.61 per cent., and of manufactured goods 46.68 per cent. The British preferential tariff (see the section on *Tariff System*) was introduced, as its name indicates, to give Britain an advantage in certain classes of manufactured goods over other nations in the Canadian market. It became operative in August, 1898, and its general effect has been to increase imports from, and exports to, Britain; but it has had small effect in diverting the natural current of trade between the United States and Canada, which during its operation has greatly expanded in volume. In 1898-1906 Canadian imports from Britain increased from \$32,500,917 to \$69,298,751, or \$36,797,834. Dur-

ing the same period Canadian imports from the United States increased from \$78,705,590 to \$180,729,458, or \$102,023,868. In 1898-1906 Canada's exports to Britain increased by \$34,400,000, while her exports to the United States increased by \$43,500,000. These facts prove that, while the Canadian preferential offer to Britain has undoubtedly arrested the decline of that country's exports to Canada and given them a new development, and while it has also permanently increased the British demand for Canadian agricultural and animal products, yet the advantages of close proximity, similar agricultural and manufacturing methods, and deepening social intercourse which stimulate trade between the United States and Canada are too strong to be overcome by hostile tariffs. The chief exports of Canada to Britain are cheese, cattle, lumber, timber, wheat, bacon and hams, butter, wheat flour, fish, apples, leather, skins, and furs; the chief imports from Britain are manufactures of wool and cotton, iron and steel and their manufactures, sugar and molasses, flax, hemp, and jute and their manufactures, drugs and chemicals. The chief exports of Canada to the United States are lumber, fish, timber, and mineral produce, including copper and copper ore, silver ore, nickel, asbestos, etc.; the chief imports from the United States are machinery, other iron and steel work, coal and coke, cotton goods, tools, cutlery, and breadstuffs.

Finances.—Under the British North America Act of 1867, by which the confederation of Canada was accomplished, the Dominion Parliament was given the right to control the public debt and property, to borrow money on the public credit, and to raise money by any mode or system of taxation. The provinces from which the Dominion was formed gave up their authority over customs revenues to the central government and were allowed annual subsidies as compensation; but they retained the right of direct taxation for provincial revenue purposes. Upon this basis the Dominion assumed the provincial debts, whose annual interest charge is the largest item on the ordinary expenditure. The ordinary revenue of Canada is raised chiefly from two sources—customs and excise duties; but there is also the income from the post office and public works departments, including railways and canals, as well as from the sale of Dominion lands and from interest on Dominion investments. The ordinary expenditure has to meet the annual charges of the public debt, the provincial subsidies, the expenses of the different executive departments, etc. The account of ordinary receipts and expenditures is made up under a consolidated fund. The revenue for the fiscal year ending June 30, 1905, was made up as follows:

Customs duties.....	\$41,433,648
Excise duties.....	12,586,475
Dominion lands.....	1,292,301
Public works, including railways and canals	7,395,377
Post office.....	5,125,373
Investments.....	2,105,031
Various.....	1,241,568

\$71,182,773

The items of ordinary expenditure for the same fiscal year were:

Public debt, including sinking fund.....	\$13,167,805
Subsidies to provinces.....	4,516,038
Legislation and civil government.....	3,510,232
Public works and railways.....	7,255,197
Justice and police.....	2,508,967
Agriculture.....	973,892
Militia.....	2,650,700
Steamship and mail subsidies.....	2,079,752
Fisheries and lighthouses.....	3,487,196
Indians.....	1,173,864
Immigration and quarantine.....	1,275,115
Pensions.....	493,684
Steamboat inspection.....	594,340
Miscellaneous.....	778,656
Charges on revenue.....	17,066,872
Northwest Territories and Yukon.....	1,735,640
Marine Hospital.....	51,732

\$63,319,682

The surplus may, according to the discretion of the ministry, be expended on capital account. The net public debt of Canada in 1905 was \$266,224,167, a decrease of \$2,255,837 since 1901. Of the total net debt \$41,500,000 is not chargeable with interest, and about 75 per cent. bears interest from 2½ to 4 per cent. Of the debt charge for 1905 the sum of \$10,630,115 was for interest, \$2,261,618 was appropriated to the sinking fund, and \$276,072 for cost of management. The administration of Canadian public finance in general follows the English system. The responsibility for expenditure of the public money is fixed upon the ministry, one of whose members, the Minister of Finance, lays before the House of Commons annually in a budget speech the state of revenue and expenditure, and makes whatever proposals he sees fit in regard to taxation or the borrowing of money on the public credit. For the carrying into effect of these proposals he must secure the approval of the House of Commons; and the criticism of all items of expenditure, or of the terms of a loan, or of any scheme of taxation, is usually effective in moderating excesses and correcting errors in financial administration. In 1907 the date of the ending of the fiscal year was changed from June 30 to March 31.

The stability of public finance in Canada is largely due to the influence of an excellent banking system. This has been founded on the combined excellences of the English and Scottish systems, together with such changes and modifications as Canadian conditions made necessary. Banking is a subject of federal jurisdiction, and the banking legislation of 1871 and amending acts, with the supervision and assistance of the Canadian Bankers' Association, have established a system which works well by secur-

ing uniform powers and restrictions. The Dominion government, recognizing the need of reforms, has provided for them by limiting the operation of the banking act to ten years, so that changes proven beneficial may be adopted in the legislation of each decennial period. This discounts causes of alarm and prevents unwise agitation. A prominent feature of organization is that of branch banks to which the head office of each bank advances money in such amounts as the necessities of business in different and remote parts of the country demand; with the result that currency circulates freely, the branch banks drawing away surplus funds from the older and larger centers to the new and more rapidly developing towns and districts. Equalization of circulation thus tends to equalization of rates of interest. The head offices of the banks, by reason of their control of widely distributed funds and their power to borrow at short notice on the value of their securities, can meet a sudden demand for a large amount of money. The banks are not allowed to put more of their notes in circulation than the amount of their paid-up capital, and their notes must be redeemable on demand in gold or in Dominion notes. In 1905 the various banks had a total paid-up capital of \$82,655,828, with \$64,025,643 in circulation, \$531,243,476 on deposit, \$618,678,633 in liabilities, and \$767,490,183 in assets. There are clearing houses at Montreal, Toronto, Winnipeg, Ottawa, Vancouver, Quebec, Halifax, Hamilton, London, St. John, N. B., and Victoria, B. C. The total clearings in 1905 were \$3,335,530,600, as compared with \$1,871,061,725 in 1901. There are also post-office savings banks and government savings banks. In 1905 989 of the former received \$10,504,430 cash deposits; and the latter \$2,817,267. The mortgage and loan companies of Canada have taken a noteworthy part in the financial development of the country. In 1904 the amount of their loans was \$140,701,629, of which \$127,228,934 was secured on real estate. Their total assets were \$176,885,012, their liabilities to shareholders \$68,254,221; and other liabilities, chiefly debentures, amounted to \$108,630,791. By far the greater part of the business of these companies is done in the province of Ontario.

Tariff System.—Canada is practically independent in her fiscal policy, for it is scarcely to be supposed that, if she desired to make a reasonable commercial treaty with any other country, in furtherance of that policy, Britain would refuse to sanction it. Nevertheless, the treaty-making power remains in the British sovereign, and if Canada desired to extend for a fixed term the benefits of her tariff to any other nation in return for reciprocal advantages, the formal assent of the British sovereign would be required. Since the relinquishment by Brit-

ain of the practice of fiscal legislation binding upon her self-governing colonies, her assent to Canadian commercial arrangements has been assumed; but it is easy to imagine instances in which it might be refused—for example, any treaty which directly and injuriously opposed the provisions of a British treaty. In practice, however, the dangers of a conflict between imperial and colonial laws and treaties are usually avoided; and a conspicuous proof of the fiscal freedom of Canada was afforded by British acceptance of the Dominion tariff of 1879, which increased the duties on British manufactures. Acceptance also by Britain of the Canadian preference implied imperial recognition of Canada's competence to give it. The fiscal autonomy of the Dominion has, however, been more strictly subordinated to political and geographical conditions than has been the case with many other countries. After confederation in 1867, the economic outlook was largely conditioned by the fact that the Canadian zone of profitable production was very similar to that of the northern tier of States of the American Union. This has largely influenced Canadian manufacturing and trade policy. Denied free access to the markets of the United States (with the partial exception of reciprocity in natural products during 1854-66), and hampered by the disadvantage of distributing to a small domestic market in a very large territory, Canada has been compelled to develop an export trade in the natural products which the United States already possesses. But the protective tariffs of continental Europe are also a barrier, and the result is that the bulk of Canadian exports goes to the open British market. Again, proximity to the United States gives Canada a superior convenience in obtaining many products that she needs to import. Her fiscal problem is further complicated by popular sentiment which favors Britain in trade matters. These limitations and conflicting claims indicated a tariff which was enacted by the Dominion Parliament in 1906, and of which the chief framer was the Hon. W. S. Fielding, Minister of Finance.

The purposes of this measure were to protect such domestic manufacturing industries as could flourish without unduly burdening the consumer, to continue in favor of Britain a preference in certain manufactures and extend Canadian exports to the British market, and to provide methods of extending Canadian trade with foreign countries. In order to accomplish this the new tariff system contains three schedules: (1) A general or maximum rate of duties: (2) an intermediate rate; (3) a minimum rate as embodied in the preferential tariff in favor of Britain. The first maintains, and in some respects slightly increases, the protection to domestic manufactures secured by the

tariff of 1897; the third continues the British preference, with changes which heighten the British advantage in exports of metal manufactures and impose a moderate duty on certain foreign goods admitted free from Britain. The second or intermediate tariff was designed as a means of negotiating with foreign countries for more favorable terms in the Canadian market so soon as those countries admit Canadian products on like terms to their markets. It was not intended to go into effect at once, but, owing to the most-favored-nation clause in treaties between Britain and foreign countries, was compelled to await the solution of difficulties thereby presented. The general or maximum schedule fixes the average rate of duties at 20 per cent.; the minimum, or British preferential tariff, allows a preference of $33\frac{1}{3}$ per cent. to certain British manufactures; the intermediate schedule does not, when applied under arrangements with foreign countries, in any case allow a reduction equal to 10 per cent., but wherever there is a reduction it diminishes to that extent the British preference. The surtax on German goods, which took effect in April, 1903, was a result of the denunciation by England, at the request of Canada, of the British treaty with the North German Confederation, which was subsequently merged in the German Empire. This treaty, owing to the most-favored-nation clause, prevented Canada from extending an exclusive preference to Britain; and after its denunciation the German government, in reprisal for non-participation in the benefit of the Canadian preference, applied the least favorable customs tax to goods from Canada. In return Canada imposed a surtax by which imports of German goods were made to pay, in addition to the duties under the general tariff, one-third the amount of those duties. German exports of sugar to Canada, by far the largest item in the trade between the two countries, were destroyed, and the trade in that article was transferred to the West Indies. With regard to the United States, from which country the bulk of Canadian imports is drawn and probably will always be drawn, the most notable feature of tariff policy has been persistent attempts to negotiate commercial treaties. With the exception of the Elgin-Marcy Treaty of 1854-66, which provided for reciprocity in natural products only, none of these attempts was successful, and during the last decade of the nineteenth century—more particularly since the preferential tariff of 1897 secured a firmer footing for Canadian natural products in the British market—the disposition to make further attempts died out. In the tariff of 1906 there are moderately protective duties on such manufactures as would otherwise be compelled to compete on disadvantageous terms with similar goods made in the Unit-

ed States; but, on the other hand, there is a very extensive list of goods imported free from the United States. These are chiefly coal, coke, and other raw materials of manufacture. In 1905, of products imported from the United States and entered for consumption, and which were valued at \$152,431,626, \$73,634,186, or nearly half, were free of duty. In that year the average on dutiable imports from the United States was 27.692 per cent., as against 24.770 per cent. on the dutiable imports from Britain. The tariff of 1906 did not materially change the duties on imports from the United States.

Railways and Canals.—The development of transportation was of exceptional importance in Canada from the first. Confederation of Ontario, Quebec, Nova Scotia, and New Brunswick into the Dominion in 1867 could not have been accomplished if the last two provinces named had not been induced to enter the federal union by the promise to build the Intercolonial railway, between Halifax and Montreal; while the construction of the Canadian Pacific railway across the continent had to be guaranteed before British Columbia would join the Dominion. Equally strong reasons for rapid and extensive railway building, especially in the new western provinces and in northern Ontario and Quebec, are the tide of immigration, which has reached large proportions, and the related fact that the railway precedes the best lines of settlement. In 1905 there were in operation 20,487 miles of steam railway. Of these the greater portion was comprised in the Canadian Pacific, the Grand Trunk, the Grand Trunk Pacific, the Canadian Northern, and the Intercolonial (owned and operated by the Dominion government) railways. Up to June 30, 1905, the Dominion government had granted for construction and subsidies to railways, \$194,003,793; the provincial governments, \$42,523,547; municipalities, \$19,121,896; making a total of \$255,883,036 contributed by governments and municipalities. As the expenditure on railways and canals constitutes the greater part of the public debt, so the importance of developing those enterprises has ever remained in the forefront of politics, irrespective of party. The new transcontinental line or Grand Trunk Pacific railway (see also CANADA, CONFEDERATION IN) stretches from Moncton, N. B., to Quebec, and thence northwesterly through the great plains region and through British Columbia to Prince Rupert on the coast. The distance is 3,240 miles, of which the eastern section, from Moncton to Winnipeg, is 1,840 miles. This line, which has been under construction since the summer of 1905, runs through the western provinces at a latitude of about 55° north. The eastern section is a government-built road. The Grand Trunk Pacific has also announced the

probable establishment of steamship lines in connection with its Atlantic and Pacific terminal ports. The Canadian Pacific has in recent years added many branches to its main line. The Canadian Northern, which has been under construction since 1896 and in 1907 had a mileage of more than 3,500 miles, is built chiefly through Manitoba, Saskatchewan, and Alberta, but has been planned to reach both the Atlantic and Pacific coasts. Another line through the western provinces to the Pacific coast was projected by James J. Hill in 1906. The number of passengers carried by the steam railways of Canada increased from 18,385,722 in 1901 to 25,288,723 in 1905, and the total freight increased from 36,999,371 tons in 1901 to 50,893,957 tons in 1905. The electric railways of Canada had a mileage of 793 miles in 1905, and the passengers carried increased from 120,934,656 in 1901 to 203,467,317 in 1905. The total capital invested in railways in 1905 was \$1,352,169,672, of which \$1,309,699,735 was paid up. Of the total capital invested \$1,289,654,207, of which \$1,248,666,414 was paid up, was in steam railways; \$62,515,465, of which \$61,033,321 was paid up, was in electric railways.

The canals of Canada include the St. Lawrence and Great Lakes system, which insures an uninterrupted waterway, with a minimum depth of 14 feet, from the head of Lake Superior to the Atlantic Ocean; the canals connected with the Ottawa and Rideau rivers; the Lake Champlain and St. Lawrence canals; the Trent river system, designed to connect lakes Huron and Ontario; and St. Peter's canal, connecting St. Peter's bay, on the south coast of Cape Breton, with the Bras d'Or. Perhaps the most important of all in possibilities is the projected Georgian bay canal, for the survey and examination of whose proposed route the Dominion government made a liberal appropriation. The route extends from the Georgian bay arm of Lake Huron, along North channel to the mouth of French river, thence to Lake Nipissing and the rivers and streams between that lake and the Ottawa river, thence to Montreal. This would afford a shorter and more direct waterway for the grain and other products destined for Europe from the Northwest and the Lake Superior region. The St. Lawrence and Great Lakes system, constructed to overcome the St. Lawrence rapids, Niagara falls, and the falls at Sault Ste. Marie, includes as its chief canals the Lachine, Cornwall, Williamsburg (comprising the Farran's Point, Galops, Rapide Flat, and Williamsburg), the Beauharnois, Soulanges, Rideau, Welland, and St. Mary's. The Welland, which is a ship canal cut through the peninsula between Lake Erie and Lake Ontario, has a depth of 14 feet, is 27 miles long, and was completed at a cost of \$26,080,366. St.

Mary's canal, at Sault Ste. Marie, is a ship canal with one lock 900 feet long and 20 feet deep. Through it a large volume of traffic passes annually, the tonnage for the nine months ending December, 1905, being 5,468,490, more than one-half the amount that passed through all the Canadian canals in that year. The Trent river system begins at the mouth of the Severn river in Lake Huron and ends at the mouth of the river Trent in the bay of Quinte. The total cost of Canadian canals up to 1905 was \$89,294,758, of which \$38,884,227 was the original cost of construction and \$50,410,531 the cost of enlargement. For a fuller account of the Canadian system consult the article CANAL.

Shipping and Navigation.—The registered shipping of Canada, on Dec. 31, 1905, including vessels for inland navigation, comprised 4,671 sailing vessels of 306,937 tons, and 2,654 steamers of 362,888 tons; total, 7,325 vessels of 669,825 tons. In 1905 a total number of 13,926 Canadian, British, and foreign sea-going vessels, of 7,993,770 tons, entered at Canadian ports; and a total number of 13,871 vessels, of 7,594,685 tons, cleared. A total number of 77,290 coasting vessels, of which 76,365 were British and Canadian, entered, and 73,423 vessels, of which 71,759 were British and Canadian, cleared. In 1904 the vessels entered and cleared at Canadian ports on inland waters between Canada and the United States were: Canadian, 18,450 of 8,777,613 tons; United States, 23,743 of 7,911,752 tons; total, 42,193 of 16,689,365 tons.

Post Offices, Telegraphs, and Telephones.—On June 30, 1905, there were 10,879 post offices in Canada. The net revenue of the post-office department in 1905 was \$5,125,573; the net expenditure, \$4,634,528. In 1905 the number of letters sent through the post office was 285,541,000; of post cards, 29,941,000. A letter postage rate of two cents has been fixed for Canada, also between the United States and Canada, between Britain and Canada, and 48 other portions of the British Empire. In 1905 there were 1,924,130 money orders issued, and their value was \$32,349,470. There were in the same year 37,808 miles of telegraph lines, of which 6,590 were owned by the government. The number of telegraph offices was 3,162, of which 338 belonged to the government. In 1904 there were 214,405 miles of telephone wires; 290,979,773 messages were sent by the telephone companies.

Government.—The principle of division of powers between federal and provincial or state jurisdiction differs from that of the United States. In Canada all subjects of legislation not expressly assigned by the constitution to the provincial governments are reserved to the federal government; in the United States all subjects of legislation not expressly reserved to the federal govern-

ment belong to the State governments. In the division of jurisdiction between the federal and the provincial legislatures the following are some of the chief subjects allotted to the federal Parliament: The care and control of the public debt and property; the regulation of trade and commerce; the raising of money by any mode or system of taxation; the borrowing of money on the public credit; the postal service; military and naval defense and service; navigation and shipping; sea, coast, and inland fisheries; currency, banking, savings banks, etc.; weights and measures; bills of exchange and promissory notes; interest; bankruptcy and insolvency; patents and copyrights; marriage and divorce; and the administration of the criminal law. In a general way it may be said that whatever is not included under the above heads, or the other specific provisions of the act, or may not be declared to be for the general advantage of Canada, or of two or more of the provinces, falls within the sphere of the provincial legislatures, and is administered thereby.

The seat of government of Canada was fixed at Ottawa until the sovereign should otherwise direct. The chief executive authority is vested in the sovereign, in whom is also vested the chief command of militia and naval forces of and in Canada. The sovereign is represented by the governor-general, appointed by the King in Council, but paid by Canada, whose term of office usually lasts five years. His salary is fixed at £10,000, and forms the third charge upon the consolidated revenue of the country. He is bound by the terms of his commission, which instrument was revised in 1887, and he can exercise only such authority as is expressly intrusted to him. He governs with the advice and counsel of the ministry, known as the Privy Council of Canada, which is directly responsible to Parliament. As the acting head of the executive he summons, prorogues, and dissolves Parliament, and assents to or reserves bills in the name of His Majesty. In the discharge of these and other executive duties he acts entirely by and with the advice of his council. Even in questions of imperial interests affecting Canada he consults with his council, and submits their views to the authorities of England. The royal prerogative of mercy in capital cases, formerly exercised by the governor-general on his own judgment and responsibility, is now administered, as in England, pursuant to the advice of the ministry. As the members of the Privy Council hold office only while they retain the confidence and support of the majority of the House of Commons, most of them necessarily sit in that branch of the legislature, although there is always a certain representation in the Senate. When an admin-

istration has been defeated on an appeal to the country, it usually retires without waiting for the assembling of Parliament. Following the British model as closely as circumstances permit, the Parliament of Canada consists of, first, His Majesty the King, represented by the governor-general; second, of the Upper House, called the Senate; and third, the Lower House, styled the House of Commons. The privileges and immunities of the two Houses are defined by the Parliament of Canada, but must not exceed those enjoyed by the Imperial House of Commons at the time of the passing of the act by the Canadian Parliament defining such privileges and immunities. The sittings are annual, but may be oftener if imperatively necessary. Senators are appointed by the governor-general upon the recommendation of his council. They hold office, under certain prescribed conditions, for life, and must be of the full age of 30 years, and have real and personal property worth \$4,000 over and above all liabilities. They must be natural-born subjects of His Majesty, or have become naturalized. Every senator and every member of the House of Commons and of the provincial legislatures must take the oath of allegiance before taking his seat. No senator can hold a seat in the House of Commons, nor can he sit in any legislature of the several provinces, excepting in the case of the Legislative Council of Quebec. Bills may originate in the Senate, except revenue or money bills, in which case the action of the Senate is confined by usage to their adoption or rejection. They cannot offer any amendments thereto, and rejection can be justified only by extraordinary circumstances. As at present constituted, the Senate consists of 87 members—24 each from Ontario and Quebec, 10 each from Nova Scotia and New Brunswick, 4 each from Prince Edward Island and Manitoba, 3 from British Columbia, and 4 each from Alberta and Saskatchewan. The House of Commons, which is elected by the people for a term of five years, consists at present (1907) of 214 members. This number is fixed under the provisions of the Confederation Act, but the representation must be rearranged after every decennial census by Act of Parliament, on the basis that Quebec is always to have 65 representatives, and each of the other provinces such a number as will give the same proportion of representatives to its population as the number 65 bears to the population of Quebec as ascertained by the census. British Columbia, by the terms of her admission into the confederation, however, is never to have less than 6 members. Under the new Redistribution Act following the census of 1901 Ontario has 86 members, Quebec 65, Nova Scotia 18, New Brunswick 13, Prince Edward Island 4, Manitoba 10, British Co-

lumbia 7, 5 each for Alberta and Saskatchewan, and 1 for the Yukon Territory. The members of the House of Commons are elected on franchises fixed by the different provinces. Voting is by ballot. Both senators and members of the House of Commons are paid an annual allowance of \$2,500 each, subject to a deduction of \$15 a day for each day of non-attendance. The speaker of the Senate and the speaker of the House of Commons receive a salary of \$4,000 each. The prime minister receives a salary of \$12,000 and the leader of the opposition \$7,000.

The judicial system is modeled on that of Britain. There are no elective judges, all appointments being made during good behavior, and a judge can be removed only on an address from the two houses of Parliament. All the judges, even those of the superior and county courts in each province, are appointed by the Governor-General in Council; but police magistrates and justices of the peace are appointed by the provincial governments. The Supreme Court of Canada is at Ottawa. It has an appellate civil and criminal jurisdiction throughout the Dominion. The Exchequer Court is also a colonial court of admiralty, and as such has powers as provided in the Colonial Courts of Admiralty Act of 1890. There are not, as in the United States, any courts of inferior federal jurisdiction; but the provincial courts are, in a sense, federal courts, since their judges are appointed by the federal government, although paid out of provincial funds. It should be noted that the Supreme Court at Ottawa is not the final court of appeal in Canada in all cases, but that, in certain cases, an appeal can be taken from its decisions to the Judicial Committee of the Privy Council in London.

Defense.—During 1906 the system of administration of the Canadian militia was reorganized. The Dominion is now divided, for military purposes, into twelve districts, with a district officer commanding, and a brigade staff in charge of each. Provision has also been made for the inspection of the militia by an imperial officer, and for the introduction of a system of interchange of colonial and imperial military officers. The permanent militia numbers 1,066. Peace training establishments provide for the training of about 55,765 men, including 4,870 officers. The war establishments provide for 104,600 of all ranks. With a few exceptions, such as judges, clergymen, professors, etc., all adult males between eighteen and sixty are liable to service. The Royal Military College, a school of scientific military instruction, is situated at Kingston, and there are also schools of artillery, cavalry, mounted rifles, and infantry. Canada has no navy, but the nucleus of a naval reserve has been formed, and special attention has been called in

Britain to the value of the large seafaring population of the Dominion as a source of supply for British naval recruits.

Education.—Education in Canada is a subject of provincial jurisdiction, and in the British North America Act of 1867 provision is made for protecting the educational rights possessed by minorities in the provinces before confederation. The sections on *Education* in the articles on the different provinces should be consulted. The outstanding feature which explains the Canadian educational situation, in so far as complicated by separate or parochial schools, is the fact that supporters of such schools made protection of their rights a condition precedent to confederation, which would not have been accomplished without a compromise. In Quebec, for example, the system of primary, secondary, and higher instruction was, and is, predominantly religious; and its character was so firmly fixed and so inseparably involved with racial and religious feeling that it had power largely to dictate the terms on which the province entered confederation. That necessarily led to a demand for recognition of the educational rights of minorities in all the provinces; of the Protestant minority in Quebec, and the Roman Catholic minority in each of the other provinces. Educational development has not proceeded wholly on that line, as in Manitoba, where, after a vexatious and prolonged conflict, separate schools were abolished; but it persisted so far as to cause serious difficulty in settling the question of elementary schools in Alberta and Saskatchewan in 1905. See ALBERTA and SASKATCHEWAN.

The division of education into primary, secondary, and higher is common to the Dominion; and so also are the organization and administration of the educational affairs of each province by a central provincial authority, which is variously called a board of education, council of public instruction, etc., and which, except in Quebec, includes the provincial ministry. In Quebec, the council of public instruction is composed of all the Roman Catholic bishops of the province, an equal number of lay Roman Catholic, and an equal number of Protestant members. The primary Canadian schools are the elementary and kindergarten; the secondary are the high schools and collegiate institutes, together with such exceptional elementary schools as provide instruction of a high-school grade; and the higher educational institutions are the normal schools, colleges, and universities. Elementary instruction is, generally, free, compulsory, and co-educational for pupils between five or six and eighteen or twenty-one years of age. Except in British Columbia, local boards of trustees are elected in every school section, incorporated village,

town, and city, and these select the teacher, build the schoolhouses, and control other matters of local consideration. For the maintenance of schools taxes are imposed by the province, the municipality, and the school district. In addition to the primary and secondary schools, a number of manual training and technical high schools have been established. The following table gives information respecting the primary, high, and superior schools of Canada:

Provinces	Year Ended	Schools	Teachers	Pupils	Expenditure
Ontario	Dec., 1905	6,361	10,388	475,155	\$7,165,734
Quebec.....	June, 1904	6,319	10,829	337,933	2,424,832
Nova Scotia.	July, 1904	2,351	2,511	98,792	985,031
New Brunsw- wick	June, 1905	1,737	1,868	60,006	631,818
Manitoba ...	Dec., 1904	1,674	2,240	60,432	1,786,311
British Columbia	June, 1904	349	624	25,787	597,764
P. E. Island.	Dec., 1903	562	562	19,031	168,765
Northwest Territories	Dec., 1903	743	1,152	33,191	213,764

The public schools included in the table numbered about 19,000, with about 25,000 teachers and more than 575,000 pupils. The figures for the Northwest Territories were nearly all for the schools now included in the provinces of Alberta and Saskatchewan.

For purposes of the higher education Canada has about eighteen degree-conferring corporations, with thirty colleges, many of which are of denominational origin. The leading institutions are the universities of Toronto, Queen's, McMaster, Western, and Ottawa, in the province of Ontario; McGill University, Laval University, and Bishop's College, in the province of Quebec; King's College, Dalhousie College, Acadia University, St. Francis Xavier's College, and St. Anne's College, in the province of Nova Scotia; the University of New Brunswick, Mount Allison College, and St. Joseph's College, in the province of New Brunswick; and the provincial university of Manitoba. Provincial universities for Alberta and Saskatchewan have also been planned. All these have degree-conferring powers, and among them Toronto, McGill, and Laval universities are the most important. With the first-named institution have been federated Victoria University (Methodist), Trinity University (Anglican), and University College, the original nucleus of the teaching faculties of the university; and there have also been affiliated colleges of music, dentistry, agriculture, pharmacy, St. Michael's College (Roman Catholic), Knox College (Presbyterian), Wycliffe College (Anglican), and Albert College. McGill University is re-

nowned for its schools of medicine and science. Manitoba University, a provincial institution organized on a broad and progressive basis, has affiliated with it St. Boniface College (Roman Catholic); St. John's College (Anglican); Wesley College (Methodist); Manitoba College (Presbyterian); and Manitoba Medical College. Laval University, of Quebec and Montreal, is the leading Roman Catholic educational institution of Canada. The development of higher education has been deeply involved with the question of political and religious privilege. The governors of the provinces before confederation had been instructed by the imperial authorities to provide means of establishing state-aided universities. In Lower Canada, where the power of the Roman Catholic clergy was supreme, this could not even be attempted on secular lines; but Laval University, an institution mainly for the teaching of religion, though now having also faculties of law, medicine, and arts, became the leading organ of higher Catholic education, in that respect representing the French-Canadian population. In Upper Canada, Nova Scotia, and New Brunswick, the intention of founding provincial universities was vitiated by the insular design of the imperial government of incorporating in these universities the doctrinal requirements of the Church of England. This old wine could not be contained in new bottles, and after the universities of King's College (Upper Canada, later Ontario), King's College (Nova Scotia), and King's College (New Brunswick) were established, with admission only for students belonging to the Church of England, the majority of the people of each province, largely composed of Presbyterians, Catholics, Methodists, and Baptists, instantly rejected sectarian claims. They proceeded to organize their own colleges: Victoria College (Methodist), Queen's College (Presbyterian), in Upper Canada; Dalhousie College (practically Presbyterian), St. Francis Xavier's College (Roman Catholic), and Acadia University (Baptist), in Nova Scotia; Mount Allison College (Methodist) and St. Joseph's College (Roman Catholic), in New Brunswick. All these institutions obtained degree-conferring powers. Thus was reached a point of departure which suggested further educational development on two lines: the denominational college or university, freed from sectarian requirements of admission; and the tendency to centralize and broaden higher education by the organization of a leading university in each province, with which smaller and outlying colleges and universities are federated or affiliated. In 1907 development on these lines had accomplished notable results. Most of the denominational colleges had abolished sectarian tests of admission; and

the federation or affiliation of the majority of colleges in Ontario with Toronto University, together with the organization of a provincial university in Manitoba, with several affiliated colleges, had proved successful. Laval and McGill universities had also a number of affiliated colleges. In Nova Scotia King's College (Windsor) still remained in 1907 on a sectarian basis, and there were a few other colleges in like condition; and in both Nova Scotia and New Brunswick university federation had not made substantial progress. McGill University, of Montreal, had its origin in neither state aid nor denominational protest, but through the foresighted munificence of the Hon. James McGill. Queen's University, Kingston, Ontario, elected to

established Church of Scotland), Methodists, and Baptists, aroused strong opposition which eventually succeeded in abolishing all exclusive religious privileges and in establishing the entire separation of church and state. According to the census of 1901, the numbers of the leading denominations in the different provinces were as follows:

Roman Catholics.....	2,229,600
Methodists	916,886
Presbyterians	842,442
Anglicans	680,630
Baptists	316,477
Lutherans	92,524
Congregationalists	28,293
Miscellaneous creeds	206,821
Pagans and persons whose creed was not given	58,328

The following table shows the numbers of the leading denominations in the several provinces according to the census of 1901:

PROVINCE	Roman Catholic	Church of England	Presbyterian	Methodist	Baptist
Ontario	390,304	367,937	477,386	666,388	116,320
Quebec	1,429,260	81,563	58,013	42,014	8,480
Nova Scotia.....	129,578	66,107	106,381	57,490	83,233
New Brunswick.....	125,698	41,767	39,496	35,973	80,874
Manitoba	35,672	44,922	65,381	49,936	9,166
British Columbia.....	33,639	40,689	34,081	25,047	6,500
Prince Edward Island.....	45,796	5,976	30,750	13,402	5,905
Northwest Territories.....	39,653	31,659	30,987	26,636	5,999

remain independent. It is still Presbyterian in management, but its courses are free to all, and it has become, next to Toronto, the most important university in the province. Each province has provided normal schools for the training of teachers. There are also model schools.

Religion.—Canada has no established church, and enjoys religious liberty. The special position and privileges of the Roman Catholic Church in Quebec were first granted by the terms of the Treaty of Paris in 1763, and were confirmed by the Quebec Act of 1774. The complete recognition of those privileges by the British authorities was partly due to signs of discontent among the English-speaking colonies on the Atlantic coast, and to the desire to secure the good-will of the new subject population. It was also found impracticable to introduce the English common law and judicial decisions in a community in which a different system, of which religion was the most essential element, had been firmly established. With regard to the leading Protestant denominations other than the Church of England, the acquirement of a free religious status was gradual, since the imperial government favored the predominance of Anglican Church claims in the provinces previous to the union of Upper and Lower Canada in 1841. This was notably so in the matter of higher education (see the section on *Education*). The mistaken policy of trying to establish and endow the Church of England in Canada, together with the denial of full legal recognition of the Presbyterians (except the Es-

Among the miscellaneous sects were 31,797 Mennonites, 14,900 Disciples, 16,401 Jews, and 6,891 Mormons.

The different denominations represented in the Northwest Territories under the census of 1901 are mostly included in the provinces of Alberta and Saskatchewan, created in 1905.

The development of religious life and organization in Canada presents several interesting phases. Broadly speaking, the vitality and exclusiveness of religious denominations, which, in the early life of Nova Scotia, New Brunswick, Ontario, and Quebec (excluding, in the last-named, the Roman Catholic Church), were much more numerous than at the opening of the twentieth century, were aided by the special privileges of the Church of England. Opposition to that church was a rallying cry, and a ground of united political action. But, after those privileges had been abolished, there remained a narrow preference for sectarian usages, doctrines, and polity, which obscured the essentials of religion, fostered petty bigotries, and weakened church effort by needlessly dividing it. The first mutual approaches of the different Presbyterian and Methodist churches, which had maintained the distinctive tenets of the parent churches in Britain, did not promise much, and were complicated by the fact that new members of those bodies came from the United States. Political was added to religious prejudice. But the counteracting force of earnest evangelism and missionary effort did much to overcome obstacles to union. Methodists from Britain began to co-

operate with their fellow religionists from the United States, and the first step toward union was taken in 1833. A Methodist Episcopal Church, with a polity resembling that of the church of similar name in the United States, was organized. Increasing settlement gave new life to other Methodist sects, chiefly of British origin—Primitive Methodists, Methodist New Connexion, and Bible Christians. The fundamental tenets of Methodism were the same in all these, and the multiplication of churches and missionary agencies went on until growth of toleration and the need of economy brought the question of union into practical prominence. For about fifteen years the discussion went on; and the result was that in 1883 Wesleyan Methodists, Methodist Episcopalians, Primitive Methodists, Bible Christians, and Methodist New Connexionists were united into one Methodist Church of Canada. A similar process was going on among the Presbyterians. Before 1861 there were several sects of that denomination, but in 1875 all were united into one Presbyterian Church of Canada. Thus union of sects into one church marked also the severance, so far as organization was concerned, of the newly formed church from the parent or allied church in Britain and the United States. For example, the Church of England in Canada was originally within the jurisdiction of the Archbishop of Canterbury. Its organization in 1893 into one body, governed by a general synod, made it an independent Canadian church. In 1907 a still larger scheme of union between the Presbyterian, Methodist, and Congregationalist churches had taken practical shape and was well advanced. Though at first the scheme was looked upon as visionary, preliminary difficulties were overcome and the governing body of each church sanctioned the appointment of committees for the further consideration of the question. Reports of these committees have revealed fewer and less formidable obstacles than were expected. Less rigidly held Calvinistic views have paved the way for a reasonable hope of closer mutual approach, while the old argument of economy by concentration of resources, so well illustrated by the experience of preceding unions, has lost none of its force. In the early life of the provinces, and even down to and after confederation, there was much self-denial and heroism in the work of establishing churches and missions. The examples of self-sacrifice among the Jesuits are ever memorable, not only in missionary annals, but in the history of exploration and colonizing achievement. Nor were the lives of the early Protestant missionaries, if less dramatic in their effect upon the imagination, less fervidly consecrated to religion. The Methodist preacher, riding alone through sparsely inhabited dis-

tricts, his saddle-bags filled with Bibles and tracts, was a pioneer of civilization, a maker of new paths of settlement, as well as a gatherer of souls. Not only was the missionary work of the Presbyterian, Anglican, Methodist, and Baptist clergymen of great importance in the early life of the provinces, but the intellectual leaders among them, men like Egerton Ryerson and Bishop John Strachan, were closely identified with the first educational institutions of the country.

Literature.—Lack of racial unity as a basis of development has been adverse to a truly national Canadian literature. In the early history of French Canada the narratives of settlement and exploration and of the heroic missionary work of the Catholic religious orders were written in an eager, strenuous spirit that believed in the founding of New France. Devotion to the Catholic Church, reinforced by political ambition, tended to foster a national ideal mediævally French and monarchical, although traditions of Old France were modified by a novel and picturesque environment. These conditions continued with varying effect until the conquest of Quebec in 1759, when British rule brought the French in contact with a different class of political and legal ideas and customs. Through racial rivalries and a political discontent common to both, the two populations progressed during 1791-1867 to a better knowledge of each other and a conscious sense of political unity; but the separateness of the literary spirit and product in each could not be impaired. The French-Canadian writer looks to-day, as he always looked, to the French Academy for his highest recognition. The Canadian writer in English often has in view English and American, as well as Canadian, readers, and if a practical turn of mind leads him to consult market conditions, he does not hesitate to live and publish in London or New York. He does this the more willingly if he has a lively sense of the fact that world-literature in English knows no boundaries, or if he has felt the reproach that a dependent state will always have a provincial mind. Account must also be taken of the literary work of persons of British birth but Canadian residence, such as Goldwin Smith (*q. v.*). Hence the phrase "Canadian literature" is more correctly limited to the writings of native and resident Canadians in English and French. The two races have no stronger connecting bond than commerce and union under a federal system of government. Though writers of the English-speaking portion have chosen themes from the life of their French fellow-subjects, and though French writers have felt and responded to the political influence of the English, the two literary currents must remain apart.

The earliest writers of French Canada,

after chroniclers of the first voyages, were the pioneers of settlement and exploration. Champlain (*q. v.*) wrote an extended account of his voyages and travels which has been edited by Abbé Laverdière (6 vols., Quebec, 1870). These were followed by Marc Lescarbot's "Histoire de la Nouvelle France" (Paris, 1609), to which was appended in a later edition (1618) a collection of poems entitled "Les Muses de la Nouvelle France"; "Le Grand Voyage du Pays des Hurons" (1632), by Théodat Gabriel Sagard (*q. v.*); and, more important, the celebrated records of missionary devotion and achievement, the "Relations des Jésuites" (73 vols., Cleveland, 1896-1901), which have been a mine of information for the historian. These were the most notable literary productions of the period of Champlain's achievement (1603-35), and after a considerable interval they were succeeded by further narratives of exploration and closer description of the country and its inhabitants. Chrétien Le Clerq's "L'Établissement de la Foi" (Paris, 1691) manifests the rivalry between the Jesuit and Récollet orders; and Joseph François Lafitau's "Les Mœurs des Sauvages Américains" (1724) is a work on the Iroquois or Five Nation Indians by a Jesuit priest. The account of the "Discoveries and Voyages" of Father Louis Hennepin (*q. v.*), the first white man to see the falls of Niagara, revealed many new and interesting facts, but in some portions is of doubtful veracity. All the narratives of the long period from Champlain's death in 1635 to the conquest in 1759 culminate in the notable work of Pierre François Xavier de Charlevoix (*q. v.*), the "Histoire et Description Générale de la Nouvelle France" (3 vols., Paris, 1744; 6 vols., New York, 1866-72). This work is a discriminating and trustworthy description of French-Canadian conditions and achievement written by one who came from France to see the new country for himself, and who traveled through it.

The English conquest arrested the development of French Canada until the latter was assured of its promised political rights and religious privileges. From the conquest to the passage of the Quebec Act in 1774 the new subjects of Britain were in the uncertainty of an ill-defined status. They did not know the real intentions of the imperial authorities; but the insight of the Governor, Sir Guy Carleton (*q. v.*), afterward Lord Dorchester, happily grasped the situation and he recommended the largest degree of civil and religious liberty. The energies of the French after the grant of constitutional government in 1791 were concentrated upon adapting themselves to the changed political environment. Their progress was slow, their attention was occupied by the hard work of settlement, and the

cultivation of literature was postponed. After the rebellion of 1837-38 had won for them a working constitution under parliamentary government, and the legislative union of Lower and Upper Canada in 1841 had provided for the two provinces a temporary, though doubtful, adjustment, historical writing again appeared. Michel Bibaud's "Histoire du Canada sous la Domination Française" appeared in 1843, and during 1845-52 François Xavier Garneau's very able "Histoire du Canada" was written. An English translation was published in 1866, and the book has become a classic among both the French and English populations. It was followed by Abbé Ferland's "Cours d'Histoire du Canada" (Quebec, 1861-65) and Abbé Faillon's "Histoire de la Colonie Française en Canada" (Paris, 1865-66). The fruit of French-Canadian experience under the British political system appeared in Louis Philippe Turcotte's "Canada sous l'Union" (1871-72), and L. O. David's "Les Patriotes de 1837-38" (1884) was practically a defense of Papineau and the French-Canadian reformers. Biographical writing and the study of epochs are illustrated by Joseph Tassé's "Les Canadiens de l'Ouest" (1878) and T. P. Bédard's "Histoire de Cinquante Ans." Abbé Tanguay has written on the genealogy of Canadian families. Abbé Casgrain and Sir Joseph Le Moine have brilliantly depicted some of the most thrilling events and enshrined some of the most romantic legends in the life of French Canada. Historical and descriptive sketches, novels, and poems have been numerous since 1841. Of the novelists, the chief are Joseph Marmette, P. J. O. Chauveau, Joseph C. Taché, Napoléon Bourassa, and A. Gerin-Lajoie. A fine collection of popular verse, entitled "Chansons Populaires du Canada," was set to music and edited by Ernest Gagnon, and published at Quebec in 1865; and an admirable English version of it by William McLennan was published at Montreal in 1886. Louis Honoré Fréchette (*q. v.*) is perhaps the leading poet. His work was crowned by the French Academy. Benjamin Sulte, Octave Crémazie, and Pamphile Le May are of almost equal rank. The literary form of the French-Canadian poets is based exclusively on the models of the parent country, and the sentimental bond uniting them to Old France is strongly manifest, notwithstanding the local variations of color and theme and patriotic feeling.

The first literary endeavors of the English in Canada were, like those of the French, narratives of discovery and exploration, such as those of Samuel Hearne, Alexander Mackenzie (*q. v.*), and Lord Selkirk, the last of whom established a settlement of Scotchmen in the Northwest. These narratives lacked much of the atmosphere and dramatic incident that marked the best

French productions of a similar kind; but the immigration of the United Empire Loyalists after the close of the Revolutionary War infused a political vigor and patriotic sentiment that soon enriched the literary life of the country. Between the close of the War of 1812 and the movement that ended in Canadian confederation, party politics in the English provinces found vital utterance in the press, which henceforth became a strong, well-sustained educator of public opinion. French Canada felt the political impulse and followed with a similar literary expression. The patriotic feeling roused by the American invasions during the War of 1812 was a potent factor in fixing the attachment of both Lower and Upper Canada to Britain. "The Loyalists of America and Their Times," by Egerton Ryerson (*q. v.*), Ferdinand B. Tupper's "Life and Correspondence of Sir Isaac Brock" (see BROCK, SIR ISAAC), published in 1845, and several well-written sketches of Canadian pioneer life illustrate the earlier political and social life of Upper Canada; while the agitation called forth by the struggle for responsible government in all the provinces produced the splendid political writing and speeches of Joseph Howe (*q. v.*), of Nova Scotia, and the journalistic work and pamphleteering of William Lyon Mackenzie (*q. v.*) and Robert Gurlay. The most important political document of this era was the famous "Report" of Lord Durham (1838). Its recommendations brought about the legislative union of Upper and Lower Canada. In some respects it has been unduly praised. It was more remarkable for its accurate summary of racial and political conditions than for the wisdom of its recommendations, and in the interest of peace and nationality the legislative union which was largely its logical result had to be superseded by confederation. John C. Dent's "Last Forty Years" (1881) and "Story of the Upper Canadian Rebellion" (1885) are able and interesting narratives of a period of revolutionary agitation followed by constitutional development; William Kingsford's "History of Canada" (10 vols., 1887-98) is an authoritative work written with care and impartiality; Robert Christie's "History of Lower Canada" (1848-55) deals with the formative period 1791-1841. The "History of Nova Scotia" (1837), by Thomas C. Haliburton (*q. v.*), and his famous anticipation of Yankee dialect writing, "The Clockmaker, or Sayings and Doings of Sam Slick of Slickville," are the best known works produced in Nova Scotia. James Hannay's "History of Acadia" and Annand's "Life and Times of the Hon. Joseph Howe" also deserve mention. Several able writers on constitutional history and constitutional law have appeared, notably Sir Alpheus Todd, whose "Parliamentary

Government in England" and "Parliamentary Government in the Colonies" are standard works; and Sir John G. Bourinot, whose chief writings are of permanent value. The political, historical, and journalistic work of Goldwin Smith covers a wide range and is justly celebrated for its lucidity and rare style, but much of it that refers to Canada ignores the national point of view and has little authority in the Dominion. The history of the Canadian Northwest, of which the first popular work was Sir W. F. Butler's "Great Lone Land" (1872), has been written in its later phases by Alexander Begg, G. M. Adam, and George Bryce.

In poetry and fiction English-speaking Canada at first developed very slowly, but after confederation a national spirit quickened literary production and was manifest in a broader point of view, as evidenced by the intensity with which the more romantic phases and events of French-Canadian life and history appealed to writers of British birth and descent. The best-known poets are Archibald Lampman, Bliss Carman, Charles G. D. Roberts, and W. W. Campbell (*qq. v.*), whose productions have all obtained a more than national recognition. G. F. Cameron, D. C. Scott, F. G. Scott, Ethelwyn Wetherald, Pauline Johnson, the daughter of a Mohawk chief, and Miss I. V. Crawford have written poetry of superior merit. Charles Mair's "Tecumseh" (2d ed., 1901) and Charles Heavyside's "Saul" (1857) are dramas written with more than ordinary power of feeling and expression. It is not possible to give here more than a partial list of the writers of verse. In fiction W. Kirby's "The Golden Dog" was a novel of French-Canadian life which won wide fame for its author. The rich literary vein uncovered by it remained unworked till Sir Gilbert Parker (*q. v.*) produced a number of books which have given him high rank among contemporary writers of fiction. John Galt (*q. v.*), J. Richardson, Mary H. Catherine, Miss M. R. Charlton, G. M. Adam, and Sarah J. Cotes may also be mentioned among novelists, of whom the list is necessarily incomplete. Galt and Richardson depicted phases of settlement and adventure in the earlier history of the country. There are many sketches of the trials and adventures of pioneer life, of which Susanna S. Moodie's "Roughing It in the Bush" and "Life in the Clearings" may be considered among the best. Sir J. W. Dawson (*q. v.*) and Sir Daniel Wilson (*q. v.*) are two of the more notable names in science and criticism. Of more recent writers W. H. Drummond (*q. v.*), the poet of the French-Canadian habitant or small farmer, has interpreted the latter's mind and heart in verse which reproduces with marvelous fidelity a living patois, the speech of a

people who put French thoughts in English with whimsical results. Charles W. Gordon, a Presbyterian clergyman, whose pen-name is "Ralph Connor," has written a number of stories in which deep religious feeling is combined with skilful character-drawing. Nor should the speeches of the leaders in political life be forgotten. Joseph Howe, George Brown, Sir John A. Macdonald, Thomas D'Arcy McGee, Edward Blake, Alexander Mackenzie, Sir C. Tupper, Sir R. Cartwright, and Sir W. Laurier (*qq.v.*) have added substantially to political oratory in English. The debates on confederation were remarkable for their weight and high political tone. The Canadian press and pulpit have likewise contributed much to the elevation of public taste. The influence of such newspapers as the "Globe" and the "News" of Toronto, the "Gazette" and the "Herald" of Montreal, and of many other daily and weekly journals is of much importance, and the quality of the editorial writing is high. The influence of American newspapers, magazines, and reviews, which circulate widely in Canada, has been considerable in molding the taste and views of the people; but with the growth of national feeling and imperial sentiment there is an increased desire for a greater supply of British periodicals. Further changes in the postal regulations between Britain and Canada have been discussed with that object in view.

History.—In 1534 Jacques Cartier, a French navigator, entering the St. Lawrence on the festival of the saint of that title, took nominal possession of North America in the name of his king, Francis I. In 1608 Quebec was founded by Champlain; in 1623 he built Fort St. Louis, from which stronghold France ruled for 150 years a vast region extending E. to Acadia (now Nova Scotia), W. to Lake Superior, and ultimately down the Mississippi as far as Florida and Louisiana. The Récollet and Jesuit missionaries traversed the country in all directions, and underwent incredible hardships in their zeal for the conversion of the Indians. These fearless priests were the pioneers of civilization in the far West, and to La Salle is due the discovery of the Mississippi valley. In 1670 Charles II. granted the Hudson's Bay Company the perpetual exclusive right of trading in the territory watered by all the streams flowing into Hudson bay. Garrisoned forts were raised at suitable points, and the bitter enmity between the French and the English traders frequently led to bloody struggles, in which sometimes the Indians also took a part. The most warlike were the Iroquois, or Five Nations, who were persistent enemies of the French, while the peaceful Hurons were steady allies. Meanwhile, the wars on the Ameri-

can continent followed the course of the wars in Europe, until the long struggle between France and England for the supremacy in America came to a close on the Plains of Abraham in 1759, when General Wolfe defeated Montcalm. Peace was concluded between Great Britain and France in 1763, when, by the Treaty of Paris, Canada was formally ceded to England, and Louisiana to Spain. In 1774 the Quebec Act extended the boundaries of the province, and that mainly under French laws, down the Ohio to its confluence with the Mississippi, and up the latter stream to its source. Finally, Canada receded to its present limits in 1783, giving up to the American republic, at the close of the Revolutionary War, the territory now comprised in Minnesota, Wisconsin, Michigan, Ohio, Indiana, and Illinois. In 1791 Canada was divided under separate legislatures into two sections, the E. retaining chiefly French institutions, and the W. receiving those of England. This change, while accommodating the racial prejudices of the French and English, was soon followed by struggles, both in Lower and in Upper Canada, between the popular party in the assembly, or lower house, and the reactionary governors and upper house. In both the principle at stake was the same, namely, that of responsible government and of the right of financial control by the assembly. The offices in both governments were monopolized by those who opposed extension of popular rights. Rebellion broke out in both provinces in 1837-38, but was suppressed with small loss of life. The trouble of arranging a settlement induced the imperial government to send out Lord Durham, who made his celebrated "Report" recommending the legislative union of the two provinces, which took place in 1841. New troubles soon developed. Increasing population in Upper Canada did not increase the number of representatives, and the demand of representation by population, which would have advantaged the English-speaking element at the expense of the French, was opposed by the latter. The payment of money in compensation for losses during the rebellion of 1837 angered the Tory party, which in 1849 burned the parliament buildings at Montreal and stoned the Governor-general, Lord Elgin. During 1854-66 a reciprocity treaty with the United States promoted Canadian prosperity, but at the time of its termination there was great dissatisfaction. In the meanwhile, as a remedy for political unrest, statesmen of different parties in the provinces began the movement which ended in confederation. For subsequent history see CANADA, CONFEDERATION IN.

Population.—The question of population in Canada is of special importance on account both of the sparsely inhabited and

the unoccupied areas of the country, whose great distances make the distribution of products comparatively difficult, and of the ambition of the people for a more important national life. The decennial census returns of 1881, 1891, and 1901 were of such serious meaning that they were used as arguments for a policy that would encourage greater immigration and restrict emigration, especially to the United States. According to the census of 1901 the population of the Dominion was 5,371,315; in 1891 it was 4,833,239; in 1881, 4,324,810. The increase from 1881 to 1891 was 508,429, or 11.75 per cent.; and from 1891 to 1901, 538,076, or 11.14 per cent. The rate of increase in a new country for the decade 1891-1901 was, therefore, smaller than that of the crowded population of England, which was 12.1 per cent., or of Wales, which was 13.3 per cent., to say nothing of the increase of 20.73 per cent. in the population of the United States for the decade 1890-1900, or of 25.50 per cent. for the decade 1880-90. Discussions of the causes of this slow increase ascribed it chiefly to the superior attraction of the United States, which absorbed not only a large number of native Canadians annually, but also the majority of immigrants which Canada had been at much pains and expense to secure. This state of things was remedied after the accession to power of a Liberal ministry in 1896. Hon. Clifford Sifton, for some time Minister of the Interior under Sir Wilfrid Laurier, organized agencies abroad to a high degree of efficiency, and by persistent advertisement of Canadian vacant farming lands started increased immigration to the Dominion. About the same time it became more widely known that desirable free lands in the United States were taken up, and this also helped to divert more settlers to Canada. The results of the new policy were not convincingly apparent until 1902. In that year the total immigration for the fiscal year ending June 30 was 67,379, an increase of 18,230 over that of 1901. In 1903 it was 128,364; in 1904, 130,329; in the calendar year 1905 it was 144,621. In the calendar year 1906 it had risen to 215,000. In 1907 reports from immigration agencies, voluntary societies in aid of immigration, and other sources indicated the coming of more than 300,000, nearly one-third the annual immigration into the United States. Racially, the population of the Dominion in 1901 consisted of 1,649,371 French; 1,260,899 English; 988,721 Irish; 800,154 Scotch; 310,501 German; and 127,932 Indians and half breeds. There were also numerous other and smaller racial elements. The French Canadians are chiefly descendants of the people of Normandy and Brittany, and retain many of the characteristics which mark the people of the two French provinces. In the latter, as well as among the French Canadians, religious con-

servatism and devotion to the Roman Catholic Church are predominant. The habitant, the farmer of Quebec, is, generally speaking, close-fisted, hard-working, and religious, ruled in things spiritual and in many things temporal by the parish priest; but hopeful, hospitable, and with an admirable sense of family obligation. For him most of social interest, after family life, centers in the range and the parish, the former being a subdivision of the latter and adopted as a means of closer association and mutual helpfulness in rural districts. The French Canadian, whether habitant or engaged in other occupations, of which the chief are lumbering, mining, and fishing, is in many respects a picturesque and attractive character, who has drawn the attention and sympathetic interest of the novelist and the poet. Of his race there are more than 1,300,000 in Quebec, 160,000 in Ontario, 80,000 in New Brunswick, 45,000 in Nova Scotia, 14,000 in Prince Edward Island, and about 35,000 in the northwest provinces and territories.

According to the census of March 31, 1910, the population of the Dominion was 7,489,781; in 1901 it was 5,371,315; in 1891, 4,833,239; in 1881, 4,324,810; in 1871, 3,485,761. The increase in 1871-1881 was 839,049; in 1881-1891, 508,429; in 1891-1901, 538,076; in 1901-1910, 2,118,466; and in the four-year period of 1906-1910, it showed the remarkable total of 1,048,781.

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Canada, Growth of Constitutional Government in. At the commencement of the nineteenth century the population of the provinces of Prince Edward Island, Nova Scotia, New Brunswick, Lower Canada, and Upper Canada did not reach 270,000 souls, of whom at least 150,000 were French Canadians. Their total trade did not exceed \$10,000,000, the public revenues were inadequate for the public requirements, and the British government was obliged to give considerable aid to the provincial treasuries. The government was directly controlled by the Imperial Secretary of State in London and his representatives in the several provinces. The governing authorities in the five provinces were these: A governor-general in Lower Canada—then the most populous section of British North America—who exercised a nominal supervision, as the royal representative, over all British North America; a lieutenant-governor in each of the other four provinces; an executive council in Upper and Lower Canada, generally composed of members of the Legislative Council; a legislative council in all the provinces, appointed by the crown, and in Nova Scotia, New Brunswick, and Prince Edward Island exercising executive as well as legislative functions; an assembly, elected by voters possessing a small property qualification, in all the five provinces.

The imperial government had certainly the interests of British America at heart, but nevertheless they erected a structure of provincial government which was defective at its very foundation. The crown was supreme in the executive and legislative councils, and the Assembly had little influence over the administration of public affairs. The absence of a system of local or municipal institutions in the provinces was another serious weakness in the provincial machinery. The people were called upon to manage the affairs of a province before they had learned to administer their purely local affairs in city, township, or village. Despite these defects inherent in the system of government, the machinery worked with little friction for a while. The unfortunate war of 1812-1815, in which Canada performed her duty to the empire with infinite patriotism, prevented political dissension, since all classes of people recognized the supreme necessity of uniting at this crisis to defend their homes and country. The war did much to solidify the various racial elements of British North America during its formative stage. Frenchmen, Englishmen, Scots

men from the Lowlands and the Highlands, Irishmen, and Americans, one and all, united to support British connection. But when peace was proclaimed and the legislatures were relieved from the pressure that the war had brought upon them, the politicians again got the upper hand. The machinery of government became clogged, and political strife convulsed the country from one end to the other. An "irrepressible conflict" arose between the government and the governed classes.

In all the provinces, but especially in Lower Canada, the people saw their representatives practically ignored by the governing body, their money expended without the authority of the Legislature, and the country ruled by irresponsible officials. A system which gave little or no weight to public opinion as represented in the Assembly was necessarily imperfect and unstable; and the natural result was a frequent deadlock between the Legislative Council, controlled by the official class, and the House, elected by the people. The governors necessarily took the side of the men whom they had themselves appointed and with whom they were acting. This system of government was generally worked in direct contravention of the principle of responsibility to the majority in the popular House. Political agitators had abundant opportunities for exciting popular passion. In Lower Canada, Papineau—an eloquent but impulsive man, having rather the qualities of an agitator than those of a statesman—led the majority of his compatriots. For years he contended for a legislative council elected by the people; for it is curious to note that none of the men who were at the head of the popular party in Lower Canada ever recognized the fact, as did their contemporaries in Upper Canada, that difficulties would be best solved, not by electing an Upper House, but by obtaining an executive who would only hold office while supported by a majority of the representatives in the Assembly. In Upper Canada the radical section of the Liberal party was led by W. Lyon Mackenzie, who fought vigorously against what was generally known as the "Family Compact," which occupied all the public offices and controlled the government.

Such was the political situation in Canada when Queen Victoria ascended the throne on June 20, 1837. If we survey the general condition of things in those troublous times, the prospect was not encouraging. The total population of the provinces did not exceed 1,350,000 souls, of whom nearly one-half were French Canadians. Trade and commerce were quite paralyzed by the political discontent which had existed for years, and had already broken out into rebellion. The value of the whole trade

of British North America—that is, of the imports and exports—was about \$25,000,000. The revenue of all the provinces did not exceed \$7,000,000, and in more than one province—notably in Upper Canada—it was insufficient to meet the ordinary expenditures. The total production of wheat did not exceed 5,000,000 bushels, of which the greater portion was raised in French Canada, despite the want of energy and knowledge displayed by the *habitants* in the cultivation of the soil. The seigniorial exactions—a heritage from the French régime—retarded settlement and enterprise in the province of Lower Canada. The excessive grants of land made by the crown to the Loyalists, military men, and the Anglican Church, kept valuable districts of Upper Canada idle and profitless for years. The little island of Prince Edward had been nearly all granted by ballot to a few landlords in a single day, and till the entrance of the colony into the Confederation in 1873, its progress was seriously crippled by the difficulties arising out of this wholesale disposal of the public domain. The means of communication in each province were most wretched, in the absence of a municipal system and local taxation, and as a result of the ownership of large districts by absentee proprietors. The only town of importance was Montreal, with a population of 40,000 souls. Few streets in the cities were lighted or paved; buildings of architectural beauty were the exception. Denominational colleges existed for the higher education of youth, but the state had not in any degree intervened successfully in the establishment of a system of popular elementary schools. In 1838 there was in all the public and private schools of British North America only one-fifteenth out of a total population of 1,500,000 persons. The administration of justice was satisfactory in all the provinces except in Lower Canada, where justice was sadly clogged by national jealousies, which showed themselves constantly in the jury-box. As in the courts of law and in the Legislature of French Canada, so it was in social and every-day life—the French Canadian in direct antagonism to the English Canadian. “I expected,” wrote Lord Durham in 1839, “to find a contest between a government and a people; I found two nations warring in the bosom of a single State; I found a struggle not of principles, but of races.”

The special mission of Lord Durham, who was sent to Canada as governor-general in 1838, was a turning-point in the political development of the British North American colonies. As a sequence of his report, so replete with political wisdom, English statesmen of all parties, notably Lord John Russell, recognized at last the necessity of intrusting a larger measure of self-govern-

ment to the people of the provinces—of giving them as complete control of their internal affairs as was compatible with the security of the empire.

The union of the Canadas in 1841, when the French and English sections were equally represented in one Legislature, was the first important step in the political development of all the provinces of British North America. Then followed between 1841 and 1849 the concession of responsible government in the fullest sense of the term, while the legislatures obtained control of the provincial revenues and taxes. At the same time came the repeal of the navigation laws which had fettered colonial trade since the days of Cromwell. The post office was given to the Canadian government, and in fact all matters that could be considered to appertain to the provinces were now placed under their immediate legislative jurisdiction.

The Canadians, under the impulse of relatively unfettered action, went vigorously to work to lay the foundations of a municipal system, as indispensable to the operations of local self-government. The troublesome land question, involved in the seigniorial tenure, was settled after much agitation on terms favorable to vested interests, while the clergy reserves were also arranged so as no longer to favor one church at the expense of others, or to impede the progress of settlement and cultivation. The union of the Canadas lasted until 1867, when it had outgrown its usefulness, and the provinces found it necessary to enter into a federation, which had been foreshadowed by Lord Durham and advocated by many eminent men even before his time.

The confederation of 1867 brought only four provinces into one territorial organization for general or Dominion purposes—Ontario, Quebec, Nova Scotia, and New Brunswick—and it was not until 1873 that little Prince Edward Island, the garden of the Gulf of St. Lawrence, united its political fortunes with those of the young Dominion. Efforts were made to bring in Newfoundland, but purely selfish local considerations have always prevailed in that island over national sentiment, and it is still doubtful when this large colony, which has been placed by nature as a sentinel at the very portals of Canada, will fall into line with its sister colonies in North America. One of the most important results of confederation in its early days was the annexation by the Dominion of that vast tract of country which up to that time had been almost exclusively in possession of the Indians and the traders of the Hudson's Bay Company. Next came into confederation the province of British Columbia, which extends from the Rockies to the waters of the Pacific Ocean.

A new province of Manitoba, which is

watered by the Red and Assiniboine rivers, and territorial districts as large as European states, were organized for purposes of government in the vast prairies of the West. Within a period of 30 years Canada had stretched from the Atlantic to the Pacific, and the territory now under her control is very little inferior in extent to that of the great republic to the S., and contains within itself all the elements of a prosperous future.

It is unfortunately true that this result was not achieved until blood had been shed and much money expended in crushing the rebellious half-breeds led by the reckless Riel; but, apart from this sad feature of Canadian history, this important acquisition of territory has been attained under circumstances highly advantageous to the Dominion. Canada now possesses an immense territory of varied resources—the Maritime Provinces with their coal, fish, and shipping, together with a valuable, if limited, agricultural area, not yet fully developed; the large province of Quebec, with ranges of mountains on whose slopes, when denuded of their rich timber, may graze thousands of cattle and sheep, with valuable tracts of meadow lands, capable of raising the best cereals and the finest cattle of the continent; the rich province of Ontario, the chief agricultural section of the Dominion, whose cities and towns are full of busy industries; the vast Northwest, still in the very infancy of its development, which has already given the confederation three great provinces—Manitoba, Alberta, and Saskatchewan—which have become the principal wheat-growing district of Canada; and, finally, the gold-producing province of British Columbia, whose mountains are still rich with undeveloped treasures, and whose mild climate invites a considerable industrious population to cultivate its slopes and plateaus and collect the riches of its river and deep-sea fisheries. Even that inhospitable Arctic region of the far Northwest of Canada, through which the Yukon and its tributaries flow, appears to be rich with untold treasures of gold and other minerals, and promises to be a source of wealth to a country which is still in the infancy of its material development.

Self-government now exists in the fullest sense of the term throughout the Dominion, as the result of the political struggles of 100 years. At the base of the political structure lie those municipal institutions which enable a people in every local division to make improvements, support schools, and even encourage public libraries. Then we go up higher to the provincial organizations, governed by a lieutenant-governor, nominated and removable by the government of the Dominion, and advised by a council responsible to the people's repre-

sentatives; with a legislature composed, in only two of the provinces, of two houses—a council appointed by the crown and an elective assembly—while in all the other provinces there is simply an assembly, chosen by the people either by universal suffrage or on a very liberal franchise. The fundamental law known as the British North America Act, which was passed by the Imperial Parliament in 1867, gives jurisdiction to the provincial governments over education, provincial works, hospitals, asylums, and jails, administration of justice (except in criminal matters), municipal and all other purely local affairs.

The general government of the Dominion is administered by a governor-general, with the assistance of a ministry responsible to a Parliament composed of a Senate appointed by the governor-general in council, and a House of Commons elected in nearly all the provinces by universal suffrage. This government has jurisdiction over trade and commerce, post office, militia and defense, navigation and shipping, fisheries, railways and public works of a Dominion character, and all other matters of general or national import. The appointment of a governor-general by the crown, the power of disallowing bills which may interfere with imperial statutes and treaties, the right which Canadians still enjoy of appealing to the Judicial Committee of the Privy Council from the courts of the provinces, as well as from the Supreme Court of Canada; the obligation which rests upon England to assist the colony in time of danger with all the power of her army and fleet; the fact that all treaties with foreign powers must necessarily be negotiated through the imperial authorities—these are the most patent evidences of Canada being still a dependency of the empire. Even the restraint imposed upon Canada with respect to treaties has been modified to a great degree by the fact that England has acknowledged for many years that Canada should be not only consulted in every particular, but actually represented in all negotiations that may be carried on with foreign powers affecting her commercial or territorial interests.

One of the most encouraging results of this political system has been not merely the material development of the Dominion, but the creation of that powerful national sentiment which best enables the whole political structure to resist successfully any storms of racial antagonism or passionate party spirit which may from time to time beat against its walls. French Canada, with its population of more than 1,350,000 people, still maintaining their language and special institutions, is no longer restive and uncertain of its future as in the years immediately preceding and following the rebellion.

It is true that at times, when the French

Canadians press their national prejudices to extremities, a spirit of antagonism is at once evoked between them and the English elements, but the unfortunate state of things that existed before 1837 is no longer likely to return, and whatever jealousies or rivalries break out now and then above the surface are sooner or later carried away by a current of sound public opinion, anxious for the harmony of all classes and creeds, and only solicitous for the safe working of the Union.

The next great step in the political career of Canada is a question which frequently occurs to Imperial as well as Canadian statesmen. It is not annexation to the United States—that is impossible; it is not independence—that is not even discussed under existing conditions. These are days of a dominant imperialism throughout the British empire, and the influence of that sentiment in Canada can be estimated from the enthusiasm with which Canadians rallied to the aid of England in South Africa. One thing is quite certain, that the national movement among all British-speaking people—indeed, among all such thoughtful French Canadians as Sir Wilfrid Laurier—is towards the placing of the relations between the parent state and its great dependencies on such a permanent basis as will strengthen the empire and give Canada even greater influence in the councils of the Imperial State. SIR J. G. BOURINOT.

Canada Balsam, a pale balsam, resin, or oleoresin, obtained by incision from a Canadian tree, the American silver-fir, sometimes called the Balm of Gilead fir (*Abies balsamea*). Canadian balsam is of the consistence of thin honey, drying slowly by exposure to the air into a transparent adhesive varnish. It is used in varnish manufacture, in mounting objects for microscopic examination, and for various other optical purposes, because of its perfect transparency and its high refractive power.

Canada Goose, the common American wild goose (*Branta canadensis*), 30 to 35 inches long, brownish above, lighter below, head, neck, bill, and feet black, a white patch on the cheek. See also GOOSE.

Canada Hemp, a perennial herb, *Apocynum cannabinum*, of the dogbane family, native of North America. It has a strong fiber, used by the Indians for twine, nets, fabrics, etc. See APOCYNACEÆ; DOGBANE.

Canada Thistle. See THISTLE.

Canadian (or North) Channel, one of the two passages into which the island of Anticosti (*q. v.*) divides the estuary of the St. Lawrence (*q. v.*). It has a breadth of about 30 miles, and contains the Mingan Islands, a group of 29 islets extending for about 45 miles along the coast of Labrador.

Canadian Pacific Railway, a line of railway which traverses British North

America from the St. Lawrence to the Pacific. One of the conditions upon which the province of British Columbia in 1871 entered the Dominion of Canada was the construction of such a railway, and it was completed, according to arrangement with the Canadian Government, by a syndicate of London, Paris, and American capitalists, and opened for general traffic in June, 1886. Commencing at Montreal, the line goes to Ottawa, thence around the N. of the Great Lakes to Port Arthur at the head of Lake Superior, and thence to Winnipeg, Manitoba, thence to Stephen in the Rocky Mountains, then across British Columbia to Vancouver on the Pacific. The line is of great importance not only as a means of communication between Europe and Eastern Asia and Australasia, but also as a military highway binding together the great masses of the British Empire. The length of the line from Montreal to Vancouver is 2,909 miles, without counting side extensions and leased lines. To increase its usefulness both the Imperial and the Dominion governments granted annual subsidies to a line of steamers between Vancouver and Hong Kong and Japan.

Canadian Period, a sub-division of the American Ordovician, or Lower Silurian, system. It comprises the Calceiferous, Beekmantown, and Chazy epochs.

Canadian River, a river that rises in the N. E. part of New Mexico, and runs generally E. through Texas, Oklahoma, and Indian Territory to the Arkansas, of which it is the chief tributary, and which it enters at Tamaha, about 45 miles above Fort Smith. Its length is about 900 miles, but it is rather shallow and not important for navigation. Its largest tributary is the Rio Nutria, or North Fork of the Canadian, which runs parallel to the main stream for about 600 miles. Owing to the close proximity of other streams during the lower part of its course, the territory drained by it is comparatively small.

Canadian Turpentine. See CANADA BALSAM.

Canaigre, a species of dock, *Rumex hymenosepalus*, growing wild in Arizona, New Mexico and Texas. The rootstock furnishes tannin in larger quantities than are obtained from any other plant. The supply of wild canaigre having considerably diminished, the systematic cultivation of the plant was undertaken with much success. See TANNIC ACID.

Canajoharie, a village in Montgomery co., N. Y., 55 miles N. W. of Albany and about 9 miles N. of Sharon Springs, on the S. bank of the Mohawk river and on the Erie canal. The town has two banks, a library, three weekly newspapers, machine shops, flour mills, planing mills, a brewery and manufactories of trunks, carriages, re-

frigerators, paper bags, and gloves. In the vicinity are stone quarries.

Canal. The innate, physical properties of water render it peculiarly applicable to the cheap distribution of the world's products. Its chemical composition, great mobility, buoyancy, incompressibility, weight and general distribution make it indispensable in sustaining life, promoting manufactures and stimulating commerce. Hence those nations which have utilized this medium of transportation to the fullest extent have dominated the world, and those countries which have given special attention to the systematic development of their waterways are the most thrifty and successful in trade. As the foreign commerce is dependent upon the price at which the excess of internal production can be placed on board the ship, it is of great importance to the intercontinental trade that the internal rates should be a minimum, and as this can best be secured by having continuous systems of waterways, without break of bulk, it becomes a wise policy to connect the natural channels by such artificial canals as will best fulfil these requirements. These manifest economies have led France, Belgium, Holland, Germany and other countries to develop their river and canal routes to the utmost and have made them among the most successful in trade and finance of the nations of the earth. Canals are classified according to their purposes into *aqueduct*, *navigable*, *drainage*, or *irrigation*, covering a wide scope, but the limits of this article will be restricted to those designed for navigation.

Requirements.—In the selection of a route it is fundamentally necessary that there shall be a sufficient supply of water at all seasons, for navigation and for the losses arising from seepage, leakage, evaporation and lockage. These conditions necessitate a knowledge of the probable amount of tonnage, dimensions of vessels and lock-chambers, height of lifts, area of drainage basin, amount of run-off available, distribution and rate of rainfall, character of topography and geology, and many other incidental elements governing the construction of an open conduit which shall be reasonably water-tight, and be so located that it may be fed by gravity from sources at a higher level. Where this is not practicable the summit-level may occasionally be supplied by pumping. The quantity of water may be somewhat diminished by the use of inclined planes between the various levels, or by hydraulic lifts or the use of pneumatic, balanced caissons. The general dimensions of the cross-section of the trunk are designed to be such as to permit a free passage of the displaced water at low velocities, to prevent the wasting of the banks

as well as the creation of a grade in front of the boats. This will require a sectional area of from five to six times the mid-ship section of the vessel, for a speed of from four to five miles per hour, with a clearance of about two feet under the keel and a width at bottom of at least twice that of the craft using the channel. Hence it is that the earlier canals no longer fulfil the requirements of modern vessels and have fallen into disuse in many countries.

Locks and Lifts.—Without the means of overcoming differences of elevation, canals would have but limited scope, so that at an early date various devices were applied to surmount grades. These were chutes, inclined planes, locks and lifts. Of these the "lock" is the standard; but in many cases in modern practice, and particularly where the supply of water is limited, the "lift" is substituted. The operation of the lock is simple, as it consists of a water-tight well or chamber of suitable dimensions and shape, closed at the ends by movable gates so placed as to be opened or closed at pleasure. The gate for the higher level is placed on a submerged wall, known as the lift wall, through or under which culverts are built to admit the water from the upper level to the lock chamber, or it may be admitted by means of valves in the gates themselves. As the gates can be operated only when the water level on each side of them is the same, it is first necessary to create an equilibrium of pressure by opening the valves of the gate in question. Thus, if a boat is descending from a higher level and the lock chamber has been emptied by a previous boat moving in the same direction, then the lower gates must be closed and the valves at the upper gate be opened, so as to draw the water from the higher level into the chamber until it is filled, by gravity. The upper gate may now be opened and the boat be admitted to the lock. This gate is then closed and the valves in the lower gate, which were closed, are opened so that the water is drained off into the canal below, thus lowering the vessel in the chamber to the same level. This volume is known as the prism of lift. The lower gate is then opened and the boat passes out. If the next lockage is desired by an ascending boat, it may immediately enter the chamber, after which the lower gate is closed, with its valves, the upper valves are opened until the water rises to the level of the higher stretch, raising the vessel on its surface, when the upper gates are opened and the boat resumes its journey. The lift of the lock is limited by the size of, and pressure on, the gates, and it is deemed practicable to build them to a height of 50 feet for spans of 80 feet, but the highest in use to-day is probably that on the St. Denis canal of France, which is limited to 30 feet. When

the elevation exceeds the lift of a single lock, two or more may be placed in tandem, as at Lockport on the Erie Canal. Where water is scarce and the traffic large, various sizes of locks may be employed, or the useful length of the larger locks may be reduced by an intermediate gate for smaller vessels.

Crude forms of lifts were used in England as early as 1838, when two counter-balanced tanks were suspended by chains passing over pulleys, for hoisting small boats; but these have given place to large hydraulic or compressed air elevators, of which the first was built on the Weaver, England, in 1875. It has a vertical lift of 50 feet 4 inches, and can raise boats of 100 tons in its caisson, which is 75x15.5 feet. This Anderton lift cost \$240,000. Later lifts were built at Les Fontinettes, France, at a cost of \$380,000 and height of 43 feet 1 inch, and at La Louvière, Belgium, for \$250,000, with a lift of 50 feet 6¼ inches. The latest and largest hydraulic lift is that at Heinrichenberg, Germany, capable of raising barges of 950 tons. It has five pistons and the caisson is supported upon five lattice columns resting on cylindrical steel-plate floats 32.8 feet high and 27.25 feet in diameter, which carry the entire load of 3,000 tons. It was opened to traffic in 1899 at a cost of \$650,000. For still greater lifts, the Dutton Pneumatic Balance Lock has been designed for the great elevations at Cohoes, Lockport and other points. It consists of two counterpoised caissons carrying water-borne vessels of any size, connected by syphons and operated by compressed air. The lift at Cohoes is to be 144 feet.

Inclined planes for conveying boats of small weight on dry trucks or on water caissons are well known. At Meaux, France, boats of 70 tons are thus elevated 45 feet up an incline of 4 per cent. The passage of the Alleghany Mountains from Hollidaysburg to Johnstown was made over the Portage railroad, 37 miles long, surmounted on each side of the summit by five inclines having various inclinations. The rise on the eastern side was 1,398 feet and the fall on the western, 1,171 feet, but it is now abandoned. The hydraulic cradle was in use on the Blackhill-Monkton Canal, in Scotland. The gradient was 10 per cent. and the lift 100 feet. The incline at Georgetown on the Chesapeake & Ohio Canal lifted 390 tons up a slope of 8 per cent. Those on the Morris & Essex Canal were water-borne also and are still in existence, but seldom used. The same principle, but with the support given by a flexible and adjustable bed, was ingeniously applied by the late Capt. James B. Eads to the proposed Ship Canal at Tehuantepec, Mexico, but this was never built. A modification of the inclined plane,

to permit larger boats to be carried, by moving them laterally, was introduced on the Grand Junction Canal of England, recently completed. The Bohemian Machinery Works have also designed some gigantic planes for connecting the Elbe and Danube, to raise 800 tons over a divide of 557 feet height. Another design is proposed by Professor Czischek, consisting of a drum of 65 feet diameter to carry the boat in water contained in its bottom. The drum is then rolled up or down the plane with its load.

The limits of space preclude the possibility of any reference to the history of this great economic factor in transportation and the development of the means of propulsion. But a few words should be added as to its *raison d'être*.

Decadence of Canals.—In view of the fact that the cost of transportation by canals is but one-third of that by railroad, it is to be deplored that the economic interests of the United States are not more zealously conserved by their maintenance and enlargement. In 1846 the canal and railroad mileage of the Keystone State, for example, was greater than that of any other. There were then 715 miles of canals operated by the State, and 380 by private capital, making 1095 in all. The State owned 118 miles of railroads and private companies 700 more, making a total of 818 miles. The great Pennsylvania railroad was opened through to Pittsburgh on Dec. 10, 1852, using the portion of the canal route included in the inclined planes over the mountain division and having to compete with a waterway operated by the Commonwealth. Under these conditions it became of vital importance to the railroad to extinguish the opposition by purchasing the canals, so that between 1865 and about 1874 some 701 miles of canals, which had cost over \$33,000,000 to build, were abandoned. In a similar manner, 656 miles of the canals in the State of Ohio, costing nearly \$11,000,000, were rendered useless in the few years following 1852. New York has been fortunate in retaining her trunk line waterways which transferred the commercial supremacy of the United States to her metropolis in 1826, for she has only lost 269 miles of her canals, costing a little more than \$10,000,000, although there appears to be a determined movement organized to-day (1905) to drive her supremacy to the more capacious waterways across the border, by resistance to the enlargement of the Erie and Hudson route to the sea-board. The census of 1890 shows that up to 1889 some 2,215 miles of canals have been thus abandoned in the United States, and at the same date there were only 3,383.3 miles in operation. In the meantime the railroad mileage had increased to 157,976 miles, and at pres-

ent it exceeds 212,000 miles, while the canal mileage is but little more than one per cent. of this total. Of the canal mileage proper of 1889, 2,264.6 miles were under State or corporate control, 40.63 under the Government. The remainder of 1,078.04 was slack-water or canalized river improvement. The Government canals consist of short, detached links, as follows: Sault Ste. Marie, 1.02 miles; Lake Superior, 2.12; Keweenaw, 5.0; St. Clair Flats, 1.19; Des Moines, 7.60; Coosa, 5.30; Louisville and Portland, 2.40; Muscle Shoals, 14.50; and Elk River, 1.50. Some of these were acquired from the private owners who had built them to meet the demand of the times. Of the extensive system built by the Commonwealth of Pennsylvania, barely 300 miles remain. These are the Delaware Division, from Easton to Bristol, 60 miles; the Lehigh Coal & Navigation, 48 miles; the Pennsylvania, from Nanticoke to Clark's Ferry on the Susquehanna, 101.5 miles; and the Schuylkill Navigation, from Port Clinton to Philadelphia, 89.88 miles. Most of the abandoned canals were wholly inadequate to meet modern requirements.

Their Economic Advantages.—This extinction of the canals as auxiliaries to the railroads has resulted in great losses to the country as well as to the roads, which are frequently compelled to carry large volumes of bulky tonnage at a loss to maintain the plants established on their lines; so that there is a growing demand for additional water facilities and a conviction that the most successful railways are those which have the cheapest water competition. This is illustrated by the great developments on the Great Lakes and the seaboard. Moreover, the statistics of transportation show that those canals which have been purchased or controlled by railroads soon fall into arrears, while the most profitable are those under corporate management. Although pertaining more directly to economics, it is important that this phase of the subject be stated, since it concerns the utility of the whole system of transportation. The failure of Great Britain to compete successfully

lected as to strangle the whole of the inland water traffic." Parliament subsequently interdicted the further obliteration of these waterways, and the question is now as to the control and rehabilitation of those that remain. On this point the ministers favor the granting of powers to local authorities, and the wisdom of this conclusion may be seen from the general results of State railroad management as set forth by Mr. Henry Hunter, the Chief Engineer of the Manchester Canal. "The Board of Trade returns for 1898 gave 2,768 miles of independent canals, with a traffic of 33,348,573 tons per annum, out of which a net profit of \$1,080 per mile was earned, and 1,138 miles of canals, under railway control, with a traffic of 6,009,820 tons per annum, and a net profit of \$200 per mile." From this it appears that the canals under corporate management carried about 12,500 tons per mile, as compared with 5,281 tons by those under railway control, and that the profits by the former were 5.4 greater, so that the policy of the railways was to neglect their most profitable ally and to divert the tonnage to the more expensive medium of carriage at its own and the public's loss.

The market-range of any commodity is determined by the margin between its cost of production and wholesale price. This is very small for raw materials, and limits the distance to which they may be carried at a profit. As the rate by canal is, in general, one-third that by rail, the range will be three times greater and the area tributary to a manufacturing centre, if accessible by water routes, would then be nine times greater by canal. An analysis of the tonnage carried by the New York State canals between 1837 and 1897 gives the following values and percentages of the several groups of commodities and illustrates how little of the higher class freight seeks water and how much of the lower class patronizes the canals.

The Coastwise Chain.—The Atlantic and Gulf coasts of the United States are characterized by a cordon of sandy islands enclosing a series of bays, sounds and lagoons,

Average Value per Ton of Articles Moved on
New York State Canals.

Years.	Forest Products.	Agri- culture.	Manu- factures.	Merchan- dise.	Other Articles.	Total Average Value.
1837 to 1897.....	\$10.95	\$37.82	\$37.03	\$306.50	\$15.29	\$38.45
1874 to 1897.....	11.88	29.75	30.42	258.02	12.41	31.46
Tonnage %	25.%	22.%	.04%	.07%	42.%	100%

with France, Belgium, Germany and other countries having cheap internal transportation, is ascribed largely to the throttling of her canal system by the railroad interests, and it is stated that out of a total of 3,906 miles in the United Kingdom in 1883 the railroads were allowed to obtain control of 1,138 miles, which were "so adroitly se-

especially favorable for a safe, interior, and protected navigation, if connected and improved by a few short links. This system was agitated and recommended by Gallatin as early as 1807, but was only begun when the necessity became apparent because of the destruction of the capital at Washington in 1814, after which the Chesapeake

and Delaware Canal of 14 miles length was opened to a depth of 10 feet, in 1829. The general statistics of the old-time links of this chain have already been stated, and it would serve no useful purpose to attempt to trace in detail the various routes, which cover about 3,500 miles of coast line.

President U. S. Grant, in his fourth annual message, urged its development in these words: "Such a route along our coast would be of great value at all times, and of inestimable value in case of foreign war." The experience of the Civil War has demonstrated the vital importance of the Chesapeake & Delaware Canal, as it was the salvation of the capital in the beginning of the conflict. For several sessions favorable reports have been adopted by the committees of Congress to secure control of and enlarge these canals, so as to emancipate them from the tolls which restrict interstate commerce. In 1904 a report was submitted to Congress for a 16-foot channel from Norfolk, Va., to Beaufort, N. C., 194.1 miles in length, requiring the removal of 66,000,000 cubic yards at an estimated cost of \$10,023,000, but a reviewing board reported that it was "not advisable for the United States to expend \$10,000,000 in constructing a channel 16 feet deep from Norfolk to Beaufort." It was therefore recommended that \$5,000 be expended for additional surveys. The State of Massachusetts has on several occasions chartered private companies to build across the Cape Cod Peninsula; one, via the Bass River route; one, by way of Buzzard's Bay; and a third application is now pending for a canal from the Weymouth-Fore River via Brockton and Taunton, to Narragansett Bay, a distance of 31.79 miles, with a summit elevation 130 feet above tide, surmounted by 14 locks having lifts varying from 7 to 25 feet, at a cost of \$57,618,358. The trunk of this canal is, as proposed, to be 130 feet wide and 25 feet deep. It is designed to avoid the casualties and delays of the outward passage, which are great, and to develop the manufacturing interests of the State. In this connection it is well to observe that Rhode Island far outranks all other States in the value of her manufactures, which averages \$429 per capita, as she has a coast line nearly three times greater, per unit of area, than that of any other State. Her ratio is 30 lineal miles to each 100 of area. Massachusetts ranks next, with 11 miles; Maine, 8; Maryland and North Carolina, 5. This shows the effect of water communications on industrial pursuits by the facilities afforded for cheap movement of raw materials.

The lagoons of the Gulf played so important a part in maintaining communications when the ports were blockaded during the Civil War, that great efforts have been

made to improve their connections, and in August, 1901, the system was opened by a short canal of only 7 miles, leading from the Mississippi to Lakes Borgne, Maurepas, and Pontchartrain, Mississippi Sound, Mobile Bay and the Alabama and Warrior Rivers, which now exercises a controlling influence on the freight rates from other sections. The benefits of this system are far-reaching, as it shortens the distance between the New Orleans markets and the Gulf points lying to the eastward; it saves the transshipment of through freight; it reduces the rates and insurance both by rail and water; it enables vessels drawing 10 to 12 feet to reach a point within 20 miles of the city without towage, and shortens their distance to the Gulf by 60 miles each way; it lowers the price of coal both for local and for bunker use, which formerly came down from Pittsburgh, 2,100 miles, but is now obtained from the Alabama fields more cheaply. The trunk of the canal is from 150 to 200 feet wide, and the lock is 200 feet long by 50 in width and 25 in depth. Other connections on the Texas lagoons are projected and surveys ordered.

The Canadian System.—The water-ways of Canada stretch from the Straits of Belle Isle to Port Arthur, on Lake Superior, a distance of 2,260 miles, or to Duluth, in Minnesota, 2,384 miles, of which less than 74 are through artificial channels. These begin at Montreal, 986 miles from the sea, and include the Lachine, 8.5 miles; Soulanges, 14; Cornwall, 11; Farran's Point, 1; Rapide Plat, $3\frac{1}{2}$; Galops, $7\frac{1}{2}$, to Lake Ontario; then the Welland, between it and Lake Erie, $26\frac{3}{4}$ miles, with a lift of $326\frac{3}{4}$ feet overcome by 15 lift and 1 guard locks; and finally the Sault Ste. Marie, $11\frac{1}{8}$ miles long, with a lift of 20 feet. The total difference of elevation between the head of tidal water and Lake Superior is about 600 feet, of which 551 are surmounted by locks without dams. These canals are owned and operated by the Government, and in 1900 were deepened to 14 feet throughout. The locks are 270x45 feet, with the exceptions of those at Farran's Point, and Iroquois, which are made 800 feet long to pass full tows at one lockage. The breadth at bottom varies from 80 to 100 feet. On the Ottawa system from Montreal to Kingston on Lake Ontario via the Ottawa and Rideau Rivers, 245.6 miles, there are (excluding the Lachine already mentioned), the St. Anne's Lock and Pier, $\frac{1}{8}$ mile; the Carillon, $\frac{1}{2}$; the Grenville, $\frac{3}{4}$; giving a 9-foot navigation to Ottawa. Thence to Kingston there are 35 locks ascending, and 14 descending, having a total lockage of $446\frac{1}{4}$ feet, limited to 5 feet draught. The locks are 134x33 feet, and the distance is $126\frac{1}{4}$ miles. Other small canals exist, but the most promising one as to its future possi-

bilities is that connecting Georgian Bay with the Ottawa River via French River, Nipissing, and other lakes leading into the Mattawa, Ottawa and St. Lawrence Rivers, —a total distance of 430 miles, in which it rises 60 feet to the summit and then falls 621 feet to Montreal. It is designed to have 34 locks of 500x60x20 feet, and it is expected to divert most of the traffic of the great Canadian Northwest to this route because of its greater advantages in cost and time, as it is 400 miles shorter and will require three days less time each way. The estimated cost of this canal is \$68,000,000, while the 12-foot channel proposed through the State of New York is estimated at \$101,000,000, and a 20-foot channel at more than three times that of the Canadian project. The total expenditures by the Dominion for construction, enlargement, maintenance and operation had been \$95,316,910.07 up to June 30, 1900. The total revenue was but \$12,401,917.32, which would indicate prospective foreclosure or abandonment, yet "The Canadians do not take so narrow a view, but recognize that they are essential to the commercial life of a country." This impression will be confirmed with the increase of population now migrating from the States to the Saskatchewan and Peace Rivers, and with the opening of the more northerly routes by both rail and water.

A Great Belt Waterway in South America.—In 1904 the project of organizing the South American Navigation Company was agitated at the Louisiana Purchase Exposition. This is one of the most ambitious canal projects in the world, as it would embrace a system of internal waterways covering nearly 6,000 miles, and connecting nine republics—namely, Colombia, Venezuela, Brazil, Ecuador, Bolivia, Peru, Paraguay, Uruguay, and Argentina. The purpose is to connect the waters of the Orinoco, Upper Amazon and La Plata by canals and slackwater improvements, so as to make it practicable for vessels to enter the delta of the Orinoco and pass through the heart of the country, tapping the Pacific coast republics en route to the estuary of the La Plata. It is believed that the divide between Mamore and Pilcomayo Rivers is only a half mile across, and that in 1772 a canal was actually cut through it, capable of passing six-oared boats. The connection between the Orinoco and Amazon would be via the Rio Cassiquiare, which would open up the valley of the Amazon which Humboldt predicted would become "the centre of human civilization." The project contemplates the issuance of guaranteed bonds, at 6 per cent., by the Republics interested, and the subsidizing of the company by a land grant of 4,000 acres per mile, with other privileges.

The Great Belt of North America.—The importance of connecting the Great Lakes with the seaboard was realized at an early date, and in 1826 the Erie Canal was opened for light-draught boats of about 76 tons burden. In 1862 the capacity was increased to boats of 240 tons, propelled in part by steam. It was again enlarged to 9 feet depth about 1900, and the State has now authorized the expenditure of \$101,000,000 to increase the depth to 12 feet. This link in the chain, from New York to Buffalo, is 502 miles in length. Thence via the Lakes to Chicago, the distance is about 967 miles, and from Chicago to Cairo, along the route of the Illinois River and Canal, and the Mississippi River, 562 miles; thence to the Gulf, 1,072 miles, making a total of 3,043 miles. The dimensions of this route at present vary greatly; the lake portion being designed to pass vessels of 20 feet draught, to which the Chicago Drainage Canal has been made to conform, but the river route in places barely affords an eight-foot navigation at low-water stages. The elevation of Chicago is 581.28 feet above mean sea level, requiring a number of locks to surmount the portion of the route between the Hudson River and Lake Erie, but the rest of the distance will be down-grade and be controlled by the locks and slackwater of the Illinois section. By such a comprehensive system, with its tributaries, about 80 per cent. of the population of the United States can interchange trade by means of internal water transit during the season of navigation.

For the general literature of the subject the reader is referred to the following authorities: Keasbey, "The Nicaragua Canal and the Monroe Doctrine" (1896); Colquhoun, "The Key of the Pacific" (1895); Jeans, "Waterways and Water Transport" (1890); Rodrigues, "The Panama Canal" (1885); Nelson, "Five Years at Panama" (1889); "Great Canals of the World," Department of Commerce and Labor, Washington; Proceedings of the International Waterways Congresses; Reports of the Chief of Engineers, U. S. A.; Reports of The American Society of Civil Engineers, and of the British Institution of Civil Engineers; Special Consular Reports, Department of State, Washington; and for much of the current technical periodical literature, the "Engineering Index," published by the "Engineering Magazine," New York.

For more complete descriptions of the larger modern projects see the titles, in this Encyclopedia, under ISTHMIAN CANAL; PANAMA CANAL; SHIP CANAL; and also BALTIC AND NORTH SEA CANAL; ERIE CANAL; PORT ARTHUR SHIP CANAL; SAULT STE. MARIE CANAL; SUEZ CANAL; WELLAND CANAL.

L. M. HAUPT.

Canalejas y Mendez, José, a Spanish statesman; leader of the Liberal party; owner and editor of "El Heraldo," of Madrid, the party organ; a former President of the Academy of Jurisprudence, and chief of the Departments of Justice, Finance, Public Instruction, and Public Works; became Prime Minister, Feb. 9, 1910, and especially conspicuous because of the controversy between Spain and the Vatican. In writing on the "religious question in Spain," he declared it was not a struggle against Church and religion, but "merely and temporarily a strain in the working out of a problem of recovering for the civil law of the State certain faculties which had been allowed to lapse."

Canaletto, the name of several painters, of whom the best known are: 1. A Venetian painter, born Oct. 18, 1697, whose true name was *Antonio Canale*. He is chiefly celebrated for his pictures of Venice, those of the Grand Canal being especially distinguished for fidelity and skilful coloring. He visited England, where he executed many commissions and acquired a high reputation by his views of local scenery. Canale is said to have been the first to use the camera obscura for perspective, etc. He died in 1768. 2. His nephew, **BERNARDO BELOTTI**, born in 1724, who was likewise a good artist, lived in Dresden, where he was a member of the Academy of Painters. He died in Warsaw in 1780. The Canaletti developed the pictorial treatment of architecture to a very high point.

Canandaigua, village and county-seat of Ontario co., N. Y.; at the N. extremity of Canandaigua Lake; on the New York Central and the Northern Central railroads; 29 miles E. of Rochester. The site is elevated and commands a beautiful view of the lake, and has many handsome residences and churches, the Canandaigua Academy, a female seminary, a union school, National bank, several private banks, Ontario Orphan Asylum, insane asylum, a Catholic orphanage, several manufactories and newspapers. It is a popular summer resort. Pop. (1910) 7,217.

Canara, a maritime region of Hindustan, now partly in the Madras presidency (South Canara), and partly in the Bombay presidency (North Canara), extending along the Indian ocean for 180 miles, with a mean breadth of 40 miles. The Bombay portion has an area of 3,911 square miles and a pop. of 421,840; the Madras portion 3,902 square miles and 959,514 inhabitants.

Canard, a false report; a silly rumor. The word was coined from the French *canard* = a duck, and arose from the story of cannibalism among a flock of ducks, who ate one of their number each day until at last they were reduced to one individual, the survivor having thus, it was argued,

eaten all his companions. The story was the "rage" in Paris for a time, and afterward when any marvelous recital was heard, the auditor would shrug his shoulders and exclaim, "C'est un canard!" (That's a *canard*, or duck!).

Canarium, a genus of plants, order Amyridaceæ. The gum of *C. commune* has the same properties as balsam of copaiva. The nuts are eaten in the Moluccas and Java, but are apt to bring on diarrhœa. An oil is expressed from them, used at table when fresh and burned in lamps when stale. *C. strictum* is the white dammar-tree of Malabar.

Canary Bird, an insectorial singing bird, a kind of finch from the Canary Islands, the *Carduelis Canaria* or *Fringilla Canaria*. They were introduced into Europe 300 or 400 years ago. A large proportion of the cage canaries are really mules, produced by the interbreeding of canaries with allied species, such as the goldfinch, siskin, linnet, bull-finch.

Canary Flower (*Tropæolum peregrinum*), an annual climbing plant of the Indian cress family, a native of New Granada, cultivated in Europe for its showy yellow flowers.

Canary Grass, a plant (*Phalaris canariensis*), chiefly cultivated at Sandwich, Kent, England. Canary-seed, the grain of the canary-grass, is much used as food for singing-birds.

Canary Islands, a group of islands belonging to Spain in the Atlantic Ocean, off the N. W. coast of Africa, forming a Spanish province. The group consists of seven large and several small islets, with a joint area of about 2,800 square miles, and a pop. (1900) of 358,564. The principal islands, proceeding from E. to W. are Lanzarote, Fuerteventura, Gran Canaria, Tenerife, Gomera, Palma, and Hierro or Ferro. The distance from Fuerteventura to the African coast is about 62½ geographical miles. The coasts are steep and rocky, and the surface is diversified with high mountains, narrow gorges, and deep valleys. All the islands are volcanic, and everywhere show plain marks of their origin, in the shape of cones, craters, beds of tuff and pumice, and streams of lava; but eruptions have taken place within the historical period only in Tenerife, Palma, and Lanzarote. There are no rivers, and on several of the islands water is very scarce. The springs on those better supplied are diverted by long artificial channels for the purpose of irrigation.

TENERIFFE, the largest island of the group, has an area of 877 miles, with a population of 112,000. The chief town and port is Santa Cruz de Santiago, on the S. E. coast. It is the seat of the officials of the general

government. The other towns are Laguna, a few miles from Santa Cruz, on a plain 1,800 feet above the sea; Puerto Orotava, on the N. coast; Villa Orotava, 1,060 feet higher; and Icod de los Vinos, near which the largest existing dragon tree grows. The famous Peak of Teneriffe is in the N. W. of the island.

GRAN CANARIA, which is next in importance, has an area of 758 square miles, with a population of 80,000. Its culminating peak is El Cumbre, with a height of 6,648 feet. The capital, Las Palmas, on the E. coast, is the largest town of the archipelago. The surface of this island is so broken that only a small part is under cultivation. At Artinara, at a height of 3,850 feet, there is a village of caves, with a population of 1,100 persons. A few miles from Las Palmas is the cone of Vandama, 1,800 feet high, with an extinct crater, circular and perfect, 800 feet deep.

PALMA, a classic spot for geologists, has an area of 718 square miles, and a population of 36,000. Its highest peak, Pico de los Muchachos, has an elevation of more than 7,600 feet. The ancient crater of the Caldera is of enormous size, though open to the sea on one side. Capital, Santa Cruz de las Palmas, on the E. coast.

The area and population of the other islands are as follows: LANZAROTE is 323 square miles, pop. 19,000; FUERTEVENTURA, 326 square miles, pop. 15,000; GOMERA, 169 square miles, pop. 13,000; HIERRO, 82 square miles, pop. 5,000. In former times the first meridian of longitude was commonly drawn through Hierro. The chief towns of these islands are small.

The Canaries are supposed to have been the Fortunate Islands of the ancients. The geographers of Greece and Rome were acquainted with their position, and King Juba's account of them has been preserved by the elder Pliny. For many centuries they were lost sight of, and not rediscovered until 1334, when a French vessel was driven amongst them by a storm. In 1402 the Norman Jean de Bethencourt fitted out an expedition for the purpose of subduing the islands, and in 1404, having obtained assistance from Spain, he succeeded in mastering four of them. His successor having sold his rights in Spain, they were afterward acquired by the King, who sent a large force in 1477 to conquer the Guanches, a brave and intelligent race of large stature, and comparatively fair. Their origin is unknown, but they are assumed by many to have been of Berber or of Libyan stock. Their resistance was so stubborn that it was not until 1495 that the last of the islands was mastered. They have been ever since the property of Spain. The Guanches suffered terribly from their conquerors, and have long ceased to exist as a separate peo-

ple; but in the local museums may be seen specimens of their mummies, skeletons, weapons, and pottery works.

Canby, Edward Richard Sprigg, an American army officer; born in Kentucky, in 1817. He graduated at West Point in 1839; served in the Mexican War, 1846-1848; commanded the United States troops in New York city during the draft riots of 1863; succeeded General Banks in the command of the army in Louisiana, 1864; became Brigadier-General United States Army, and Major-General of Volunteers, 1866. After the war, special duties were assigned to him, and in 1869 he took command of the Department of the Columbia. He was treacherously shot by an Indian chief, while negotiating for the removal of the Modocs from Northern California, in the "Lava Beds," April 11, 1873.

Cancan, a dance, something of the nature of a quadrille, but accompanied by violent leaps and indecorous contortions of the body. The earlier and usual meaning of the word in French is noise, racket, scandal; and is derived, oddly enough, from the Latin conjunction *quamquam*, "although,"—a great squabble having arisen in the French medieval law-schools as to the pronunciation of this word.

Cancellaria, a genus of univalve testacea, belonging to the family Muricidæ, and Swainson's sub-family scolyminae, in which the shell is turbate, scabrous and generally reticulated, the spire and aperture nearly equal, and the body ventricose. Tate in 1875 estimated the known recent species at 71, and the fossil ones at 60, the latter from the Upper Chalk till now.

Cancer, in astronomy, the fourth sign in the zodiac. The sun enters this sign on or about June 21. He is at his greatest N. declination on entering the sign, and the point which he reaches is called the summer solstice, because he appears for the moment to stop in his progress N., and then to turn S. again. The sun is then $23\frac{1}{2}^{\circ}$ N. of the equator, and a small circle of the sphere parallel to the equator at $23\frac{1}{2}^{\circ}$ distant from it is called the Tropic of Cancer. The sun leaves this sign about July 22. The constellation Cancer is no longer in the sign of Cancer. At present it occupies the place of the sign Leo.

Cancer (derived from the Latin *cancer*, a crab), or **Carcinoma**, in medicine and surgery, a name which is given to a group of malignant diseases, in consequence of their supposed resemblance to a crab. They are heterologous in their composition, that is, they consist of a growth of substance not like any of the normal tissues, yet they may grow in almost any structure of the body. The cancerous growth is essentially a new product, and it never in any circumstances exists in a healthy system. It pos-

Cancer

sesses vital properties and an organization which are peculiarly its own. Cancer is regarded as to some extent hereditary. It is divided into five varieties, distinguished by the relative proportions of the cells and binding tissue, and of a fluid—the cancer juice—also present in the growth:

1. Scirrhus or hard cancer, in which the binding tissue predominates, is a disease only occurring in adult life. It is three times more common in women than in men. It often attacks the womb, but much more frequently the female breast. It is also of frequent occurrence in the stomach and liver, and when it invades these regions it is invariably fatal in a very short time. When scirrhus cancer attacks the female breast a small lump is at first detected, perhaps as large as a hazelnut. Slowly but surely it enlarges, and although at first the tumor can be moved about quite freely underneath the skin, as it grows it becomes adherent to the circumjacent tissue, and infiltrates itself through the neighboring structures. The skin becomes puckered and the nipple retracted, and if the disease is allowed to run its course the skin ulcerates, and an offensive discharge exudes. Soon the glands in the axilla become affected by the disease, and cancer may become deposited in other parts of the body, such as the lungs, liver, kidneys, etc. As the disease advances, the patient's health begins and continues to suffer, and, worn out by acute pain and the profuse discharge, she soon succumbs. This form of cancer kills in about four years. The only cure for this and all kinds of cancer is extirpation by the knife at an early stage of the disease before the neighboring glands have become affected.

2. Encephaloid, medullary, or soft cancer, in which the cellular structure prevails, is the most malignant variety of the disease. It is met with in many situations where scirrhus is unknown. It may occur at any age, and is often met with in very young children. It may show itself almost anywhere, but its favorite seats are the bones, the viscera, the testicle, the orbit and nasal cavities. It grows very rapidly, often attains an enormous size, and sometimes bleeds freely.

3. Colloid or gum cancer, is a disease of adult life. It is most frequently seen in the intestines, but it may occur in other parts. It is of slow growth.

4. Melanosis or black cancer is distinguished by the presence of pigment, which is scattered throughout the mass. In other respects it closely resembles the medullary variety. It grows very rapidly, and is soon fatal. It originates in some tissue containing pigment, such as the eye and skin, but soon it invades all tissues alike.

5. Epithelioma or skin cancer, consisting chiefly of flat cells like those of the skin, or of cells similar to those of glands, is that

Cancrum Oris

form of cancer which originates in the skin and mucous membranes. It occurs in the shape of an irregular ulcer, and advances slowly at first. For years it may remain inactive, making little or no progress. Then it may begin to grow more rapidly, and invade the surrounding and neighboring tissues. The pain, which before was occasional and trifling, now becomes constant and acute. The patient's health begins to suffer. Secondary deposits take place in other parts of the body. Epithelioma most frequently attacks the lips, the anus, the penis, etc., but it is not confined to these situations.

In the treatment of cancer, whatever be its variety, it is necessary to get the disease at an early stage of its growth, so that it may be thoroughly removed with the knife. If it is detected and removed at this period of its existence it is curable, but if the neighboring glands have become involved in the disease the relief is only temporary. Surgeons now rarely operate when the lymphatic glands have become involved, or in cases where the general health is very low.

Cancer Root, or Beech Drops (*Epiphegus virginiana*), a parasitic herb of the order Orobanchæ, a native of North America, growing on the exposed roots of beech-trees. The whole plant is powerfully astringent, and the root is especially bitter and nauseous. In conjunction with arsenious acid, it is believed to have formed a medicine once famous in North America under the name of Martin's Cancer-powder. Another American plant of the same order, *Phelipæa biflora*, sometimes shares the same name and repute in popular medicine; and an infusion of the Common Broomrape (*Orobanche major*)—a native of Great Britain and of the S. of Europe, parasitic on the roots of broom, furze, and other leguminous plants—has been employed as a detergent application to foul sores.

Cancrin, Georg, Count, a Russian general, statesman, and financier; born in Hanau, Prussia, Dec. 8, 1774. He served with distinction against the French (1812-1815); was Minister of Finance from 1823 to 1844; and wrote on military and economic subjects, his most noted work being "Military Economy in Peace and War." He died in St. Petersburg, Sept. 22, 1845.

Cancrum Oris (literally "sore in the mouth"), known also as NOMA, WATER-CANCER, and WATER-CANKER, a peculiar form of mortification, arising apparently from defective nutrition. The disease seldom occurs except between the 2d and 11th years, and is usually preceded by measles, remittent or intermittent fever, or some other serious disease. The most obvious indications of treatment are to remove the patient to pure air, to administer tonics, nourish-

Candace

ing food, and to touch the diseased parts with nitrate of silver or glyceride of carbolic acid and to wash out the mouth frequently with a weak solution of Condyl's fluid.

Candace, a name apparently common to the warrior queens of Ethiopia, *i. e.*, Upper Nubia, between the Nile and the Atbara, in the later period of the kingdom of Meröe. The most distinguished of them invaded Egypt 22 B. C., was defeated by the Romans and obliged to sue for peace, which she obtained, with a remission of the tribute imposed on her by Petronius. One of her successors is mentioned in Acts viii: 27; her high treasurer was baptized by Philip the Deacon on the road to Gaza.

Candahar. See KANDAHAR.

Candaules, a king of Lydia, who lost his throne and life through his besotted admiration of the beauty of the person of his queen, in 718 B. C.

Candeille, Amelie Julie (kon-dāy'), a French actress and composer; born in Paris, July 31, 1767. She wrote libretto and music of the very successful operetta, "The Beautiful Farmer." She died in Paris, Feb. 4, 1834.

Candelabrum, a lamp-stand. Its tripodal form among the ancients is believed to have been derived from the shape of its predecessors—braziers or basins for holding fuel, mounted on tripods. Among the Greeks and Romans they were highly ornamental, and made of bronze and marble. They survived in the branched sticks for the candles whereby halls and stately dinner-tables are illuminated.

Candia, or **Crete** (called in the most ancient times **IDÆA**, from Mount Ida, afterward **CRETA**, whence the Turkish name **KIRID**), one of the most important islands of the Turkish empire; situated in the Mediterranean, 81 miles from the S. extremity of the Morea, and 230 from the African coast; is 160 miles long, 7–35 broad, and contains 3,326 square miles. A high chain of mountains covered with forests runs through the whole length of the island, in two ranges. On the N. side it declines moderately to a fertile coast, provided with good harbors; on the S. side, steeply to a rocky shore, with few roadsteads, and reaches its greatest height in the lofty Psiloriti (the ancient Ida), 8,060 feet high, and always covered with snow. Mountain torrents, which are swollen in the winter and spring but almost dry in summer, conduct the waters to the sea. Numerous springs give fertility to most of the valleys, in which, and on the declivities of the mountains, is seen a luxurious vegetation. The air is mild; the summer is cooled by the N. winds; the winter is distinguished only by showers of rain. Earthquakes, however, are not infrequent. The island might, therefore,

Candia

be a most delightful residence, and supply, as formerly, a much larger population than at present. But agriculture is at a very low stage, while education and the amenities of civilized life are almost entirely absent. The principal products of the island are olive oil, wheat, oranges, lemons, silk, grapes, wine, valonia, carobs, and honey. The inhabitants (estimated at 1,200,000 in ancient times, or 900,000 in the time of the Venetians) are now about 309,250 of whom about a third are Mohammedans. Soap is extensively manufactured, and the exports comprise olive oil soap, wool, carobs, cheese, fruits, valonia, acorns, etc. Most of the harbors are silted up. The capital is Candia, or Megalokastron; Canea is the most important place of trade.

According to Homer, King Idomeneus sailed from this island to Troy, with 80 vessels. The Greek mythology made Crete the scene of many of the adventures of the gods and heroes. Here Saturn is said to have reigned, and afterwards Minos, 1,300 years before Christ. The island figures little in Greek history, and took no part in the wars with the Persians. It possessed a number of independent towns often at war with each other, but ready to combine against a stranger. The ancient Cretans had an evil reputation, and in particular were proverbial as liars. Crete was conquered by the Romans 67 B. C. In the year 823 it passed from the Roman emperors of the East to the Saracens, who built the capital, Candia, on the ruins of Heraclea, but were expelled again, in 961, by the Greeks. The Byzantine sovereign sold the island to the Venetians in 1204, who fortified most of the cities, won the good-will of their new subjects by a mild government, and repelled all the assaults of the Genoese and Turks till the middle of the 17th century. About this time the attacks of the Turks became more determined. They landed a large force in 1645, which soon took Canea and Retimo, and besieged the capital with vigor. The siege, the longest in modern history, lasted over 20 years. To assist the Venetians volunteers from all parts of Europe poured in. The Christians at last, thinned by slaughter and disease, their city in ruins, and its walls battered down, after having exhausted all means of defense, were compelled to surrender to the Turks, Sept. 27, 1669. At the time of the capitulation the garrison consisted of only 2,500 soldiers; 30,985 Christians and 118,754 Turks were killed or wounded during the siege. Having obtained possession of the capital, the Turks now endeavored to expel the Venetians from the strongholds which remained to them on the island, and before the expiration of the 17th century they had been successful in their efforts.

Three pashas, at Candia, Canea, and Retimo, now governed the island. On ac-

Candidate

count of the feuds of these pashas the inhabitants of the W. mountains succeeded in forming a government of their own, under Turkish protection. As the compacts made with them by the Turks were not always observed, they were wont in such cases to take up arms, and though they were often defeated they were never entirely subdued. The pashas having demanded hostages of them in 1821, they joined the Greek insurgents.

Had the mountaineers been armed when the Turks made their first descent on the island, it would probably have been impossible for the invaders to have maintained themselves in Candia, but as it was the island remained under Turkish rule. In 1868 a formidable insurrection, fomented by Greece, was with difficulty suppressed by the Turks, after a tedious conflict. In consequence of this revolt the Turks granted to the Cretans a certain degree of autonomy, but Turkish bad faith produced another revolt nine years later. At that time a new constitution of a parliamentary character was inaugurated, but many of its provisions were annulled in 1889. In 1896 there was again a rising against the Turks, in which, as before, the Greeks took part, one result being the outbreak of war between Greece and Turkey. The Greek troops landed on the island were withdrawn at the instance of the Great Powers, who undertook to secure an autonomous government under Turkish suzerainty and to cause the Turkish troops to be withdrawn. On Sept. 6, 1898, the Mohammedans of Candia rose against the Christians, and the fighting resulted in the death of many of the latter, including some British sailors. The leading powers at once demanded the complete withdrawal of the Turkish troops who had abetted the rebels, and ultimately, on Oct. 11, the sultan complied with their demand, the troops being soon after withdrawn. Shortly afterward Prince George of Greece was appointed high commissioner or governor of the island. There is now a national assembly elected by the people, and the island has received a regular constitution.

Candidate, a term taken from the Latin *candidatus*, a candidate, literally a person dressed in white, because, among the Romans, a man who solicited an office, such as the prætorship or consulship, appeared in a bright white garment—*toga candida*.

Candle, a light made of a wick of cotton or other material enveloped in prepared wax or tallow. Candles are primarily divided into dipped or mold candles, sometimes called dips and molds, according to the method of their manufacture. Named from the materials employed in their construction, they are paraffine, spermaceti, composition, stearine, tallow, palm-oil, or wax candles.

Candle Nut

Candleberry (*Myrica cerifera*), a shrub, natural order Myricaceæ, growing from 4 to 18 feet high, and common in North America, where candles are made from its drupes or berries, which are about the size of peppercorns, and covered with a greenish-white wax, popularly known as Blayberry tallow. The wax is collected by boiling the drupes in water and skimming off the surface. A bushel of berries yields from four to five pounds of wax. Another plant belonging to the same genus is the sweet-gale (*Myrica Gale*), which grows abundantly in bogs and marshes in Scotland—a small shrub, with leaves somewhat like the myrtle or willow, of a fragrant odor and bitter taste, and yielding an essential oil by distillation.

Candle Fish, a small fish peculiar to the Pacific coast of the United States. It is so oily that when dried and a wick is drawn through it, it will burn like a candle. It is allied to the Smelt family.

Candlemas, the feast of the Purification of the Blessed Virgin, Feb. 2d; so-called from being formerly celebrated with processions and shows of candles. It was instituted in the 6th century, during the reign of Justinian, and came in lieu of the Roman festival of Lupercalia, which had been also celebrated in the month of February, and with candles.

Candle Mold, a mold for making candles. The Sieur le Brez of Paris is said to have been the inventor of molding candles. At the present day, candle-molds are usually made of pewter or tin; in some cases glass has been employed. They may be inserted in a wooden frame, the upper part of which serves as a trough; or several molds may be permanently attached to a tin trough, the whole constituting a single mold. Each mold consists of a cylindrical tube having a conical tip, with a circular aperture through which the double wick is drawn, by means of a hooped wire, allowing the loop to project a little beyond the open end of the mold; while the other end of the wick projects beyond and closes the aperture in the conical tip. Sticks or wires are passed through the loops, their ends resting on the edges of the mold-frame. The mold is placed open end up, and the melted tallow poured into the trough by means of a ladle. When sufficiently hard, they are withdrawn by means of the wires or sticks passing through the loops.

Candle Nut, the nut of *Aleurites triloba*, a tree of India, the Moluccas, Pacific Islands, etc., natural order Euphorbiaceæ. It is about the size of a walnut, and yields an oil used for food and for lamps, while the oily kernels are also strung together and lighted as torches.

Candler

Candler, Warren A., an American clergyman; born in Carroll county, Ga., Aug. 23, 1857. He was graduated at Emory College in 1875, and was ordained to the Methodist ministry. He was pastor of various churches, and in 1888 was elected a bishop. He has been President of Emory College since 1888. He wrote: "History of Sunday Schools" (1880); "Christus Auctor" (1899); etc.

Candlish, Robert Smith, a Scotch clergyman; born in Edinburgh, March 23, 1806; was educated at Glasgow University. In 1828 he was licensed, and in 1834 transferred from Bonhill to St. George's, Edinburgh. In 1839 he threw himself into the conflict with the civil courts in the matter of congregational right of election and independent church jurisdiction in matters spiritual, and soon became, next to Chalmers, the most prominent leader of the "non-intrusion" party and disruptionists of 1843. After the death of Chalmers, Candlish was the ruling spirit in the Free Church. In 1862 he was made principal of the New College, Edinburgh. He was the author of "Contributions towards the Exposition of the Book of Genesis" (1842); "The Atonement, its Reality and Extent" (1845); "An Examination of Mr. Maurice's Theological Essays" (1854); "The Fatherhood of God" (1865), and an "Exposition of the First Epistle of St. John" (1874). He died Oct. 19, 1873.

Candolle, Alphonse Louis Pierre Pyramus de (kon-dol'), a Swiss botanist; born in Paris, Oct. 28, 1806; son of Augustin de Candolle. He was Professor of Botany and director of the Botanical Garden at Geneva, published numerous works on botanical subjects, and continued his father's "Introduction to a Natural System of the Vegetable Kingdom." He died, April 4, 1893.

Candolle, Augustin Pyramus de, a Swiss botanist; born in Geneva, Feb. 4, 1778. He studied at Paris, where he made his reputation by his "History of Succulent Plants," and "Essay on the Medicinal Properties of Plants." In 1808 he took the chair of botany at Montpellier, where he replaced the artificial method of Linnæus by the natural method of Jussieu, and published the remarkable "Elementary Theory of Botany." After the Restoration of 1815, he returned to Geneva, where he devoted the rest of his life to his great work, "Introduction to a Natural System of the Vegetable Kingdom," the continuation of which he entrusted to his son, together with an herbarium of 70,000 species of plants. He died Sept. 9, 1841.

Candy, or Kandy, a city of Ceylon, near the center of the island, 72 miles N. E. of Colombo (with which it is connected by railway, in a fertile valley surrounded by

Canes Venatici

finely-wooded hills. The residence of the governor at the N. E. extremity is among the finest structures in Ceylon. Other noteworthy places are the Buddhist temple, called "the palace of the tooth," the most sacred in the Buddhist world, the old royal cemetery, the military magazine in the center of a lake, the government brick-works, etc. Pop. (1901) 26,522.

Candy, an Eastern measure of weight, varying from 560 pounds up to above 800.

Candytuft, the popular name of several flowers of the genus *Iberis*, order Cruciferae, common in gardens: said to be named from Candia.

Cane, or Ken, a river in Bundeland, India, a tributary of the Jumna river. It follows a N. E. course and is about 250 miles in length.

Canea (Greek *Khania*), the capital and chief commercial town of Crete, situated on the N. W. coast, with a fine harbor. It occupies the site of the ancient Cydonia, but the present town is due to the Venetians, from whom it was wrested by the Turks after a two years' siege in 1669. Canea is the principal mart for exporting local productions. Pop. (1900) 24,537. See CANDIA.

Canebrake (*Ludolfia* (*Arundinaria*) *macrosperma*), a colossal reed, nearly allied to the bamboo, which reaches a height of 30 or 40 feet, and forms dense swamp-jungles (sometimes of wide area) in marshy places, and along the banks of the Red river, the Arkansas, the Mississippi, and their tributaries.

Canella, a genus of plants, belonging to the order Guttiferae, but of which the affinities are so doubtful that it has been made the type of a distinct order, Canellaceae. They are ornamental shrubs or trees. *Canella alba* is a common West Indian aromatic evergreen shrub. It is called also Wild Cinnamon.

Canephorus, one of the bearers of the baskets containing the implements of sacrifice in the processions of the Dionysia, Panatheneia, and other ancient Grecian festivals, an office of honor much coveted by the virgins of antiquity. The term is applied to architectural figures bearing baskets on their head, sometimes improperly confounded with Caryatides.

Canes Venatici (Latin "the Hunting-dogs," Asterion and Chara), one of the northern constellations added by Hevelius in 1690, between Boötes and Ursa Major. Coming in after the time of Bayer, it has none of his assigned letters; but Baily, in the "B. A. C." in 1845, assigned the letters *a* and *b* to the two brightest stars, and they will probably stand, though they have not been universally accepted by astronomers. The former of the two stars is a well-known

double. On the maps, the two dogs, Asterion and Chara, are represented as held in leash by Boötes, and pursuing Ursa Major and the celestial pole, but this change in the figure of Boötes has of course been made since the introduction of Canes Venatici into the celestial train. The constellation is surrounded by Ursa Major, Boötes, and Coma Berenices.

Canfield, James Hulme, an American educator; born in Delaware, O., March 18, 1847; spent his early life on a New England farm; was graduated at Williams College in 1868; and was engaged for several years in railroad building in Minnesota and Iowa. In 1872 he was admitted to the bar, and practised in St. Joseph, Mich., until 1877; in 1877-1891 he was Professor of History in the University of Kansas; and in 1891-1895 was Chancellor of the institution. He then became President of the Ohio State University. For five years he was secretary of the National Education Association. He became librarian of Columbia University in 1899. He died March 29, 1909.

Cang, Cangué, or Kea, the wooden collar, weighing from 50 to 60 pounds, and fitting closely round the neck, imposed upon criminals in China.

Caniapuscau (kan-ē-ap'us-kâ), a river in Labrador, outlet of a lake of the same name, flowing N. W. into Hudson Strait; length, 400 miles.

Canicatti, a town in Sicily, Province of Girgenti, well built, and with a population of 20,000, mostly engaged in agriculture.

Canicula, the dog-star or Sirius; hence Canicular days, the dog-days.

Canidæ, a family of mammals belonging to the order Carnivora, and the section Digitigrada. The muzzle is more or less pointed, the tongue smooth, and the claws non-retractile, the last-named character distinguishing it from the Felidæ. The fore feet have five toes each, and the hind ones four. Molar teeth, $\frac{6}{7}$ - $\frac{6}{7}$ or $\frac{7}{7}$ - $\frac{7}{7}$. The carnassial has a heel or process. It contains the dogs, wolves, foxes, and jackals. It is akin to the Hyænidæ. Canidæ have been found in the Eocene, but this may not have been the first appearance of the family in geological time. There are fossil as well as recent genera known.

Canidia, a sorceress, who could bring the moon from heaven. Mentioned by Horace.

Canigon (kâ-nē-gon'), one of the peaks of the Pyrenees in France. It is in the Department Pyrénées-Orientales, 24 miles from Perpignan; height, 9,137 feet.

Canina, Luigi (kâ-nē'nä), an Italian architect; born in Casale, Piedmont, Oct. 23, 1795; was for some time Professor of Architecture at Turin, and afterward lived in Rome, where he published works of great

value on the antiquities of Rome, Veii, Etruria, and Tusculum. He died in Florence, Oct. 17, 1856.

Caninde (kâ-nên'-dā), a river of Brazil, flowing into the Parnahiba; length, 200 miles.

Canisius College, an educational institution in Buffalo, N. Y.; organized in 1870 under the auspices of the Roman Catholic Church; reported at the end of 1900: Professors and instructors, 32; students, 285; volumes in the library, 23,000; scientific apparatus valued at \$10,000; grounds and buildings at \$342,000; income, \$20,452; President, Rev. John B. Theis, S. J.

Canis Major ("the greater dog"), a constellation of the Southern hemisphere, remarkable as containing *Sirius*, the brightest star.—**CANIS MINOR** ("the lesser dog") is a constellation in the Northern hemisphere, immediately above Canis Major, the chief star in which is *Procyon*.

Canities (Latin *Canus*, "hoary or gray-haired"), whiteness or grayness of the hair. When occurring in consequence of old age it is not a disease. Sometimes it happens suddenly, as a result of severe mental emotion. The causes are, however, not clear.

Canker, (1) in medicine, a collection of small sloughing ulcers in the mouth, especially of children; called also water canker. (2) In horticulture, a kind of gangrenous disease to which fruit-trees especially are liable, beginning in the younger shoots and gradually extending to the trunk. (3) In farriery, a disease in horses' feet causing a discharge of fetid matter from the cleft in the middle of the frog, generally originating in a diseased thrush.

Cankerworm, a worm or larva destructive to trees or plants; in America specifically applied to moths and larvæ of the genus *Anisopteryx*.

Canna, one of the Argyllshire Hebrides, 12 miles S. W. of Skye, and 3 N. W. of Rum. It is $4\frac{1}{2}$ miles long, 1 mile broad, and $4\frac{1}{2}$ square miles in area. The surface, nowhere higher than 800 feet, consists of trap. A hill here of basalt, called Compass Hill, reverses the magnetic needle.

Canna, a genus of plants belonging to, if not even typical of, the endogenous order Marantaceæ. They have beautiful red or yellow flowers. *Canna indica* is the Indian shot or Indian bead, a native of Asia, Africa, and America; it is common and in flower most of the year in Indian gardens. The seeds have been used as a substitute for coffee, and they moreover furnish a beautiful but not a durable purple. A kind of arrowroot is extracted in the West Indies from a species believed to be *C. Achiras*. The fleshy corms of some cannas are said to be eaten in Peru, and, according to Von

Martius, those of *C. aurantiaca glauca* and others are diuretic and diaphoretic, acting like orris-root.

Cannabinaceæ, hempworts, an order of plants of the Urtical alliance. They have a solitary suspended ovule, and a hooked exalbuminous embryo with a superior radicle. They inhabit the temperate parts of the Eastern hemisphere. Only two genera are known, *Cannabis*, or Hemp, and *Humulus*, or Hop.

Cannæ, a town of Southern Italy, Province of Bari, near the mouth of the Ofanto, formerly the Aufidus, famous as the scene of the great battle in which the Romans were defeated by Hannibal (216 B. C.) with immense slaughter.

Cannel Coal, a variety of bituminous coal, which differs from the purer kinds of ordinary coal, and jet, in containing extraneous earthy matters, which render it specifically heavier than water. It varies much in appearance, but is generally of a brown or black color, with a dull earthy to a brilliant waxy luster. It is very dense and compact, and not easily frangible, breaking with an uneven or largely conchoidal fracture, and does not soil the fingers. When burning, it splits and crackles, without melting, and leaves 3 or 4 per cent. of ash.

Cannes (kän), a seaport of France, on the shore of the Mediterranean, in the Department of Alpes-Maritimes; famous as a winter residence, and as the place where Napoleon landed when he returned from Elba, March 1, 1815.

Cannibalism, the act or practice of eating human flesh by mankind; anthropophagy. In the "Odyssey" of Homer we have the story of Polyphemus devouring human flesh; and in Herodotus, the Massagetæ (i: 216) are said to eat their aged parents. The Padæi of India (Herodotus iii: 99) were in the habit of killing and eating their relations when they fell ill; a story which some would reject with as little show of reason as others would believe it. Modern facts, the truth of which is put beyond all doubt, confirm the statements of Herodotus. Among the ancient Tupis of Brazil, when the Pajé (chief) despaired of a sick man's recovery, he was by his advice put to death and devoured. Herodotus (iv: 26) also says that among the Issedones, when a man's father dies, his relations come and help to eat the dead man, whose flesh they render more palatable by mixing it with that of some animal. In the Middle Ages, these stories were wonderfully enlarged, and people who had not yet embraced Christianity were pretty generally set down as anthropophagi. When the Lombards invaded Italy at the end of the 6th

century, it was reported of them that they ate human flesh; and a century later the same aspersions were cast on the Slavonian tribes. It became the fashion to bandy the accusation between enemies: thus, during the Crusades, the Saracens said the Christians ate human flesh, as well as the unclean flesh of swine; while the Christians on their side maintained that the Saracens ate men, women, and children, and were particularly fond of a sucking Christian babe torn fresh from the breast of its mother. The old travelers abound in stories of cannibalism, which we may almost invariably pronounce to be false. Few persons would now credit that the Indians and Chinese sold human flesh in the market, or that the Grand Khan of Tartary fattened his astronomers and magicians with the carcasses of condemned criminals; but the statements of Marco Polo regarding the Battas, a people of Sumatra, have been confirmed. When America was discovered, cannibalism was found to prevail to a very great extent, and as late as the year 1866 it is well known that two Brazilian officers exploring the Pachitea river were eaten by the natives. In many parts of Africa, cannibalism is systematically practised with some human flesh being regarded as a great delicacy, and even preferred to every other kind of food.

Canning, Charles John, Earl, an English statesman, son of George Canning; born Dec. 14, 1812; educated at Eton and Oxford. In 1841 he was appointed Under-Secretary of State for Foreign Affairs in Peel's government, and in 1846 Commissioner of Woods and Forests. In the Aberdeen ministry of 1853, and under Palmerston in 1855, he held the post-master-generalship, and in 1856 went out to India as Governor-General. Throughout the mutiny he showed a fine coolness and clear-headedness, and though his carefully-pondered decisions were sometimes lacking in promptness, yet his admirable moderation did much to reëstablish the British Empire in India. He was raised to the rank of Earl and made Viceroy, but returned to England with shattered health, and died in London, June 17, 1862.

Canning, George, an English orator and statesman; born in London, April 11, 1770; educated at Eton and at Oxford. He was first brought into Parliament by Pitt in 1793, and in 1796 became Under-Secretary of State. In 1797 he projected, with some friends, the "Anti-Jacobin," of which Gifford was appointed editor, and to which Canning contributed the "Knife-grinder" and other poems and articles. In 1798 he supported Wilberforce's motion for the abolition of the slave-trade. In 1807 he was appointed Secretary of State for Foreign Affairs in the Portland administration, and

was slightly wounded in a duel with Lord Castlereagh, arising out of the dispute which occasioned the dissolution of the ministry. In 1810 he opposed the reference of the Catholic claims to the committee of the whole House, on the ground that no security or engagement had been offered by the Catholics, but supported in 1812 and 1813 the motion which he had opposed in 1810. In 1814 he was appointed Minister to Portugal, and remained abroad about two years. He refused to take any part in the proceedings against the Queen, and in 1822, having been nominated Governor-General of India, he was on the point of embarking when the death of Castlereagh called him to the Cabinet as foreign Secretary. One of his earliest acts in this situation was to check the French influence in Spain. He continued to support the propositions in favor of Catholic emancipation, arranged the triple alliance for the preservation of Greece, but opposed parliamentary reform and the Test and Corporation Acts. April 12, 1827, his appointment to be Prime-Minister was announced. On all the leading political questions of his day, with two exceptions—the emancipation of the Catholics and the recognition of the South American republics—he took the high Tory side. He died in Chiswick, Aug. 8, 1827.

Canning, Sir Samuel, an English civil engineer, born in Wiltshire in 1823; is best known in connection with the laying of the Atlantic cables in 1865-1866 and 1869, and those in the Mediterranean and North Seas. He was knighted in 1866.

Canning Industry. According to the census of 1905 on manufactures there were in the United States 2,703 establishments engaged in the canning and preserving of fruits, vegetables, fish, and oysters. These were operated on a combined capital of \$70,082,076. The value of the products reported was \$108,505,471, to produce which involved an outlay of \$3,236,138 for salaries of officials, clerks, etc., \$14,238,170 for wages, \$8,590,984 for miscellaneous expenses, including rent, taxes, etc., and \$70,058,686 for various materials used, freight, and fuel. The canning and preserving of fruits and vegetables is by far the largest of the three branches of the industry. This branch had 2,261 establishments, operated on a capital of \$47,629,497, which employed 39,988 wage-earners, paid \$10,428,521 for wages and \$51,582,460 for materials, and had products valued at \$78,142,022. The canning and preserving of fish ranked second in importance, having 373 establishments, which employed \$19,853,016 capital and 6,959 wage-earners, paid \$3,241,740 for wages and \$15,885,354 for materials, and had products valued at \$26,377,210. The canning and preserving of

oysters was the smallest branch of the industry. It reported 69 establishments, \$2,599,563 capital, 3,291 wage-earners, \$547,909 paid for wages and \$2,590,872 for materials, and a product valued at \$3,986,239.

During the fiscal year ending June 30, 1910, there were exported from the United States 63,860,696 pounds of canned salmon, valued at \$6,314,258; canned oysters to the value of \$594,066; canned fish other than salmon to the value of \$240,389; canned or preserved fruit to the value of \$2,656,019; and canned vegetables to the value of \$782,973. In the same period the United States imported canned or preserved fish and fish products to the value of \$13,835,968.

Cannon. See ORDNANCE.

Cannon, George Q., an English legislator; born in Liverpool, England, Jan. 11, 1827; removed to the Salt Lake Basin, where he became a prominent Mormon leader. He was a member of the Legislative Council of Utah in 1865-1866 and 1869-1872, and was a delegate to Congress from 1865 to 1881. At a Constitutional Convention at Salt Lake City in 1872 he was chosen to present the constitution and memorial to Congress for the admission of the Territory into the Union as a State. He translated the "Book of Mormon" into the Hawaiian language. He died in Monterey, Cal., April 12, 1901. His son, Frank J. Cannon, was elected one of the first two United States Senators from Utah in 1896.

Cannon, Joseph G., an American lawyer; born in Guilford, N. C., May 7, 1836. He removed to Illinois, and was admitted to the bar there. He was State Attorney in 1861-1868; was elected to the 43rd Congress (1873-1875) as a Republican, and with the exception of the session of 1891-1893 afterward held the seat by reelections. He was Speaker, 1903-1911.

Cano, Alonso, a Spanish painter, sculptor, and architect, called the Michael Angelo of Spain, born in Granada, March 19, 1601. He first made himself known by his statues for the great church of Lebrija, and was in 1638 appointed painter to the King. His wife having been murdered by a servant or pupil, he was suspected and put to torture; but his right arm was spared from respect for his talents. He afterward became a priest, and was made a *racionero* (resident) of Granada, where he passed the remainder of his life. He died in Granada, in 1667.

Cano, Juan Sebastian del, a Spanish navigator, born in Guetaria, Guipuzcoa, about 1460. He was one of the first to circumnavigate the globe (1522), as captain of one of Magellan's fleet, which he afterward commanded. In 1525 he was placed second in command of a similar expedition and became its commander by the death of

Loaisa. He died on the Pacific, Aug. 4, 1526.

Canoba, the Indian Apollo, or god of inspiration.

Canoe, a boat made of a hollow trunk of a tree, or of the bark shaped and strengthened. Canoes have been made large enough to carry 20 or 30 hogsheads of sugar. Some have decks, and carry sail of rush or silk-grass; but they are generally open boats, propelled by paddles. They are seldom wide enough for two men to sit abreast, but vary greatly in length. Greenland Canoes or kayaks, are often made of light wooden frames covered with seal-skins, which are also drawn across as a deck, with only a hole left for one man to sit in it. During the last 20 years there has been a new and extensive use and development of the craft. The Canoe has become civilized, and is, in effect, a small yacht, capable of making extended cruises wherever there is water a few inches deep and under all conditions practicable or safe for any small boat. Mr. MacGregor, an adventurous Englishman, may be styled "the father of the modern Canoe." He conceived the idea of constructing a boat that should combine the lightness and seaworthy qualities of the Indian bark canoe and the Greenland kayak, with the structural finish and strength furnished by a modern boat-builder. The "Rob Roy" was the outcome of this aim, in which Mr. MacGregor made long voyages up the Jordan and the Nile. Since that time canoeing has become a recognized sport, and many better models have been produced, among which may be named the "Nautilus," the "Shadow," the "Pearl," etc. The Canoe is usually decked over except in the middle, and under a portion of the decked space are water-tight compartments that contain sufficient air to keep the boat afloat in case of accident. These are made of sheet-copper or other non-rusting metals. Such, in its simplest form, is the modern Canoe. The equipments and fittings in common use are so numerous and elaborate that they cannot here be enumerated; but it should be said that one object of the Canoe is to provide a sleeping-place for her owner when camping. Canoes are built to carry sails, and with center-boards to counteract the drift to leeward of a shallow boat when "on a wind." Some of these models carry upward of 150 square feet of sail, and are very fleet. There are many Canoe clubs in the United States and in England, and the Canoe may be seen on all the coast-wise and inland waters of the United States and Canada.

Canon, in its original sense, a cane or reed used as a measure or rule. Specifically, a law or rule in general.

In ecclesiastical history a canon is a book containing the rules of a religious order

used in monastic institutions. A list or catalogue of the canonized saints of the Roman Catholic Church. A dignitary of the Church; one who possesses a prebend, or revenue allotted for the performance of divine service in a cathedral or collegiate church. Canons were of various kinds; as, cardinal canons, domiciliary canons, expectative canons, foreign canons, lay or residentiary canons, tertiary canons, and regular and secular canons. The order of regular canons of St. Augustine was spared at the time of the Reformation, and it continues in the Anglican Church to the present day. They are still nominally what they once actually were—the council of the bishop for the administration of the affairs of his diocese—and they constitute the chapter of the body known as the Dean and Chapter.

In music a Canon is a vocal composition consisting of two, three, or four parts, in which the several voices begin at fixed intervals consecutively; sometimes each voice commences with the same, sometimes with different notes. Canons may be finite or infinite; the former end, like other compositions, with a cadence, while in infinite canons the theme is begun again before the parts which follow are concluded. They are so constructed as to form a perpetual fugue, but differ from ordinary fugues; for in the latter it is sufficient for the subject to be repeated occasionally according to the laws of counterpoint, while in the former it must be strictly repeated by all the succeeding parts. In ancient music, Canons were rules for determining the intervals of notes. Among the ancient Greeks this term signified what is now called a monochord.

In printing, canon is a kind of large type so called from its early use in printing the canon of the mass and the service-books of the church.

Cañon (kā-nyōn'), the Spanish word for tube, CANON TYPE. funnel, cannon; applied by the Spanish-Americans, and hence in North America generally, to long and narrow river gorges or deep ravines with precipitous and almost perpendicular sides, occurring frequently in the Rocky mountains, the Sierra Nevada, and great western plateaus of North America. The anglicized pronunciation is *kān yān*, and the spelling *canyon* is much used.

Canoness, a lady holding a similar position to a canon. Canonesses still exist in Germany.

Canonical Books, the books of Scripture belonging to the canon.

Canonical Hours, certain stated times of the day appropriated by ecclesiastical law to the offices of prayer and devotion in

Aa

the Roman Catholic Church, viz., matins with lauds, prime, tierce, sext, nones, even-song or vespers, and compline.

Canonicals, the dress or vestments of the clergy.

Canonization, a ceremony in the Roman Church, by which deceased persons are declared saints. The Pope institutes a formal investigation of the miraculous and other qualifications of the deceased person recommended for canonization; and an advocate of the devil, as he is called, is appointed to assail the memory of the candidate. If the examination is satisfactory, the Pope pronounces the beatification of the candidate, the actual canonization generally taking place some years afterwards, when a day is dedicated to his honor, his name inserted in the canon or Litany of the Saints in the Mass, and his remains preserved as holy relics.

Canon-law, the body of ecclesiastical law as laid down by the canons.

(1) *Before the Reformation*: A community, civil or religious, no sooner comes into existence than it requires rules for its government, and those first formed require to be modified and developed and added to during the whole period that the community exists. Hence the first germs of the Canon-law are to be sought for in apostolic times, while its complete development took place at the period when the power of the papacy reached its height. The oldest canons are called Apostolic canons. The canons of the Councils of Nice (A. D. 325), Constantinople (A. D. 381), Ephesus (A. D. 431), and Chalcedon (A. D. 451), obtained civil sanction by decree of Justinian. Till the 12th century the Canon-law consisted mainly of these canons collected together with the capitularies of Charlemagne and the decrees of the Popes, from Siricius, A. D. 398, to Athanasius IV., A. D. 1154. In A. D. 1114, Ivo, Bishop of Chartres, commenced to collect the decrees made by popes and cardinals; Gratian, a Benedictine monk, methodized the collection, and published it in 1150. There followed the Decretals of Gregory IX., in A. D. 1234. Next came the "Sext" of Boniface VIII., A. D. 1298; the Clementines or Constitutions of Clement V., A. D. 1308, and the Extravagants of John XXII., A. D. 1317. These, with some more recent "Extravagants," constitute the "Corpus Juris Canonici" (The Body of Canon Law). Some lawyers graduated in canon and others in civil law, while not a few did so in both. As the fully-developed Canon-law greatly exalted the ecclesiastical over the civil power, it was never very cordially accepted by the English Parliament, and there was a national Canon-law composed of legatine and provincial constitutions.

(2) *Since the Reformation*: By 25 Hen. VIII., c. 19, repealed by 1 Phil. and Mary, c. 8, but reenacted by 1 Eliz., c. 1, a revision of Canon-law was ordered, and only those parts of it were left binding which were not repugnant to the common or statute law. In the 27th year of Henry VIII., degrees in Canon-law were abolished, not however by Parliament, but by mandate. In 1603, under James I., certain ordinances analogous to canons were enacted by the clergy, but never received the sanction of Parliament. It has therefore been adjudged that where they introduce anything new they are not binding on the laity.

Canon of Scripture, the term canon, as applied to the Scriptural writings, has been taken with various significations. At one time it expressed simply a catalogue of church belongings; at another, it was interpreted to denote an authorized specification of all holy books, appointed to be publicly read. Later, it was narrowed in its application to those inspired writings recognized by Christian believers.

Canopic Vases, vessels found in Egypt, which were placed in tombs and contained the embalmed intestines of the dead.

Canopis, an Egyptian god, who overcame the Chaldean god, Ignis, by water.

Canopus, an ancient Egyptian city, between Alexandria and the western mouth of the Nile, once the chief harbor of the Delta. It had a popular temple of Serapis.

Canopus, or **Canobus**, a bright star of the first magnitude, belonging to the Southern constellation Argo, and invisible in the North or Middle parts of the United States, on account of its nearness to the South Pole.

Canosa (kan-ō'sa), (ancient Canusium), a town of Southern Italy, Bari, near the Ofanto, 15 miles S. W. of Barletta. The old city, said to have been founded by Diomed, or in a period antecedent to the records of Roman history, was in ancient times one of the most considerable cities in this part of Italy for extent, population, and magnificence. It reached the acme of its prosperity under Trajan. It was reduced to its present condition by disasters inflicted on it by the Goths, Saracens, and Normans. Pop. (1901) 24,230.

Canossa (kan-os'ä), a ruined castle near Reggio, Italy, interesting for its historical associations. The Emperor Henry IV., excommunicated by Gregory VII., humbly waited for three days in its courtyard bareheaded, barefooted, and fasting, until the Pope reversed his decision.

Canova, Antonio (ka-nō'va), an Italian sculptor, born in Possagno, Nov. 1, 1757. He was first an apprentice to a statuary in Bassano, from whom he went to the Academy of Venice, where he had a brilliant

career. In 1779 he was sent by the senate of Venice to Rome with a salary of 300 ducats, and there produced his Theseus and the Slain Minotaur. In 1783 Canova undertook the execution of the tomb of Pope Clement XIV. in the Church of the Apostles, a work in the Bernini manner, and inferior to his second public monument, the tomb of Pope Clement XIII. (1792), in St. Peter's. From 1783 his fame rapidly increased. He established a school for the benefit of young Venetians, and amongst other works produced his group of "Venus and Adonis," the "Psyche and Butterfly," a "Repentant Magdalene," the well-known "Hebe," the colossal "Hercules hurling Lichas into the Sea," the "Pugilists," and the group of "Cupid and Psyche." In 1796 and 1797 Canova finished the model of the celebrated tomb of the Archduchess Christina of Austria, and in 1797 made the colossal model of a statue of the King of Naples executed in marble in 1803. He afterwards executed in Rome his "Perseus with the Head of Medusa," which, when the "Belvidere Apollo" was carried to France, was thought not unworthy of its place and pedestal. In 1802 he was invited by Bonaparte to Paris to make the model of his colossal statue. Among the later works of the artist are a colossal Washington, the tombs of the Cardinal of York and of Pius VII.; a "Venus Rising from the Bath"; the colossal group of "Theseus Killing the Minotaur"; the tomb of Alfieri; the "Graces Rising from the Bath"; a "Dancing Girl"; a colossal "Hector"; a "Paris," a "Mars and Venus," etc. After the second fall of Napoleon, in 1815, Canova was commissioned by the Pope to demand the restoration of the works of art carried from Rome. He went from Paris to London, and returned to Rome in 1816, where he was made Marquis of Ischia, with a pension of 3,000 scudi. He died in Venice, Oct. 13, 1822.

Canovas del Castillo, Antonio (kā'nō-vās del kās-tēl'yō), a Spanish statesman and man of letters; born in Malaga, Feb. 8, 1826; was editor of the Conservative journal "Patria," and in 1854 entered the public service as member of the Cortes; thereafter he held various posts in the government. At his death he had been for some years prime minister. He is author of "Literary Studies" (2 vols., 1868); "History of the Austrian Dominion in Spain" (1869); "Problems of the Time" (2 vols., 1884); "Studies on the Reign of Philip IV." (3 vols., 1888-1890). He was editor-in-chief of a "General History of Spain," consisting of monographs by sundry writers, of which the first volume appeared in 1890. He was assassinated at the baths of Santa Aqueda, Aug. 8, 1897.

Cano y Masas, Leopoldo (kā'nō ō mäs'ās), a distinguished Spanish poet and dramatist, born in Valladolid, Nov. 13, 1844. He graduated from the Spanish Military Academy at Madrid (1865), and was appointed professor of analytical and descriptive geometry there in 1867, retiring in 1885. His first comedy was "Laurels of a Poet" (1852). His many other plays include: "The Code of Honor"; "Modern Idolatry," and "The Death of Lucretia." He is the author of a volume of poems, "Arrows."

Canrobert, François Certain (kān-rō-bār'), Marshal of France, born at St. Cere in Lot, June 27, 1809, studied in the military academy of St. Cyr, and in 1828 entered the army. He had seen close upon 20 years' brilliant service in Algeria, and had actively supported the future emperor at the *coup d'état* of 1851, when in January, 1853, he received the rank of a general of division. As such he commanded the first division of the French army under Marshal St. Arnaud, sent to the Crimea in 1854; and at the battle of the Alma was wounded in the breast and hand by the splinter of a shell. On St. Arnaud's death, nine days later, Canrobert assumed the chief command of the French army. According to Kinglake, he deliberately retarded the progress of operations, let slip many opportunities, and hampered the English—his object therein being to forward Napoleon's plan of himself coming out to head a final and victorious campaign. In the war in Italy against the Austrians (1859) Canrobert had the command of the third division of the French army, and at the battles of Magenta and Solferino his *corps d'armee* was engaged. In the Franco-German war of 1870 he was shut up in Metz with Bazaine, and became a prisoner in Germany. He was an ardent Imperialist till the death of the Prince Imperial (1879). In 1876 he became a member of the Senate. He died Jan. 28, 1895.

Canso, Cape, the E. extremity of Nova Scotia, at the entrance of Chedabucto Bay. Canso Strait, a passage 17 miles in length and 2½ in average breadth, separates Nova Scotia from the island of Cape Breton.

Cantabile (kan-tab'i-le), in music, a term applied to movements intended to be performed in a graceful, elegant, and melodious style.

Cantabri, the rudest and most valiant of all the old Iberian tribes anciently inhabiting the N. mountains of Spain.

Cantabrian Mountains, the general name of the various mountain ranges extending from the Western Pyrenees along the N. coast of Spain to Cape Finisterre.

Cantacuzenus (kan-ta-kō-zē'nus), a Greek princely family. (1) JOHANNES

Cantacuzenus

CANTACUZENUS was a noted soldier and statesman of the Byzantine empire in the reigns of Andronicus II. and III., the latter of whom in 1341 left him guardian and prime minister of his son, Johannes V., then nine years old. Cantacuzenus, however, proclaimed himself the child's colleague, Oct. 26, 1341, and after a five years' civil war secured his recognition, as well as the marriage of one daughter to the young emperor, and of another to the Sultan Orchan, whose help had been necessary to him. A second war, during which the Turks occupied Gallipoli, caused his retirement in 1355 to a monastery, where he died in 1383. He wrote a history of his time, and a defense of Christianity. (2) **MATTHIAS**, his son, was also made a colleague in the empire in 1353, and on his father's abdication began a war which ended two years later in



CANTERBURY CATHEDRAL.

his own deposition. He, too, died in 1383. (3) His brother **MANUEL** (died 1380) was governor of Peloponnesus from 1348, and was recognized as despot of Misithra by Johannes V.; he did much to encourage the immigration of the Albanians into the depopulated Morea. The family was notable among the Fanariots, and in later years a Russian branch supplied several brave and successful leaders to the cause of Greek independence.

Cantal, a central department in France, area 2,229 square miles; capital, Aurillac.

Canterbury

This department, formerly part of Upper Auvergne, is named from its highest mountain, the Plomb du Cantal, 6,094 feet in height. The greater part of it, occupied by the Cantal mountains and highlands, furnishes only timber, archil, and pasture. It is watered by numerous rivers, the principal of which are the Dordogne, Cère, and Lot. The principal crops are rye, buckwheat, potatoes, chestnuts, hemp, and flax. Cattle, sheep, pigs, horses, and mules are reared in large numbers. Large quantities of cheese ("Auvergne cheese") are made. Hot mineral springs are abundant. Pop. (1906) 228,690.

Cantarini, Simone (kan-tar-ē'nē), also known as **IL PESARESE**, an Italian painter, born in Pesaro in 1612, studied under Guido Reni at Bologna, where he afterwards painted a large number of pictures, all much in the style, but without the grace and delicacy, of his master's work. His 37 etchings more closely resemble those of Guido. Throughout his life Cantarini's intolerable arrogance made him numerous enemies; and after a quarrel with his chief patron, the Duke of Mantua, he died in Verona in 1648.

Cantata, a poem or dramatic composition set to music, with solos and choruses. A cantata consisted originally of a mixture of recitative and melody, and was given to a single voice, but the introduction of choruses altered the first character of the cantata, and gave rise to some confusion in the manner of describing it.

Canteen, in military language, a regimental establishment managed

by a committee of officers, in barracks or forts, for the sale of liquors, tobacco, groceries, etc., to the soldiers at reasonable prices. The profits are employed for the benefit of the soldiers themselves. The word is also applied to a flat can or metallic bottle used by soldiers for carrying drinking water.

Cantemir, Prince Antiochus. See **KANTEMIR**.

Canterbury, a city and parliamentary and municipal borough of England in Kent, 55 miles S. E. of London, giving name to

Canterbury

an archiepiscopal see, the occupant of which is primate of all England. The Roman name was Durovernum, and the place was of early importance. Its present name is a modification of the Saxon Cant-wara-byrig, the Kentishmen's city. The foundation of the archiepiscopal see took place soon after the arrival of St. Augustine in 596. In the 8th, 9th, 10th, and 11th centuries the city was dreadfully ravaged by the Danes, but at the Conquest its buildings exceeded in extent those of London. The ecclesiastical importance of the place was consummated by the murder of Thomas à Becket in the cathedral, the priory and see benefiting by the offerings of devotees and pilgrims at his shrine. Henry VIII. dissolved the priory in 1539, and ordered the bones of Becket to be burned; and the troopers of Oliver Cromwell made a stable of the cathedral. The city is beautifully situated in a fertile vale, on the river Stour. Small portions of the old walls and one of the old gates still remain. The cathedral, one of the finest ecclesiastical structures in England, 530 feet in length and 154 in breadth, has been built in different ages, the oldest part dating from about 1174. The great tower, 235 feet in height, is a splendid specimen of the Pointed style. Other ecclesiastical buildings are St. Augustine's monastery, now a church missionary college, St. Margaret's church, and the church dedicated to St. Martin, believed to be one of the oldest existing Christian churches. The old archiepiscopal palace is now represented by a mere fragment, and the archbishops have long resided at Lambeth. Canterbury has a royal grammar-school, founded by Henry VIII., numerous other schools, art gallery, etc. There are breweries and malting establishments; and the principal articles of trade are corn and hops. There are extensive barracks for cavalry and infantry. Pop. (1901) 24,868.

Canterbury, a district occupying most of the center of South Island, New Zealand, with a coast line of 200 miles, and a greatest breadth of about 150 miles. The W. part is traversed by mountains, from which a fertile plain of 2,500,000 acres slope gradually down to the sea. Banks' Peninsula is a projection on the E. coast, consisting of an assemblage of densely-wooded hills, and containing several harbors. The famous "Canterbury Plains," extending along the coast, are admirably adapted for agriculture, while the interior is fine pastoral country, though, except near the highlands, very destitute of trees. Its considerable mineral resources are as yet not well developed, though some coal—of which there are large beds—is raised. The chief places in the province are Christchurch, the capital; and Lyttelton, the port town, 8 miles from Christchurch. Pop. (1906) 159,106.

Canton

Canterbury=bell, a name given to species of *Campanula*, *C. medium* and *C. trachelium*.

Canthoplasty (Gr. *kanthos*, "the angle of the eye," and *plastikos*, "formative"), the formation by plastic operation of the angle of the eye, an operation proposed by Ammon when the eyelids are not sufficiently cleft, or when the eyelids produce tension on the eyeball, as in inflammatory processes.

Cantharis (pl. can-thar'-i-des), the Spanish-fly or Blister Beetle-fly, *Cantharis vesicatoria*, a coleopterous insect, the typical one of the family *Cantharidæ*. They are collected principally in Hungary, Russia, and the south of France, and are imported in cases of 100 to 175 pounds weight. In several parts of England they have become so naturalized as to be almost native. They are about eight lines long; the elytra are a fine green color. They have a disagreeable odor and a burning taste, and contain a crystalline substance, Cantharidine.

The insects described above are externally used as a rubefacient in the form of a liniment, also as a vesicant in the form of the common blister. They are applied to diseased and painful joints, also in cases of pleuritis, pericarditis, pneumonia, and other internal inflammations. Internally they are given in chronic affections of the nervous system, especially of the spinal cord. They have also a diuretic action. They have, among the ignorant, acquired a great reputation as an aphrodisiac. But if they have such an effect it is (outside of their diuretic action) simply irritation, which will result in stranguery and inflammation. They should never be administered except by a physician.

Canticle, certain detached psalms and hymns used in the service of the Anglican Church, such as the *Venite exultemus*, *Te Deum laudamus*, *Benedicite omnia opera*, *Benedictus*, *Jubilate Deo*, *Magnificat*, *Cantate Domino*, *Nunc dimittis*, *Deus misereatur*, and the verses used instead of the *Venite* on Easter day. The word is also applied to that book of the Old Testament also known as the "Song of Solomon."

Cantelever, or **Cantilever**. See BRIDGES.

Canto Fermo, plain-song or choral song in unison or octave and the notes all of one length; the grave, measured chant of the ancient Church.

Canton, a small division of territory, constituting a distinct state or government, as in Switzerland.

Canton, called also YANG-CHING (*i. e.*, "city of rams"), a large commercial city and port in the south of China, and capital of the province of Kwang-tung (of which the name Canton is merely a corruption), on the N. or left side of the Shu-kiang, or Pearl

river, in a rich alluvial plain, 70 miles N. of Macao and 90 N. W. of Hong-kong. The Pearl river is the estuary of the same stream that higher up is called Boca Tigre, or Bocca Tigris. Farther up still, the stream is known as the Canton river; and this is but the chief channel by which the united waters of the Si-kiang and the Pe-kiang rivers reach the sea through the delta. The city is surrounded by walls partly brick, partly sandstone, 25 to 40 feet high, 20 feet thick, with an esplanade inside, 6 miles in circumference; and it is divided by a partition wall running E. and W. into two unequal parts, the N. or old city, much the larger, and the S. or new city. There are 12 outer gates, four gates in partition wall, and two water gates, shut and guarded by night. The entire circuit, including suburbs, is nearly 10 miles. Among the names of the gates are Great Peace Gate, Eternal Rest Gate, etc. At the S. W. corner of the suburbs S. of the river, are the Hongs or European quarter, divided from the river by a quay, 100 yards wide, called Respondentia Walk. The streets, more than 600, are in general less than 8 feet wide, and very crooked. The houses along the water-side are built on piles and subject to inundations. Ancient barricades inclose each street, and in the principal streets night-watchmen in watch-towers proclaim the hours and sound fire alarms.

There are two pagodas, the "Plain Pagoda," erected more than 10 centuries ago, 160 feet high, and an octagonal nine-storied pagoda, 175 feet high, erected more than 1,300 years ago; and 124 temples or Joss-houses. The Honam temple, one of the largest in Canton, covers with its grounds, 7 acres, and has 175 priests attached. The "Temple of Filial Duty" has 200 priests, supported by 3,500 acres of glebe-lands. The priests and nuns in Canton number more than 2,000, nine-tenths of them Buddhists. The "Temple of Five Hundred Genii" has 500 statues of various sizes in honor of Buddha and his disciples. Examination Hall, in the old city, is 1,330 feet by 583 feet, covers 16 acres, and has 8,653 cells. There are also in Canton four prisons, 14 granaries, a handsome English church, 14 public schools, and 30 colleges, a foundling hospital, an English and an American missionary hospital. Nearly half the craft on the river are fixed residences, and the population on land and water can hardly be less than a million and a half. The climate of Canton may be pronounced healthy. The average temperature ranges from 42° to 96° F.; though a fall of snow occurred in 1835, and again in 1861. There are fogs in February and March. From October to January the temperature is agreeable, the sky clear, the air invigorat-

ing. The average rainfall is 70 inches annually.

The admirable situation of Canton, connected by three rivers with the whole province, E., N., and W., and to the W. with the distant interior of China, and commanding a safe and commodious anchorage for the largest vessels, explains how, from an early period, it was a favorite port with foreign merchants. The earliest notices date back to two centuries B. C. In 700 A. D. a regular market was opened and a collector of customs appointed. The Arabs made regular voyages hither as early as the 9th century. The Portuguese found their way to it in 1517, and were followed by the Dutch a hundred years later. These in turn were overtaken and supplanted by the English before the close of the 17th century, and an immense trade was carried on by the agents of the East India Company. Their monopoly ceased on April 22, 1834. Since that date the proceedings of the Canton government officers have originated two wars with the British. The city was captured by the allied French and English forces, December, 1857, and continued to be garrisoned by them till October, 1861. After the treaty of Nankin (signed Aug. 29, 1842), Canton was known as one of the five treaty ports, with Amoy, Foochow, Ningpo, and Shanghai. Foreign commerce, however, is still hampered in many ways in Canton. The lekin duties press most heavily on foreign merchants; ocean steamers have been compelled to discharge their cargo at Whampoa; and the general insecurity of property renders it necessary that every shop which contains anything of value should be barricaded at dusk, so that it could stand a siege: at sunset business must stop.

The chief exports from Canton are tea, silk, sugar, and cassia; the chief imports, cotton, woolen and metal goods, food-stuffs, opium, kerosene, etc. The value of the exports is about £4,000,000 a year; that of imports varies from £3,000,000 to £3,500,000. These figures represent only the movements through the foreign customs, and do not include the comparatively enormous trade with Hong-kong by junk. Of upwards of 3,000 vessels, with a tonnage of 2,500,000, that annually visit the port, four-fifths are British. The population of the city, which was ravaged by the plague in 1894 (as was also Hong-kong), is stated at 1,800,000, although estimates in 1900 placed it at over 2,000,000.

Canton, village and county-seat of St. Lawrence county, N. Y.; on Grass river, and the Rome, Watertown and Ogdensburg railroad, 59 miles N. E. of Watertown. It is the seat of St. Lawrence University, and has large flour and lumber interests, a National bank, weekly newspapers, several

churches, and an assessed property valuation of over \$3,000,000. Pop. (1890), 2,580; (1900), 2,757.

Canton, city and county-seat of Stark county, O.; on Nimishillen creek and the Pennsylvania, the Baltimore and Ohio, and the Cleveland, Canton and Southern railroads; 60 miles S. of Cleveland. It is in a fine wheat-growing district, with coal, limestone, and pottery clay in the vicinity, and was for many years the residence of President McKinley.

Business Industries.—Canton is a manufacturing city of considerable importance. According to the Federal census of 1900 there were 502 manufacturing establishments with \$10,094,813 capital and 7,017 hands, and products aggregating \$12,258,427 in value. The principal industries were the manufacture of agricultural implements, brick and tile, foundry and machine shop products, iron bridges, steel goods, and stoves. There are two National banks with a combined capital of \$400,000 and surplus of \$62,000, besides several State and savings banks. The assessed property valuation in 1900 exceeded \$13,000,000.

Public Interests.—Canton has an electric light and street railway system, and well-paved streets. The notable buildings are the postoffice, high school, public library, the United States Signal Service station, and several churches. In 1899 there were 13 public school buildings, with 124 teachers and 5,751 scholars, and public school property valued at \$544,000, a high school, and a boarding school for girls. Pop. (1900) 30,667; (1910) 50,217.

Canton, John, English electrician, born in Stroud, July 31, 1718, settled as a schoolmaster in London, and was elected a Fellow of the Royal Society in 1749. He invented an electroscope and an electrometer; originated experiments in induction; was the first to make powerful artificial magnets; and in 1762 demonstrated the compressibility of water. He died March 22, 1772.

Cantonment, quarters for soldiers. Troops during prolonged operations, when not in close proximity to the enemy, and not in regular camp or bivouac, are often distributed among villages, which are then called cantonments.

Cantons, Lake of the Four Forest. See LAKE OF THE FOUR FOREST CANTONS.

Cantons, the Four Forest. See FOUR FOREST CANTONS.

Canton River. See CHUKIANG.

Cantu, Cesare (kän-tö'), an Italian historian; born in Brivio, Lombardy, Dec. 2, 1805. Imprisoned for political causes in 1833, he employed his leisure in writing a historical romance, "Margherita Pusterla" (1838), one of the most successful of modern Italian romances; it gives a

graphic picture of prison life. He wrote numerous historical and biographical works; his "Universal History" (35 vols.) has passed through several editions, and has been translated into other languages. He died near Milan, March 11, 1895.

Cantyre (kan-tir'), or *Kintyre*, a peninsula of Scotland, between the Firth of Clyde and the Atlantic, forming the division of Argyleshire. It is 40 miles long from the Isthmus of Tarbet to the Mull of Cantyre in the S. W., and has an average breadth of about 7 miles.

Canute, or **Cnut** (ka-nüt', knut), King of England and Denmark, succeeded his father Swegen or Sweyn on his death in England in 1014 A. D., and confirmed the Danish power in England. He began by devastating the E. coast, and extended his ravages in the S., where, however, he failed to establish himself until after the assassination of Edmund Ironside, when he was accepted king of the whole of England (1017). Canute, who began his reign with barbarity and crime, afterwards became a humane and wise monarch. He restored the English customs at a general assembly, and ensured to the Danes and English equal rights and equal protection of person and property, and even preferred English subjects to the most important posts. His power was confirmed by his marriage with Emma, Ethelred's widow. At Harold's death in 1018 he gained Denmark; in 1028 he conquered Norway; and in 1031 he made Malcolm of Scotland admit his superiority. Sweden also was vassal to him. He died in 1036 at Shaftesbury, leaving Norway to his eldest son, Sweyn; to the second, Harold, England; to the third, Hardicanute, Denmark.

Canvas, a kind of coarse, unbleached linen cloth, used in old times for sifting, now for sails, tents, paintings, etc. Canvas for sails is made from 18-24 inches wide, and numbered 0-8, No. 0 being the thickest. A bolt is 39-40 yards long, and weighs 25-48 pounds.

Canvas-back, a species of duck, *Fuligula* or *Aythya valisneria*. It is a great favorite with hunters in the United States. It lives mainly on a species of wild celery, which makes its flesh a great delicacy. It derives its name from the speckled feathers on the back.

Canzona, or **Canzone** (kän-tsō'na) a short song, in which the music is of much more importance than the words. It is one of the ancient forms of measured melody, and when the older writers employed it, it was usually made the vehicle for the display of skill and contrivance in the treatment of the phrases in fugal imitation. A secondary meaning of the word, scoffing or banter, perhaps accounts for the use of a form in which a musical imitation or mock-

ing was shown. In the early part of the last century the word was used to describe an instrumental composition, similar to the sonata as then known.

Canzonet, a short song, one brief compared with the sacred airs of the oratorio, or with the aria of the Italian opera.

Caoutchouc (kat'shök or kat-chök), india-rubber, so called because its primary use was the removal of pencil marks from paper. It is an elastic, gummy substance, consisting of the inspissated juice of various more or less milky species of plants. The greater part of the caoutchouc of commerce is the product of four euphorbiaceous trees, *Siphonia elastica*, from French Guiana; *S. braziliensis*, *lutea*, and *brevifolia* from Brazil. It is furnished also by *Ficus elastica*, sometimes called by way of pre-eminence the india-rubber tree. It is derived also from some *artocarpads*, specially *Castilloa elastica*, and some *apocynaceæ*, notably *Urccola elastica*. It exists to a certain extent in most milky plants.

Caoutchouc was first exported to Europe early in the 18th century. Dr. Priestly pointed out that it might be used to rub out pencil marks, crumb of bread having been previously employed for that purpose. In 1791 Samuel Piat obtained a patent for making water-proof fabrics by caoutchouc dissolved in spirits of turpentine. Hancock, in 1823, and Mackintosh followed in the same direction. Chas. Goodyear invented the vulcanizing process, which by compounding with it a small amount of sulphur renders it as hard as horn, and well adapted for various purposes in the arts.

Cap, in ships, a strong piece of timber placed over the head or upper end of a mast, having in it a round hole to receive the top or top-gallant masts, which are thus kept steady and firm.

Cap, a covering for the head, usually of softer materials and less definite form than a hat. *Cap of Maintenance*.—A cap formerly worn by dukes and commanders in token of excellency, now an ornament of state carried before the sovereigns of England at their coronation, and also before the mayors of some cities.

Capaneus, one of the seven legendary heroes who warred against Thebes, killed by Jupiter.

Cape Breton (brā-tôn'), an island of the Dominion of Canada, separated from Nova Scotia, to which province it belongs, by the narrow Gut or Strait of Canso; area 3,120 square miles. It is of very irregular shape, the Bras d'Or, an almost landlocked arm of the sea (with most picturesque scenery), penetrating its interior in various directions, and dividing it into two peninsulas connected by an isthmus

across which a canal has been cut. The surface is rather rugged, and only small portions are suited for agriculture; but it possesses much timber, valuable minerals (several coal mines being worked), and the coast abounds in fish. Timber, fish, and coal are exported. The island belonged to France from 1632 to 1763, and Louisburg, its capital, was long an important military post. It was separate from Nova Scotia between 1784 and 1820. Chief town, Sydney. Pop. (1901) 97,200.

Cape Carthage, a headland of North Africa, jutting out into the Mediterranean. Traces of the ancient city of Carthage are found on it to the N. of the Tunis lagoon.

Cape Coast Castle, a settlement of Great Britain in the Gold Coast Colony, in Upper Guinea, 315 miles W. of Lagos. The place lies in a chasm, and as its name implies, is defended by the great castle near the water's edge, and by three small forts on the hills behind, one of which serves as a lighthouse and signal station. Ceded by the Dutch to the English in 1665, Cape Coast Castle, from 1672, was possessed by several British African companies till 1843, when it was taken over by government. In 1875 it was superseded by Accra as capital of the Gold Coast. The town has a trade in palm oil. There is a telegraph line to Accra, and a road from Cape Coast to Prahsue (75 miles). Pop. 11,614.

Cape Cod, a noted peninsula of the United States on the S. side of Massachusetts Bay; 65 miles long and from 1 to 20 broad. It is mostly sandy and barren, but populous. The navigation around the cape is peculiarly baffling and hazardous, and the saving to commerce and human life which would result from short-cut water-way would be immense. A proposition to cut a canal from Buzzard's Bay to Barnstable Bay dates from the early part of the 17th century, but nothing was actually done until 1878, when a charter was granted by the legislature of Massachusetts, a company was formed, and work begun.

Cape Colony, a province of the South African Union (1910), washed on the W., S., and E. by the ocean, and having on the N. and N. E. the German territory of Great Namaqualand, the British Bechuanaland, the Orange River Colony, Basutoland (British), and the colony of Natal. A considerable portion of the boundary on the N. is formed by the Orange river. The colony extends about 450 miles from N. to S. and 600 from E. to W.; the coast line is about 1,300 miles. The area is 276,000 square miles; the pop. (1910) 2,409,804. The principal bays are St. Helena, Saldanha, Table, False, Walker, Mossel, Plettenberg, St. Francis, and Algoa. In the interior almost every variety of soil and surface is

found, but a great part of the colony is arid and uninviting in appearance. Several ranges of mountains, running nearly parallel to the S. coast, divide the country into successive terraces, rising as they recede into the interior, between which lie belts of fertile land, or vast treeless and barren-looking plains. One of these, called the Great Karoo, is 300 miles long and 100 broad, and presents a desolate appearance, having a dry and often baked soil, with small shrubby plants scattered over it. Yet these plains make valuable sheep-walks, the flocks thriving exceedingly well upon the scanty vegetation; and the soil, where water can be obtained by collecting the rain, is generally very fertile. Large reservoirs have been constructed in many places, and permanent homesteads established where formerly flocks could only be maintained for a month or six weeks at a time. The principal and furthest inland mountain terrace averages 6,000 or 7,000 feet in height, and commencing in Namaqualand, runs E. under the names of Roggeveld, Nieuwveld, Sneeuwbergen, Stormbergen, etc., to the N. E. frontier. The culminating point is the Compass Berg, over 8,000 feet high. The Table Mountain at Cape Town is a stupendous mass of naked rock, rising almost perpendicularly, about 3,585 feet in height. The colony is deficient in rivers, though in this respect the E. half is more favored than the W. The Orange river is the largest in this part of Africa, but is of little or no use for navigation. Others are the Elephants or Olifants river, flowing into the Atlantic; the Gauritz, Gamtoos, Great Fish, Sunday, and Great Kei, emptying themselves into the sea on the S. and S. E.

The climate in this part of Africa is very healthy and generally pleasant, though in summer the heat is pretty great in some parts. The mean temperature for the year at Cape Town is about 62°. The climate of the dry and elevated inland districts is considered remarkably suitable for persons with weak chests or of consumptive tendency, and many have been attracted to the colony on this account.

Except along the coast line, especially the S. E. coast district, where there are extensive forests, timber is scarce. There are upward of 100 different kinds of woods, however; many of them extensively employed for such purposes as house-building, wagon-making, furniture and cabinet work. With irrigation trees can be grown anywhere. The aloe and the myrtle grow to a great size. The quadrupeds of the colony comprise the African elephant, still found in the forests of the S. coast region; the buffalo, equally restricted in locality; the leopard, jackal, hyena, numerous antelopes, baboon, aardvark, etc. Lions at one time numerous are not now to be met with in the

colony, nor is the giraffe. The birds include vultures, eagles, and other rapacious birds, the most remarkable of which is the serpent eater, pelicans, flamingoes, and most important of all, the ostrich, now bred as a domestic animal for the sake of its feathers, the feathers plucked from an adult bird in a season being sometimes worth £10 to £18. Other native animals are large snakes, the venomous cobra de capello, and the scorpion. Along the coast whales and seals abound, and salt and fresh-water fish are plentiful. The most valuable mineral product is diamonds; copper ore is largely exported; coal is mined, and iron ore, gold, amethysts, agates, etc., are found.

In regard to the diamond industry, which is of quite recent origin, some particulars must be given. The bulk of the diamonds that come into the market of the world in the rough state are now obtained from the Cape Colony. The great mining center is Kimberley, in the far N. of the colony, about 10 miles from the Vaal river, and near the frontier of the Orange River Colony. So far as is known the first of the South African diamonds was casually picked up in 1867, and soon after several others were found, including a fine large stone known as the "Star of South Africa." By the early part of 1870 so many diamonds had been found that a rush of people to the diamond district began to take place, and the banks of the Vaal were soon covered with thousands of diggers. At first the precious stones were found on or near the surface, but subsequently it was discovered that they were to be found deeper down, and latterly they have been obtained many hundreds of feet below the surface, great open excavations having been made at the localities where they are plentiful. The richest mine has been the Kimberley mine, situated in the center of the town of the same name, which sprang up around it. For the first 100 feet in depth the diamonds were found embedded in a soft friable yellowish earth; below that the soil changed to a slaty-blue color, and was of a firmer consistency, and the diggers then thought that the bottom of the mine had been reached. It was soon discovered, however, that the blue ground yielded as many diamonds as the yellow, if not more, and this productivity has still continued. Another famous mine is the De Beer's mine. Both these mines have yielded a remarkable number of large stones, but a great many of the diamonds have been "off-colored"; that is yellow, spotted, or otherwise defective in water or luster. One of the finest yet found in South Africa is the "Porter Rhodes"; a beautiful stone weighing 150 carats, and valued at £60,000. One much larger, a yellow stone, weighing 302 carats, was found in 1884, and a still larger was found in De Beer's mine in 1888, weighing 428½ carats. The largest in the world,

weighing 971 carats, but with a large flaw, was found in the Orange Free State in 1893. Although mining operations have been carried on at great expense, owing to the depths to which the workings have been sunk (some, 600 feet or more), the profits of the companies which latterly have owned the mines have been something enormous. The rough work has been done almost entirely by the native Africans, of whom 10,000 or 11,000 have been in employment in the mines at one time. Very stringent regulations have had to be enforced to prevent theft of the precious stones, and also illicit dealing in stones unlawfully acquired.

The colony is better adapted for pasturage than for agriculture, but wheat, maize, and other cereals can be grown almost everywhere, the only drawback to their cultivation being the want of moisture in certain localities and in certain seasons. In some years a surplus of grain is left for exportation; in others grain has to be imported. All kinds of European vegetables and pot-herbs, and all the fruits of temperate climates, such as apples, pears, plums, peaches, melons, apricots, walnuts, almonds, oranges, limes, etc., thrive excellently, and fruits, dried and preserved, are exported. The vine is cultivated, and some excellent wines (notably those of Constantia) are made. The colony is said to be particularly well suited for grape culture, and the vines produce heavier crops than are known almost anywhere else. Viticulture it is believed is yet only in its infancy, though there are already over 90,000,000 vine-stocks. The colonial government had up to 1899 disposed of 128,000,000 acres of land, the quantity remaining undisposed of being 49,564,000 acres.

Sheep-rearing is the most important industry, and wool is the chief export (although surpassed in value by diamonds). The amount of this article exported to the United Kingdom in 1899 was 84,032,536 pounds. Most attention is now devoted to the breeding of pure merinos, the consequence being a great improvement in the wool. Goats are also bred, both the native and the Angora, and the exports of goats' wool or hair to Great Britain has increased from 102,570 pounds in 1868, to 12,948,574 pounds in 1899. Cattle-breeding is carried on to some extent, especially along the coasts and in the E. and N. districts. There are no manufactures of any importance, and consequently the imports of the colony consist largely of manufactured goods, chiefly from Great Britain. The total imports in 1898-1899 were of the value of £17,248,000; in 1882 they were £9,372,019, while in 1871 their value was £3,107,838; the exports in 1898-1899 amounted to £27,065,000, in 1871 to £3,585,996. The value of the gold exported in the year 1898-1899 was £17,265,000; of diamonds, including those

sent through the postoffice, £4,566,000. The total value of the diamonds exported from 1867 to 1898 was £88,000,000. The other exports of importance, besides wool, are ostrich feathers, copper ore, skins, and hides. The exports of merchandise to Great Britain in 1899 amounted to £9,335,028, the imports of British produce to £8,380,547. To facilitate the inland traffic numerous roads have been made (the total length within the colony proper amounting to 8,000 miles), while 2,700 miles of railway and 7,500 miles of telegraph have been opened. Lighthouses have been built round the coast, and harbor works constructed.

The European inhabitants consist in part of English, Scottish, and Irish settlers and their descendants, but the majority are of Dutch origin (see BOERS), while there are also a considerable number of German origin. The colored people are chiefly Hottentots, Kaffirs, Bechuanas, Basutos, Griquas, Malays, and a mixed race, the offspring of black women and white fathers. The laborers are chiefly Hottentots and Kaffirs. The prejudices and ill-feeling once subsisting between the different nationalities of which the population is made up, are now fast disappearing. Education is advancing, though it is not compulsory. The returns show a steady increase in the numbers of children of all classes receiving instruction. For the higher education there are seven colleges, besides a university (at Cape Town) incorporated in 1873. The colleges have each a staff of instructors in classics, mathematics, science, etc., but the university is merely an examining and degree-conferring institution. The religious bodies in the colony with the greatest number of adherents are the Dutch Reformed Church, the Church of England, the Methodists, Independents, and Presbyterians, in the order here given. There is no Established Church.

The constitution which was formed under the acts passed in the years 1853, 1865, and 1872 vests the executive in the governor (who is also commander-in-chief of the forces) and an executive council or ministry composed of certain office-holders appointed by the crown. The legislative power is in the hands of a legislative council of 23 members, elected for seven years, over which the chief-justice presides *ex officio*, and a house or assembly of 95 members, elected for five years, representing the country districts and towns of the colony. The public revenue for 1897-1898 was £7,212,225; the expenditure, £8,431,398; the public debt amounts to about £30,000,000. The revenue is chiefly derived from railways, customs duties, and taxes. Much the greater portion of the debt represents money spent on the construction of railways. The coinage of the colony is the British, as are also the weights and measures, except that for land the *mor-*

Cape Fear River

gen = 2.116 acres is employed. After Cape Town the chief towns are Port Elizabeth, Kimberley, and Graham's Town.

The Dutch, who had early fixed upon the Cape as a watering-place for their ships, first colonized it under Van Riebeeck, in 1652. Reducing the Hottentot inhabitants to slavery, or driving them beyond the mountains, they extended the Cape settlement over a considerable area. But the colony was under the rule of the Dutch East India Company, and owing to their regulations made very slow progress. It was captured by the British in 1795, restored at the peace of Amiens (1802), and again taken in 1806, Sir David Baird being sent at the head of an expedition to take possession of it, in order to prevent it from falling into the hands of the French.

From this time it has remained in the possession of Great Britain, to which it was formally assigned in 1815, along with Dutch Guiana, Holland receiving in return £6,000,000. It now began to advance in prosperity, but the progress of the colony was greatly retarded by the Kaffir wars of 1834, 1846, and 1851-1853, the result of the depredations of this warlike race. Subsequently the area of the colony was gradually enlarged by the annexation of surrounding districts. The most important of these annexations were British Kaffraria (annexed 1866); Griqualand West (1876); Kaffraria proper or the Transkeian districts (Transkei proper, Griqualand East, and Tembuland), including nearly the whole of the region between the Kei and the Natal border (1875-1880); Pondoland (1894); and part of Bechuanaland (1895). A most important event in the history of the colony was the discovery of diamonds. Its most recent history has been connected with the war between Great Britain and the Boer republics. See SOUTH AFRICAN WAR.

Cape Fear River, a river of North Carolina; navigable for steamboats for 120 miles from its mouth. Formed by the junction of the Deep and Haw rivers, its course is generally S. E. till it reaches the Atlantic Ocean.

Capefigue, Baptiste Honore Raymond (kăp-fêg'), a French historian and journalist, born at Marseilles in 1802. His contributions to historical science are the "History of Philip Augustus" (1829), and "History of the Restoration and of the Causes that Led to the Fall of the Elder Branch of the House of Bourbon" (1831). He died in Paris, Dec. 23, 1872.

Cape Finistere (-târ'), the westernmost point of Spain, in the province of Corunna, extending S. W. into the Atlantic, in lat. 42° 54' N., lon. 90° 21' W. Several naval battles were fought off this cape.

Cape Gata, or Cape de Gatte, a promontory of Spain, on the coast of Granada.

Capelan

24 miles in circuit and 13 miles broad. It was formerly a resort of Moorish pirates.

Cape Girardeau, a city of Cape Girardeau county, Mo.; on the Mississippi river, and on the Illinois Central, and the St. Louis, Cape Girardeau and Fort Smith railroads; 150 miles S. E. of St. Louis. It is the seat of St. Vincent's College and the Southeastern Missouri State Normal School, and has a National bank, several newspapers, and an assessed property valuation of \$800,000. Pop. (1880), 4,297; (1900) 4,815; (1910) 8,475.

Cape Hatteras, a dangerous cape on the coast of North Carolina, the projecting point of a long reef of sand.

Cape Haitien, a town on the N. coast of Haiti. It has an excellent harbor, but has declined in importance in recent years. Pop. about 15,000.

Cape Horn, or The Horn, the extremity of an island of the same name, forming the extreme S. point of South America. It is a dark, precipitous headland, 500 to 600 feet high, running far into the sea. Navigation round it is dangerous on account of frequent tempests. The cape was first doubled in 1616 by Schouten, a native of Hoorn, in Holland, whence its name.

Capel or Caple, a term used by miners to indicate the wall of a lode, especially in a tin or copper mine. It is generally of quartz, black tourmalin and hornblende. The capels sometimes contain sufficient metallic particles to make it worth while to work them. In these cases they may be considered as forming part of the lode. The word *cab* is an equivalent used by Cornish miners. In the United States, *casing* is nearly synonymous.

Capel, Lord Arthur, son of Sir Henry Capel, born about 1610, raised to the peerage by Charles I. During the revolutionary war he fought bravely as one of the royalist generals in the W. in the engagements at Bristol, Exeter, and Taunton. Having been at length forced to surrender at Colchester to General Fairfax he was imprisoned, and after some vicissitudes, executed on March 9, 1649. His "Daily Observations or Meditations" was published posthumously with a memoir.

Capel, Thomas John, an English ecclesiastic; born in London, Oct. 28, 1835. He was educated at the Roman Catholic College at Layston and was ordained to the priesthood in 1860. He devoted himself to education, establishing a Catholic public school at Kensington in 1873, and was given the title of Monsignore by Pope Pius IX. He came to the United States in 1883, and after a lecture tour settled to private life in California.

Capelan, or Capelin, a small species of fish of the trout family, *Mallotus villosus*,

Capeline

found on the coast of Newfoundland, and used as a bait for cod and other fish.

Capeline, or **Capelline**, a small piece of armor, consisting of a skull-cap of iron, worn in the Middle Ages by light armed men such as archers.

Capell, Edward, an English critic; born in Suffolk, in 1713. He was deputy inspector of plays, and published "Mr. William Shakespeare, His Comedies, Histories, and Tragedies"; "Notes and Various Readings of Shakespeare," and "The School of Shakespeare." He died in London, Feb. 24, 1781.

Capella, the name of a star situated in the constellation Auriga, on the "Charioteer's" left shoulder. It is of remarkable brilliancy, only four stars exceeding it in that respect. Its color is nearly that of solar light.

Capella, Martianus Mineus Felix, an author of the latter half of the 5th century, of whose life little is known; born probably in Africa. He wrote a work called the "Satiricon," of an encyclopedic nature very highly esteemed and much studied in the Middle Ages. The first two volumes contained an allegory called "The Marriage of Philologia and Mercury." The remaining volumes, seven in number, treated of the seven liberal arts.

Capello, Bianca, Grand Duchess of Tuscany, born in Venice in 1542. In 1563 she eloped with a banker's clerk named Pietro Buonaventuri, who put himself under the protection of Francesco de' Medici at Florence. The latter made Bianca his mistress and her husband his steward, but had him put to death in 1570, and after the death of his wife, Joanna of Austria, married Bianca in 1578. She and Francesco are supposed to have been poisoned by his brother and successor, Cardinal Fernando. She died in the Castle Poggio di Capano, Oct. 11, 1587.

Cape Matapan, a promontory of Greece, forming the S. extremity of the Peloponnesus, in lat. $36^{\circ} 23' N.$, lon. $22^{\circ} 29' E.$ The name *Tænarum*, or *Promontorium Tænarium*, was applied by the Greeks to the headland, and to the small peninsula N. of it, connected with the great Taygetic peninsula by a narrow isthmus.

Cape Nau, ancient *Lacinium Promontorium*, a headland of Italy, at the E. extremity of Calabria.

Capen, Elmer Hewitt, an American educator, born in Stoughton, Mass., April 5, 1838. He was graduated at Tufts College (1860); became a lawyer and Universalist clergyman and was president of Tufts College from 1875 till death, March 22, 1905.

Capen, Nahum, an American historical writer; born at Canton, Mass., 1804; was postmaster of Boston, Mass. (1857-

Cape of Good Hope

1861); introduced street letter-box collections; wrote "The Republic of the United States," "History of Democracy" (1874), etc. He also wrote and edited works on phrenology. He died Jan. 4, 1886.

Cape Nome, a cape and center of a remarkably rich gold mining region, on the S. face of the peninsular projection of Alaska, which separates Kotzebue Sound on the N. from Bering Sea on the S., and terminates on the W. in Cape Prince of Wales, the extent of the North American continent.

In a direct line of navigation, it lies about 2,500 miles N. W. of Seattle, and 175 miles S. E. of Siberia. The nearest settlement of consequence to it prior to 1899 was St. Michael, 100 miles to the S. E., the starting point of the steamers for the Yukon river; but during the year various aggregations of mining population had built themselves up in closer range and reduced the isolation from the civilized world by some 60 miles. The Nome district as settled centers about the lower course of the Snake river, an exceedingly tortuous stream in its tundra course, which emerges from a badly degraded line of limestone, slaty, and schistose mountain spurs, generally not over 700 to 1,200 feet elevation, but backed by loftier granitic heights, and discharges into the sea at a position 13 miles W. of Cape Nome proper.

The first discovery of gold was made in September, 1898, when a party of Swedes found it on the creeks and the gulches. It was not until July, 1899, that the beach gold was discovered. In the middle of October following Nome City had 5,000 inhabitants, all living in tents on the hitherto barren shore. The rapidity of the growth of this town has probably never been equalled. The region is wholly within American territory, and early prospecting indicated that it would rival in richness the famous Klondike district. During the season of 1901 \$7,000,000 in gold was taken from the Cape Nome region.

Cape Nun, a headland on the W. coast of Morocco, extending into the sea at the S. W. extremity of the Atlas range; lat. $28^{\circ} 45' N.$, lon. $11^{\circ} 5' W.$

Cape of Good Hope, a promontory near the S. extremity of Africa, at the termination of a small peninsula extending S. from Table mountain, which overlooks Cape Town. This peninsula forms the W. side of False Bay, and on its inner coast is Simon's Bay and Simon's Town, where there is a safe anchorage and a British naval station. Bartholomew Diaz, who discovered the Cape in 1487, called it Cape of Storms; but John II. of Portugal changed this to its present designation. It was first doubled by Vasco de Gama in 1497. Here is one of the principal astronomical institutions of

Cape Ortegal

the world. About the middle of the 16th century the French astronomer, Lacaille, made an exceedingly valuable series of observations at the Cape. Ever since the English have had a colony there they have kept up astronomical work, the Cape having been the scene of the labors of several celebrated English astronomers, among them Sir John Herschel.

Cape Ortegal, a rugged promontory forming the N. extremity of Spain, extending into the Bay of Biscay, in lat. 43° 45' N., lon. 7° 56' W.

Caper, the unopened flower-bud of a low trailing shrub (*Capparis spinosa*, order *Capparidaceæ*), which grows from the crevices of rocks and walls, and among rubbish, in the countries bordering the Mediterranean. Picked and pickled in vinegar and salt they are much used as a condiment (caper sauce being especially the accompaniment of boiled mutton). The plant was introduced into Great Britain as early as 1596, but has never been grown on a large scale. The flower-buds of the marsh marigold (*Caltha palustris*) and the nasturtium are frequently pickled and eaten as a substitute for capers.

Capercailzie, the wood grouse, mountain cock, or cock of the woods—a species of grouse, *Tetrao urogallus*, of large size, formerly indigenous in the highlands of Scotland, but which became extinct, and had to be reintroduced from the Scandinavian Peninsula, where it is abundant in the pine forests, feeding on the seeds. The general color is black and green, with white marks on the wing and tail.

Cape River, or **Rio de Segovia** (properly *Vaunks*, or *Wanx*), a river of Nicaragua, which after a generally N. E. course of nearly 300 miles enters the Caribbean Sea, after forming part of the boundary between Honduras and Nicaragua.

Capernaum, a city of Galilee in Palestine, about 70 miles N. by E. from Jerusalem. It is situated on the N. W. shore of the Sea of Tiberias. It was a place of considerable importance in the time of Christ, who describes it as exalted unto heaven. The place derives its chief interest from the manner in which it is mentioned in the New Testament. It was here that Jesus Christ began his public ministry; and in its neighborhood he delivered the Sermon on the Mount.

Capers, Ellison, an American clergyman; born in Charleston, S. C., Oct. 14, 1837. He was graduated at South Carolina Military Academy (1857) and attained the rank of brigadier-general in the Confederate army. He entered the Protestant Episcopal ministry in 1867, and after holding various rectorships was chosen bishop of South Carolina in 1893. Died in 1908.

Cape Town

Cape St. Vincent, the S. W. point of Portugal; noted for the naval victory gained off it by Sir John Jervis (afterward Earl of St. Vincent) on Feb. 14, 1797.

Cape Spartivento, ancient *Herculis Promontorium*, a promontory of Southern Italy, forming the S. E. extremity of Calabria; lat. 37° 57' N., lon. 16° 5' E.

Capet (kā'pet or kap-ā'), the name of the French race of kings which has given 118 sovereigns to Europe, viz., 36 kings of France, 22 kings of Portugal, 11 of Naples



HUGH CAPET.

and Sicily, 5 of Spain, 3 of Hungary, 3 emperors of Constantinople, 3 kings of Navarre, 17 dukes of Burgundy, 12 dukes of Brittany, 2 dukes of Lorraine, and 4 dukes of Parma. The first of the Capets known in history was Robert the Strong, a Saxon, made Count of Anjou by Charles the Bold, and afterward duke of the Ile de France. His descendant, Hugh, son of Hugh the Great, was in 987 elected King of France in place of the Carolingians. On the failure of the direct line at the death of Charles IV., the French throne was kept in the family by the accession of the indirect line of Valois, and in 1589 by that of Bourbon. Capet being thus regarded as the family name of the kings of France, Louis XVI. was arraigned before the National Convention under the name of Louis Capet.

Cape Town, a city and capital of Cape Colony, South Africa; between the N. base of Table Mountain and Table Bay. The view of the city from the bay, with the steep and massive mountain close behind it, is most imposing, and the first impression of it never leaves the mind of the voyager. Another prospect equally striking is that which opens up to the traveler who ascends behind Cape Town, and gazes over it on Table Bay, with Cape Town at his feet—its alternate gardens, vineyards, and villas, joining, in the outskirts, the pine and silver tree plantations which clothe the base of the mountain. This view reminds

Cape Town

the traveler of the Bay of Naples. For years the early history of Cape Town and of the Cape Colony were one and the same. The town was laid out by its Dutch founders with mathematical preciseness—the main thoroughfares crossing one another at right angles. The houses of old Cape Town are mostly flat-roofed, oblong, and whitewashed. A few church towers rise here and there, and break the monotony, with an occasional factory or mill chimney, announcing that easy, slow-going days have gone past. The beautiful government gardens in the heart of Cape Town serve the purposes of a public park. There is a fine oak avenue, extending for three-quarters of a mile through the gardens. The Government House is on the left side of the gardens—from which there is a private entrance—the public entrance being from Grave street. It is a heavy, irregular building, commenced more than a century and a half ago, and altered and added to from time to time. The gardens are about 14 acres in extent, and contain upwards of 8,000 varieties of trees and plants. The new and handsome Houses of Parliament, which were opened in 1885, and the public library and museum, are close to the entrance of the avenue; and the Fine Arts Gallery in New street also faces the Botanic Gardens. Stretching from the lower end of Grave street to Adderley street, there are the courts of law and the offices of the chief departments of the colonial government. Nearer the sea is the old castle, with its ravelins, glacis, ditches, gate, sally-port. It is the military headquarters of the commander of the imperial forces and his staff. The Town-house in Greenmarket Square is another structure of the olden time. The city has a regular supply of water, and is well lighted. There are spacious markets generally well supplied with fish, vegetables, and fruit; and public sales of produce, wool, feathers, etc., take place weekly. The public traffic of Cape Town is carried on by omnibuses, tram-cars, and cabs.

The earliest conception of the Europeans in settling at the Cape was to make it a place of call for passing vessels belonging to their own nation. In a higher sense, the Cape Town Harbor Board, in erecting the breakwater and constructing the docks, have made Table Bay a place of call for passing vessels of all nations. The docks were opened in 1870—the graving-dock in 1882. The graving-dock is of Paarl granite, and is of such dimensions as to facilitate the overhauling and repair of the largest vessels. The breakwater and docks reflect great credit on the colony, as a work of great utility, not only to imperial shipping, but also to the vessels of other countries. The total cost of the works engaged

Cape Wrath

in by the Board has amounted to about £3,000,000, raised by the Board on the security of the colonial government. The value of imports averaged about £3,000,000 annually in 1889–1893; the annual value of imports fluctuated from £1,500,000 to £3,500,000. Of some 600 ships using the dock in a year, 500 are British. On the creation of the South African Union (1910) the city became the seat of the Union Parliament. Pop. (1910) 169,641.

Cape Verde, the most westerly headland of Africa, jutting out into the Atlantic Ocean, between the rivers Gambia and Senegal, in 14° 53' N. lat., 17° 34' W. lon. It was discovered by the Portuguese in 1443, and is said to have derived its name from a group of gigantic baobab trees adorning its summit.

Cape Verde Islands, a group in the North Atlantic Ocean, belonging to Portugal, about 370 miles W. of Cape Verde, on the W. coast of Africa, which, as well as the islands, derives its name from the greenish tinge given to the adjoining sea by the abundance of sea-weed. The group consists of 14 islands (of which 7 are inhabited), besides islets and rocks, having a united area of about 1,790 square miles. They are, in general, mountainous, rocky, and very ill supplied with water; all are evidently of volcanic origin, and in Fogo, the most elevated of the group, an active volcano still exists. The climate is exceedingly unhealthy, and droughts are of frequent occurrence. The soil is, in general, poor, and vegetation consequently partial. Temperate and tropical fruits flourish luxuriantly. Wild animals are infrequent, but the domestic kinds are well nourished. The chief exports are cotton, indigo, cattle, hides, cotton cloth, and rum. Santiago, the principal island, and most southerly of the group, contains the town of Ribiera Grande, formerly the capital, but during the dry season the governor-general now usually resides at Porto Praya, which has a good harbor, and is occasionally touched by vessels bound for India. Porto Grande is, however, decidedly the best harbor in the group. In St. Nicolo, the island second in importance, very good cotton stuffs, stockings, etc., are made. The pop. (1900, 147,424) is a mixed race of Portuguese and negroes. These islands were discovered in 1450 by Antonio de Noli, a Genoese navigator, in the service of Prince Henry of Portugal, by which nation they were colonized. During the early part of the war between the United States and Spain (1898), the islands were made the rendezvous of the Spanish fleet under Cervera.

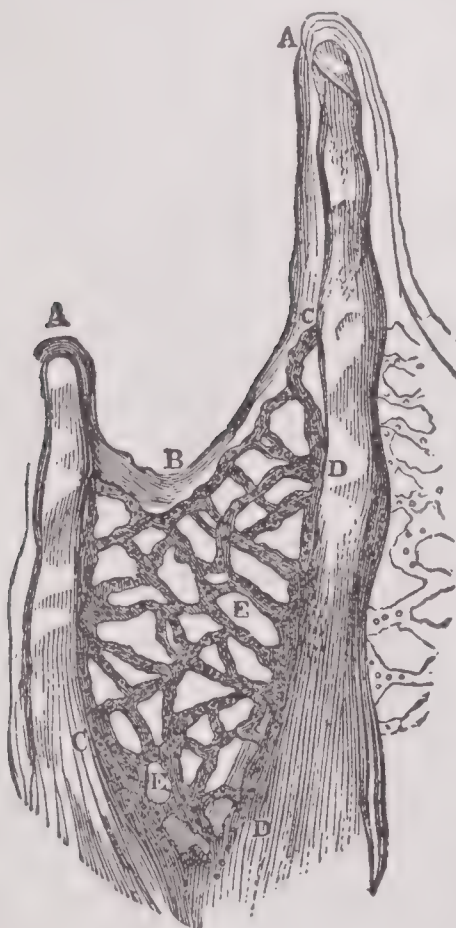
Cape Wrath, a pyramidal promontory of unrivaled wildness and grandeur, the N. W. extremity of Scotland and of Sutherland, and running out into the Atlantic;

Capgrave

lat. 58° 38' N., lon. 4° 58' 5" W. It consists of gneiss, with beds of dark hornblende rock, is intersected by complex granite veins, and presents deep fissures and tall pinnacles. From it a reef of rocks, perforated with arches and caverns, juts out into the sea. Off the cape is Stag Rock, a pillar 200 feet high. Cape Wrath is 600 feet high, and there is a lighthouse near it, 400 feet above the sea, visible 25 miles off. From the cape can be seen North Roma, 50 miles off; Hoy Head, Orkney; the Butt of Lewis, and a grand panorama of mountains of Sutherland.

Capgrave, John, an English historian, born in Lynn, Norfolk, in 1393. Most of his life was passed in the Augustinian friary of his native place, where he died in 1464. He was one of the most learned men of his day, and wrote numerous commentaries, sermons, and lives of the saints. His most important work was his "Chronicle of England," in English, extending from the creation to the year 1417. Other works were a "Liber de Illustribus Henricis" and a "Life of St. Katherine."

Capias, a writ of several sorts: (1) *capias ad respondendum*, to answer the plaintiff in a plea of debt, trespass, or the like; (2) *capias ad satisfaciendum*, to satisfy the plaintiff after judgment in his favor; (3) *capias on mesne process*, under which, on an affidavit of debt being filed, a man's person could be arrested until payment was made or bail given. This last is now abolished except in cases where the creditor has good reason to believe that the debtor is about to leave the State to defeat collection, or has secreted assets to the same end; or if the debt was made by virtue of false representations as to solvency of the debtor; or if fraud in any



Capillaries in the web between the toes of the hind foot of a Frog.

A B, epithelial surface of the web; C D, toes of the foot; E, capillary net-work of blood-vessels, showing the blood corpuscles within them.

Capillarity

way has been practiced upon the creditor. The element of fraud is the essence of the procedure.

Capillaries (from Lat. *capillus*, "a hair"), the tubes which convey the blood from the left side of the heart to the various parts of the body are called arteries, while those which return it to the right side of the heart, after it has discharged its various functions in the body, are known as veins. The name is given to the minute vessels which form the connection between the terminal branches of the arteries and the commencement of the trunks of the veins. These little vessels are of various sizes, some admitting only one blood corpuscle at once, while others are large enough to allow of the simultaneous passage of 2, 3, or more corpuscles. In the muscular tissue their average diameter is 0.003 of a line; they are smallest in the brain, and largest in bone. Their arrangement varies in different parts. The circulation of blood through the Capillaries may be readily seen in the web between the toes of the hind foot of the frog, in the tongue of that animal, in the tail or gills of the tadpole, in the wing of the bat.

Capillarity, in physics, the rise of a liquid in tubes of very fine diameter to a greater height than the surface of the fluid in which such tubes are immersed; together with certain kindred phenomena. If one end of a tube of this sort, open at both ends, be immersed in a fluid which adheres to glass, as water, the liquor within the tube will rise to a sensible height above the surface of that without. This phenomenon is explained by the attraction which exists between the glass and the fluid. Such liquids as do not adhere to glass (for example quicksilver) do not rise in the tube; on the contrary, they stand lower within than without it. The mutual action of the elementary particles of matter, of which capillarity is a noted instance, gives rise to phenomena as interesting, and in certain cases as susceptible of being attached to theory by rigorous mathematical reasoning, as the phenomena of universal gravitation. The ascent of liquids in capillary tubes engaged much of the attention of experimental philosophers in the 18th century. Hauksbee found that the ascent of the liquid does not depend in any way on the thickness of the tube, and that when two plates, forming any small angle with each other, are plunged vertically into a fluid, the fluid which rises between them takes the form of an equilateral hyperbola; from which it followed that, in tubes of the same matter, the ascent of the liquid follows the inverse ratio of their interior diameters. In order to explain these facts succeeding physicists seem to have agreed in assuming the exist-

ence of a cohesive force among the particles of the liquid and an adhesive force between the particles of the liquid and those of the tube. But these attractive forces can only be defined by their relative intensities at an equal distance, and the law according to which they diminish as the distance is increased. Now there are no data from which either their relative intensities or the law of their variation can be determined; we are, therefore, reduced to choose among a number of hypothetical laws, all equally possible; and the explanation, of course, depends on the particular hypothesis we adopt; hence the theories of Clairaut, Young, Laplace, and Poisson.

Clairaut was the first who attempted to reduce the phenomena of capillarity to the laws of the equilibrium of fluids, and exactly analyzed all the forces that concur to elevate the liquid in a glass tube. He showed that the portion of the liquid which is elevated in the tube above the exterior level is kept in equilibrium by the action of two forces, one of which is due to the attraction of the meniscus terminating the column, and the other to the direct attraction of the tube on the molecules of the liquid. Clairaut, however, regarded this last force as the principal one, and even supposed the attraction of the tube to extend as far as its axis; but this supposition is contrary to the nature of molecular forces, which extend only to insensible distances. The action of the tube has, in fact, no influence on the elevation or depression of the contained liquid, excepting in so far as it determines the angle under which the upper surface of the fluid intersects the sides of the tube. Neglecting, therefore, this force as insensible, there remains only the action of the meniscus to support the weight of the elevated column. But though Clairaut made an erroneous supposition respecting the nature of molecular action, and failed in the attempt to demonstrate from theory that the ascent of the liquid is inversely proportional to the diameter of the tube, he showed that a number of hypotheses regarding the law of attraction may be laid down, from any one of which that law of ascent may be deduced; and he demonstrated a very remarkable result, namely, that if the attraction of the matter of the tube on the fluid differs only by its intensity, or coefficient, from the attraction of the fluid on itself, the fluid will rise above the surrounding level when the first of these intensities exceeds half the second.

Young referred the phenomena of cohesion to the joint operation of attractive and repulsive forces, which in the interior of fluids exactly balance each other, and assumed the repulsive force to increase in a higher ratio than the attractive when the mutual distances of the molecules are di-

minished. From these considerations he was led to discover the invariability of the angle which the surface of the fluid makes with the sides of the tube.

Laplace published his theory of capillary attraction in 1806 and 1807, in two supplements to the "Mécanique Céleste." Assuming the force of molecular action to extend only to imperceptible distances, he demonstrated that the form of the surface of the liquid is a principal cause of the capillary phenomena, and not a secondary effect, and determined the part of the phenomena which is due to the cohesive attraction of the molecules of the fluid to each other, as well as that which results from their adhesion to the molecules of the tube. The separate consideration of the cohesive and adhesive forces leads to two equations, which comprehend the whole theory of capillarity—a general equation, common to all those points of the capillary surface of which the distance from the sides of the tube is greater than the radius of the sphere of molecular action; and a particular equation belonging to those points which are situated only at insensible distances from the surface of the tube, or are within the sphere of its action. This last equation will obviously express the angle which the surface of the meniscus makes with the sides of the tube; an angle which, as it depends only on the nature of the tube and that of the liquid, is constant and given in every case, the liquid and tube being supposed homogeneous. Laplace further supposes, in the case of elevation, that an infinitely thin film of the liquid first attaches itself to the sides of the tube, and thus forms an interior tube, which acts by its attraction alone to raise the column and maintain it at a determinate height. The height of the column, consequently, depends on the cohesion and density of the liquid.

Poisson reinvestigated the whole theory of capillary attraction. Taking the most general case of the problem, he considers not merely the surface of a single liquid, but the surface formed by the contact of two liquids of different specific gravities, placed, the one above the other, in the same tube, and deduces the two equations which determine the form of the separating surface, and the angle under which it intersects the sides of the tube. These equations are in form the same as those of Laplace; but the definite integrals, which express the two constant quantities they include, are very different; and their numerical values would be so likewise, if these, instead of being determined experimentally, could be calculated *a priori* from the analytical expression. This, however, cannot be done without a knowledge of the law according to which the molecules of the liquid attract each other, as well as of that which regulates the action of the tube on the

liquid. In applying his general solution to the explanation of the principal phenomena of capillarity, he took occasion to correct some inaccuracies of Laplace. The demonstration which Laplace had given of the invariability of the angle which the surface of the liquid makes with the sides of the tube was not altogether satisfactory; and he had even supposed that it changes its value when the liquid reaches the summit of the tube. Poisson demonstrated that the invariability of this angle will always be preserved unless the curvature of the interior of the tube is infinitely great; or, in other words, unless its radius is infinitely small and of the same order of magnitude as the radius of the sphere of molecular action. Hence the angle cannot vary when the liquid reaches the summit of the tube; for, however small the radius of the tube may be, it is always incomparably greater than the radius of the sphere of molecular action.

The molecular forces which cause the elevation or depression of a fluid in fine tubes give rise also to numerous other interesting capillary phenomena. These are displayed at the surface separation of two liquids or of a liquid and a gas; sometimes even three fluids may be brought into simultaneous contact, and the phenomena then presented are very remarkable. In the midst of a liquid, the molecular attractions at any point being similar in all directions and thus counterbalancing each other, may easily remain unnoticed. It is when an abrupt change produces want of symmetry in some direction that they become observable. They give rise, at the surface of separation of two fluids, to resultant forces that act just as would a stretched film containing the fluid; and the variations in these resultant forces causing a corresponding apparent variation in the contractile force of this imaginary film, occasion the phenomena we are about to describe.

The contractility of the film may be seen in the case of a little globule of mercury on a wooden table, or in the case of a soap bubble. The mercury, instead of spreading itself out over the wood as it might be expected to do on account of the weight of its parts is gathered up into a little ball, just as if it were contained in an elastic bag. Again, if a soap bubble be blown with an ordinary tobacco pipe, it may be shown, by bringing the mouthpiece near to a lighted candle, that the soap bubble contracts with force enough to send a strong current of air backward through the stem.

When two liquids whose superficial tensions in air are not the same are put in contact, both being also in contact with air, curious effects ensue. Thus when a pure water surface is touched with a glass rod that has been wet with any kind of oil, the surface tension at the point is reduced, and the oil, with very remarkable motions,

spreads itself out on the surface of the water. The well-known motions of light particles of camphor thrown on water are accounted for in the same way. This may be beautifully shown by means of an experiment divested by Prof. James Thomson of Glasgow, who first gave an explanation of the phenomenon known as the "tears of strong wine." Let a very well cleaned glass plate be laid on a sheet of white paper, and moistened all over with slightly colored water. Then let a few very small drops of alcohol or spirits be thrown on the plate. The water film will be seen to draw away on all sides from the points where the drops fall owing to the weakening of the superficial tension at these points. The "tears of strong wine" are seen when wine, which contains water and alcohol, is allowed to evaporate in the air. The alcohol evaporates faster than the water, and as it does so the superficial tension increases. This occurs rapidly in the thin layer of wine that adheres to the sides of a wine-glass, and causes the film to be dragged from the places where the wine is strong to those where it is weak. Thus the film is seen to run up the sides of the glass, and then to collect into drops, which run down the side again.

Capistrano, Giovanni di (kap-ēs-trä'-nō), an Italian monk; born in Capistrano, June 24, 1386; entered the Franciscan order at the age of 30, and there distinguished himself by his eloquence and devotion. From 1426 he was employed as legate by several Popes, and acted as inquisitor against the Fraticelli. In 1450 he preached a crusade in Germany against Turks and heretics, appealing to the masses, not the nobles, and successfully opposed the Hussites in Moravia, although from Bohemia he was expelled by George Podiebrad; his fanaticism led to many cruel actions, such as the racking and burning of 40 Jews in Breslau, on a charge of profaning the Host. When Belgrade was besieged by Mohammed II, in 1456 he led a rabble of 60,000 to its relief; but his enthusiasm was greater than his strength, and he died at Illock, Oct. 23, 1456. He was canonized in 1690.

Capita, an expression of frequent occurrence in laws regulating the distribution of the estates of persons dying intestate. When all the persons entitled to shares in the distribution are of the same degree of kindred to the deceased person, and claim directly from him in their own right, and not through an intermediate relation, they take *per capita*, that is, equal shares, or share and share alike.

Capital, the surplus of individual or national wealth which remains after current necessities have been met. It consists of what are popularly called savings. It is available for the employment of new labor,

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and if this be done judiciously it will produce a further surplus; or, in other words, the capital will increase. In every well-ordered community it tends to do so indefinitely. Capital and labor mutually require each other, and are not natural foes, but natural friends.

Capital, the head or the uppermost member of any part of a building; but it is generally applied in a restricted sense to that of a column or pilaster, in which it will be seen that the capital consists of an abacus or square shelf on the top, and thereunder an ovolo or quarter round, and under that a neck, which latter is always considered as part of the column itself. The Doric capital has an abacus and neck.

Capital, in geography, a city in which reside the highest authorities of a district, province, country, etc. It would be difficult to determine whether the good or evil consequences of large capitals in modern times are greater, and such an examination would far exceed our limits; otherwise it would be very easy to point out, in every department of civilization, in science, social intercourse, politics, arts, etc., both salutary and pernicious effects, resulting from the influence of capitals. It seems to us a matter of little doubt that it must be regarded as disadvantageous to any country if the capital by a disproportionate superiority destroys the importance of the rest of the country, as we find to be the case with Paris, which, as has been often observed, contains France. In Germany the state of things was long the reverse, there being no city which could boast of being the point of national concentration. The consequences have been very advantageous to science, and somewhat disadvantageous to literature. In politics this want of a central point has had melancholy consequences for Germany. London never exercised that degree of influence over England which Paris has over France; one reason of which may be that the two most extensive institutions for the diffusion of knowledge are not seated in the metropolis. The great increase of wealth and consequence which the capitals of large empires in Europe have acquired in modern times, by the introduction of the bureau system which has brought together in one place the different departments of administration, has had much influence on military operations, having made the capture of the capital now far more important than formerly. In the United States the word capital is not used officially, but instead of it the phrase seat of government, which is in most cases not the largest place of the State.

Capital Punishment. The questions most commonly discussed by philosophers and jurists under this head are, 1, as to the right of governments to inflict the punishment of death; 2, as to the expediency of

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such punishment; 3, as to the crimes to which, if any, it may be most properly confined and limited; 4, as to the manner in which it should be inflicted. A few words will be said on each of these points.

1. As to the right of inflicting the punishment of death. This has been doubted by some distinguished persons; and the doubt is often the accompaniment of a highly cultivated mind, inclined to the indulgence of a romantic sensibility, and believing in human perfectibility. The right of society to punish offenses against its safety and good order will scarcely be doubted by any considerate person. In a state of nature individuals have a right to guard themselves from injury, and to repel all aggressions by a force or precaution adequate to the object. This results from the right of self-preservation. If a person attempts to take away my life, I have, doubtless, a right to protect myself against the attempts by all reasonable means. If I cannot secure myself but by taking the life of the assailant, I have a right to take it. It would otherwise follow that I must submit to a wrong, and lose my life rather than preserve it by the means adequate to maintain it. It cannot, then, be denied that in a state of nature men may repel force by force, and may even justly take away life if necessary to preserve their own. When men enter society, the right to protect themselves from injury and to redress wrongs is transferred generally from the individuals to the community. We say that it is generally so, because it must be obvious that in many cases the natural right of self-defense must remain. If a robber attacks one on the highway, or attempts to murder him, it is clear that he has a right to repel the assault, and to take the life of the assailant if necessary for his safety; since society in such a case could not afford him any adequate and prompt redress. The necessity of instant relief, and of instant application of force, justifies the act, and is recognized in all civilized communities. When the right of society is once admitted to punish for offenses, it seems difficult to assign any limits to the exercise of that right, short of what the exigencies of society require. If a State have a right to protect itself and its citizens in the enjoyment of its privileges and its peace, it must have a right to apply means adequate to this object. The object of human punishments is, or may be, threefold; first, to reform the offender; secondly, to deter others from offending; and lastly, to secure the safety of the community by depriving the offender of the power of doing mischief. The first consideration rarely enters into human legislation, because of the inadequacy of our means to produce great moral results by the infliction of punishment. The two latter considerations enter largely into the theory and practice of legislation. Who is to be the

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judge in such cases? What is the adequate punishment for any offense? Certainly punishments ought not to be inflicted which are utterly disproportionate to the offense, and beyond the exigencies of society. No government has a right to punish cruelly and wantonly, and from mere revenge; but still, the discretion must be vested somewhere to say what shall be the degree of punishment to be assigned to a particular offense. That discretion must be, from its nature, justly a part of the legislative power, and be exercised according to the actual state of society. It may, nay, it must be differently exercised in different ages and in different countries; for the same punishment which in one age or country may be sufficient to suppress an offense, or render it comparatively harmless, may, in another age or country, wholly fail of the effect. If mild punishments fail of effect, more severe must be resorted to, if the offense be of a nature which affects society in its vital principles, or safety, or interests. The very frequency of a crime must often furnish a very strong ground for severe punishment, not only as it furnishes proof that the present punishment is insufficient to deter men from committing it, but from the increased necessity of protecting society against dangerous crimes. But it is often said that life is the gift of God, and therefore it cannot justly be taken away, either by the party himself or another. If he cannot take it away, he cannot confer that power on others. But the fallacy of this argument is obvious. Life is no more the gift of God than other personal endowments or rights. A man has, by the gift of God, a right to personal liberty and locomotion, as well as to life; to eat and drink and breathe at large, as well as to exist, yet no one doubts that by way of punishment he may be confined in a solitary cell; that he may be perpetually imprisoned or deprived of free air, or compelled to live on bread and water. In short, no one doubts that he may be restrained in the exercise of any privileges or natural rights short of taking his life. Yet the reasoning, if worth anything, extends to all these cases in an equal degree. If, by his crimes, a man may justly forfeit his personal rights, why not his life? But we have seen that it is not true, even in a state of nature, that a man's life may not be taken away by another, if the necessity of the case requires it. Why then may not society do the same, if its own safety requires it? Is the safety of one person more important than the safety of the whole community? Then, again, as to a man's inability to confer on others a right which he does not himself possess. Suppose it is so; the consequence which is deduced from this does not, in fact, arise. Blackstone, indeed, in his "Commentaries" (4 Comment. 8), seems to deduce the right of society to punish

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capital offenses, in certain cases (that is, in cases of *mala prohibita* and not *mala in se*), from the consent of the offenders. The Marquis Beccaria, on the other hand, denies that any such consent can confer the right, and therefore objects to its existence. But the notion of consent is, in nearly all cases, a mere theory, having no foundation in fact. If a foreigner comes into a country and commits a crime at his first entrance, it is a very forced construction to say that he consents to be bound by its laws. If a pirate commits piracy, it is absurd to say that he consents to the right of all nations to punish him for it. The true and rational ground on which the right rests is not the consent of the offender, but the right of every society to protect its own peace, and interests, and property, and institutions, and the utter want of any right in other persons to disturb, or destroy, or subtract them. The right flows, not from consent, but from the legitimate institution of society. If men have a right to form a society for mutual benefit and security, they have a right to punish other persons who would overthrow it. There are many cases where a state authorizes life to be taken away, the lawfulness of which is not doubted. No reasonable man doubts the right of a nation, in a just war, especially of self-defense, to repel force by force, and to take away the lives of its enemies. And this right is not confined to repelling present force, but it extends to precautionary measures, which are necessary for the ultimate safety of the nation. In such a war a nation may justly insist upon the sacrifice of the lives of its own citizens, however innocent, for the purpose of ensuring its own safety. Accordingly, we find that all nations enroll militia and employ troops for war, and require them to hazard their lives for the preservation of the State. In these cases life is freely sacrificed by the nation; and the laws enacted for such purposes are deemed just exercises of power. It may be added that the Scriptures most clearly recognize and justify the infliction of capital punishments in certain cases.

2. As to the expediency of capital punishment. This opens a wide field for discussion. Some able men who do not doubt the right, do still deny the expediency of inflicting it. It may be admitted that a wise legislature ought to be slow in affixing such a punishment to any but very enormous and dangerous crimes. The frequency of a crime is not of itself a sufficient reason for resorting to such a punishment. It should be a crime of great atrocity and danger to society, and which cannot otherwise be effectually guarded against. In affixing punishments to any offense, we should consider what are the objects and ends of punishment. It is clear that capital punishment can have no effect in reforming the offender himself. It may have, and ordinarily does

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have, the effect of deterring others from committing a like offense; but still, human experience shows that even this punishment, when inflicted for small offenses which are easily perpetrated and to which there is great temptation, does not always operate as an effectual terror. Men sometimes are hardened by the frequent spectacles of capital punishments, and grow indifferent to them. Familiarity deprives them of their horror. The bloodiest codes are not those which have most effectually suppressed offenses. Besides, public opinion has great weight in producing the acquittal or condemnation of offenders. If a punishment be grossly disproportionate to the offense, if it shock human feelings, there arises insensibly a sympathy for the victim and a desire to screen him from punishment; so that, as far as certainty of punishment operates to deter from crimes, the object of the legislature is often thus defeated. It may be added that a reasonable doubt may fairly be entertained whether any society can lawfully exercise the power of punishing beyond what the just exigencies of that society require. On the other hand, a total abolition of capital punishments would, in some cases at least, expose society to the risk of deep and vital injuries. A man who has committed murder deliberately has proved himself unfit for society and regardless of all the duties which belong to it. The safety of society is most effectually guarded by cutting him off from the power of doing further mischief. If his life be not taken away, the only other means left are confinement for life or transportation and exile for life. Neither of these is a perfect security against the commission of other crimes, and may not always be within the power of a nation without great inconvenience and great expense to itself. It is true that the latter punishments leave open the chance of reform to the offender, which is indeed but too often a mere delusion; but, on the other hand, they greatly diminish the influence of another salutary principle, the deterring of others from committing like crimes. It seems to us, therefore, that it is difficult to maintain the proposition that capital punishments are at all times and under all considerations inexpedient. It may rather be affirmed that in some cases they are absolutely indispensable to the safety and good order of society. Some States have, however, entirely abolished capital punishment, as is the case in Holland, Rumania, Portugal, and a certain number of the Swiss cantons. It was entirely abolished in Switzerland in 1874, but a few years after, owing to the increase of murders, it was again legalized. It was for a time abolished in Australia and it is no longer inflicted in the State of Maine.

3. As to the crimes to which capital punishments may most properly be limited, it is plain that this must depend on the partic-

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ular circumstances of every age and nation; much must be left to the exercise of sound discretion on the part of the legislature. As a general rule humanity forbids such punishments to be applied to any but crimes of very great enormity and danger to individuals or the State. If any crimes can be effectually suppressed by moderate means, these ought certainly to be first resorted to. The experience, however, of most nations, judging from criminal legislation, seems to disprove the opinion so often indulged by philanthropists that capital punishments are wholly unnecessary. The codes of most civilized nations used to abound with capital punishments. That of Great Britain long continued to be very sanguinary. Blackstone, in his "Commentaries," admits that in his time not less than 160 crimes were by the English law punishable with death. Forgery was one of these up to the reign of William IV. The only crimes for which capital punishment may now be inflicted, according to the law of England, are high treason and murder. The law in Scotland is substantially the same, a sentence of capital punishment now being competent only in cases of treason, murder, and attempts to murder in certain cases. Beyond treason, murder, arson, piracy, highway robbery, burglary, rape, and some other offenses of great enormity and of a kindred character, it is very questionable if there can be necessity for so great severity. Beccaria, with characteristic humanity and sagacity, has strongly urged, indeed, that the certainty of punishment is more important to deter from crimes than the severity of it.

4. As to the manner of inflicting the punishment of death. This has been different in different countries, and in different stages of civilization in the same countries. Barbarous nations are generally inclined to severe and vindictive punishments; and, where they punish with death, to aggravate it by prolonging the sufferings of the victim with ingenious devices in cruelty. And even in civilized countries, in cases of a political nature or of very great atrocity, the punishment has been sometimes inflicted with many horrible accompaniments. Tearing the criminal to pieces, piercing his breast with a pointed pole, pinching to death with red-hot pinchers, starving him to death, breaking his limbs upon the wheel, pressing him to death in a slow and lingering manner, burning him at the stake, crucifixion, sawing him to pieces, quartering him alive, exposing him to be torn to pieces by wild beasts, and other savage punishments, have been sometimes resorted to for the purposes of vengeance, or public example, or public terror. Compared with these, the infliction of death by drowning, by strangling, by poisoning, by bleeding, by beheading, by shooting, by hanging, is a moderate punishment. In modern times public opin-

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ion is strongly disposed to discountenance the punishment of death by any but simple means; and the infliction of torture is almost universally reprobated. In governments where it is still allowed by the laws it is rarely applied; and the sentence is remitted beyond the simple infliction of death. In Prussia, where atrocious criminals were acquired by the penal code to be broken upon the wheel, the king latterly used always to issue an order to the executioner to strangle the criminal (which was done by a small cord not easily seen) before his limbs were broken. So in the same country, where robbery, attended with destruction of life, was punished by burning alive, the fagots were so arranged as to form a kind of cell, in which the criminal was suffocated by the fumes of sulphur, or other means, before the flame could reach him. Not only is torture now abolished by civilized nations, but even the infliction of capital punishment in public has been given up by most of them. In England in high treason the criminal is sentenced to be drawn to the gallows, to be hanged by the neck until he be dead, to have his head cut off, and his body divided into four parts, and these to be at the disposal of the crown. But generally all the punishment is remitted by the crown, except the hanging and beheading, and these too may be altogether remitted according to circumstances. In other cases the punishment is now simply by hanging, or, in the military and naval service, by shooting. In France formerly the punishment of death was often inflicted by breaking the criminal on the wheel. The usual punishment now is beheading by the guillotine. In 1853 a kind of guillotine (*Fallschwert*) was introduced into the kingdom of Saxony, and it has since been adopted as the means of execution in several other German States. In Austria the general mode of punishment is by hanging. In Prussia hanging is rarely inflicted; but the usual punishment is beheading with a heavy axe, the criminal's head being first tied to a block. In one or two German States execution by the sword still exists. It should be remarked, however, that in Germany hanging has always been deemed the most infamous sort of punishment; and the sentence has often been commuted for beheading by the sword as a milder or less dishonorable mode of punishment. In the United States of America hanging is the almost universal mode of capital punishment, though electricity has recently been tried. The constitution of the United States contains a provision against "cruel and unusual punishments." In China murderers are cut to pieces; robbers not. In Russia the punishment of death has been frequently inflicted by the knout. In Turkey strangling and sewing the criminal up in a bag, and throwing him into the sea, are common

Capital Punishment

modes of punishment. In the Roman code many severe and cruel punishments were prescribed. During the favored times of the republic many of these were abolished or mitigated. But again, under the emperors, they were revived with full severity. In the ancient Grecian states the modes of punishment were also severe, and often cruel. Whether the ancient Greek mode of capital punishment by taking poison at such an hour as the condemned party should choose has ever been adopted in any modern nation we cannot say. It has probably never been in use among any Christian people.

Whether executions ought to be in public or in private has been a question much discussed among intelligent statesmen. On the one hand, it is said that public spectacles of this sort have a tendency to brutalize and harden the people, or to make them indifferent to the punishment; and the courage and firmness with which the criminal often meets death have a tendency to awaken feelings of sympathy, and even of admiration, and to take away much of the horror of the offense, as well as of the punishment. On the other hand, it is said that the great influence of punishment, in deterring others from the like offense, cannot be obtained in any other way. It is the only means to bring home to the mass of the people a salutary warning; of the certainty of punishment following on crimes. It is also added that all punishments ought to be subjected to the public scrutiny, so that it may be known that all the law requires, and no more, has been done. Since 1868 the law of the United Kingdom has required all executions to take place privately within the prison walls, and this system seems to have given general satisfaction. The same method is also practised in various other countries. In 1870 a similar measure was proposed in the French assembly, but the war prevented its being passed and it has not yet been enacted into a law.

In England the court before which the trial is held declares the sentence and directs the execution of it. In the courts of the United States there is a like authority; but in the laws of many of the States there is a provision that the execution shall not take place except by a warrant from the governor, or other executive authority. In cases of murder and other atrocious crimes the punishment in England is usually inflicted at a very short interval after the sentence. In the United States there is usually allowed a very considerable interval, varying from one month to six months. In Great Britain there lies no appeal from the verdict of a jury and the sentence of a court in capital cases. In France there may be a review of it in the Court of Cassation.

In Germany there is, in criminal as in civil cases, a right of appeal; hence in that country few innocent persons have

Capitanis

suffered capitally since the 16th century. Capital punishment cannot be inflicted, by the general humanity of the laws of modern nations, on persons who are insane or who are pregnant, until these conditions are past.

Capitanis, the hereditary chieftains of certain bands of Christian warriors who about the beginning of the 16th century, retired to the mountain fastnesses of Northern Greece, where they maintained a kind of independence of the Turkish government, and supported themselves by predatory incursions on the neighboring provinces. The Turks tried to organize them as a paid police, but with imperfect success; and in the struggle for Greek independence they not only formed an insurgent body of about 12,000 men, but furnished most of the Greek generals of that period — Odysseus, Karatasso, Marco Bozzaris.

Capitation-grant, a grant of so much per head; specifically applied to grants from government or governing bodies to schools according to the number of scholars in attendance, or to the number of those passing a certain test examination, and to volunteer companies on account of such members as reach the stage of "efficients."

Capitation-tax, a tax or impost upon each head or person. A tax of this kind existed among the Romans, but was first levied in England in 1380, occasioning the rebellion under Wat Tyler. It was again levied in 1513, and by Charles II. in 1667, after which it remained in force till abolished by William III. in 1689.

Capito, or **Kopfel**, **Wolfgang Fabricius**, an Alsatian reformer; born in Haguenau in 1478, entered the Benedictine order, and became Professor of Theology at Basel, where he showed in his lectures a tendency to shake off the trammels of the scholastic writers. He approved of Luther's action, but nevertheless in 1519 entered the service of Albert of Mainz; and it was not till some years later that he finally declared for the Reformation. He then entered zealously into its work, shared with Bucer the composition of the "*Confessio Tetrapolitana*," and took part in the Synod of Bern in 1532. He died in Strasburg in November, 1541.

Capitol (Lat. *capitolium*, from *caput* = a head); said to have been so called from a human head (*caput*) found when digging the foundations of the fortress of Rome, on the hill Tarpeius. Here a temple was built to Jupiter Capitolinus. The foundation was laid by Tarquinius Priscus, 616 B. C.; the building was continued by Servius Tullius; completed by Tarquinius Superbus, but not dedicated till 507 B. C., by the consul Horatius. It was destroyed by lightning, 183; burnt during the civil wars, 83; rebuilt by Sylla, and dedicated again by Lutatius Catulus, 69; twice again burnt A. D. 69, 80; rebuilt 70, 82; sacked by Gen-

Capitularies

eric, June, 455. The Roman consuls made large donations to this temple, and the Emperor Augustus bestowed on it 2,000 pounds weight of gold, of which metal the roof was composed; its thresholds were of brass, and its interior was decorated with shields of solid silver. The Capitoline games, instituted 387 B. C. to commemorate the deliverance from the Gauls, were revived by Domitian, A. D. 86. The Campidoglio in Rome contains palaces of the senators, erected on the site of the Capitol by Michael Angelo soon after 1546. The word is also applied to the building in which the Congress of the United States meets.

The National Capitol.—The S. E. cornerstone of the Capitol was laid Sept. 18, 1793, "by Brother George Washington, assisted by the Worshipful Masters and Free Masons of the surrounding cities, the military, and a large number of people." The N. wing was ready for occupancy in 1800, the S. wing in 1808; but both were partially destroyed by the British in 1814. The foundation of the main building was laid in 1818 (March 24), the restoration of the wings having been commenced three years earlier; and the whole was completed in 1827. July 4, 1851, the corner-stone of the S. extension was laid by President Fillmore, and this was finished in 1857. The N. extension was occupied by the Senate in 1859. The present dome, commenced in 1855, was completed eight years later, and Dec. 12, 1863, the American flag floated from its summit. The cost of the entire building was \$13,000,000: main building, \$3,000,000; dome, \$1,000,000; extensions, \$8,000,000; miscellaneous items, \$1,000,000. The length of the entire building is 751 feet 4 inches; its greatest breadth, 324 feet, and it covers a little over 3½ acres. The distance from the ground to the top of the dome is 307½ feet; the diameter of the dome, 135½ feet.

Capitoline Games, annual public sports, instituted at Rome 387 B. C., at the suggestion of Camillus, in honor of Jupiter Capitolinus, and to commemorate the preservation of the city from the Gauls. They fell into disuse for a time, but were revived by Nero.

Capitularies (Lat. *capitularia*), the name given to the laws, or royal enactments, issued by the Frankish kings. These laws proceeded from the great assemblies of the king, nobles, and bishops, which formed the estates of the kingdom, as distinguished from the laws issued for the separate states, which were called *leges*. They were divided into general and special *capitularies*, according to the more or less general nature of the interests which they embraced, and the mode of their publication. They have by no means been all preserved. The most famous of those of Charlemagne and of St. Louis.

Capo d'Istrias

Capo d'Istrias, Ioannes Antonios, Count, (kā'pō dis'trē-as), was born in Corfu, Feb. 11, 1776; president of the Greek republic from 1828 to 1831. His family had been settled there since 1373, but originally came from the Illyrian town of Capo d'Istria. He devoted himself to political life, and in 1809, after holding a high place in the Ionian Islands, he entered the diplomatic service of Russia. Here his policy tended to the separation of Greece from Turkey. In 1828 he entered on a seven years' presidency of Greece; but imbued as he was with Russian ideas, he aroused discontent by his autocratic measures; and on Oct. 9, 1831, he was assassinated in a church at Nauplia. See his *Life* by Mendelssohn-Bartholdy (Berl. 1864). His feeble brother, Iony Augustinos (1778-1857) succeeded him, but resigned in the following April.

Capote, Domingo Mendez, a Cuban statesman; born in Cardenas in 1863; spent his youth there; was graduated at the University of Havana, and became one of the best known lawyers in Cuba. Subsequently he was a professor in the University of Havana for many years. In December, 1895, he joined the insurgents under Gen. Maximo Gomez; became a Brigadier-General; and was appointed civil governor of Matanzas and of Las Villas. In November, 1897, he was elected Vice-President of the Cuban Republic. When the Cuban Constitutional Convention appointed a commission of five members to confer with President McKinley and Secretary Root concerning the future relations of the United States and Cuba, he became its leader. The conference was held in Washington, D. C., in April, 1901.

Cappadocia, in antiquity, one of the most important provinces in Asia Minor, the greater part of which is included in the modern province of Karaman. Its boundaries varied greatly at different times. It was conquered by Cyrus, and was ruled by independent kings from the time of Alexander the Great until 17 A. D., when it became a Roman province. It was traversed by the river Halys, and among its chief towns were Comana, Ariarathia, and Tyana.

Cappel, a village of Switzerland, in the canton of Zurich, 4½ miles N. of Zug. Here the reformer Zwingli was killed in a conflict with troops of the Catholic cantons, Oct. 11, 1531. A monument has been erected to his memory.

Caprara, Giambattista, a cardinal of the Roman Church; born in Bologna, Italy, May 29, 1733. He studied theology, became vice-legate of Ravenna in 1758 under Benedict XIV., and in 1785 was sent by Pius VI., as nuncio to Vienna, to remonstrate with the Emperor Joseph on his conduct in relation to church matters. His remon-

Capri

strance proved ineffectual, but in 1792 he was appointed a cardinal, shortly afterward a member of the State council, and in 1800 Bishop of Jost. In 1801 he went to Paris as legate of Pius VII., and conducted the negotiations with the French republic with so much success that in 1802 the first concordat was concluded. Shortly after, he was appointed Archbishop of Milan, and in 1805 he crowned Napoleon King of Italy. He died in Paris, June 21, 1810.

Capri, an island in the beautiful Gulf of Naples, which contributes not a little to the charms of this favorite scene of nature. Capri, 5 miles long and 2 broad, lies at the entrance of the gulf, and consists of two mountains of limestone, remarkable for their picturesque shape, and a well-cultivated valley. The inhabitants, amounting to 4,600, are occupied in the production of oil and wine, in fishing and in catching quails, which come in immense numbers from Africa to the shores of Italy. Every spot which can be made productive is cultivated. In fact, agriculture all around Naples is in the highest state of perfection. A high rock separates Capri from the little town of Anacapri, 1,600 feet high, which is reached by 522 steps cut in the rock. With the Romans Capri was called *Capræ*. Augustus obtained it from the Neapolitans in exchange for Ischia, and made it a place of agreeable retreat, but never made use of it. Tiberius spent here the last seven years of his life in degrading voluptuousness and infamous cruelty. The ruins of his palaces are still extant, and other ruins are scattered over the island. The island of Capri is remarkable for several remarkable caverns or grottoes in its steep rocky coast. By far the most remarkable of these is unquestionably the celebrated *Grotta azzurra* (Blue Grotto), which was discovered by a singular accident in the summer of 1832, an Englishman while bathing having observed the opening in the rocks which forms the entrance to the grotto, and swam into it. It gets its name from the fact that, while the sun is shining outside, all the objects within the cavern—rocks, water, sand—are tinged with a beautiful blue color, very soft and agreeable to the eye. The cavern is elliptical in form, measuring about 1,200 or 1,300 feet in circumference; its height is considerable, and its roof and sides bristle with stalactites. The blue color within the grotto is supposed to be caused by the refraction of the rays of light in passing through the water before entering the cave. The blue rays, with those next to them, the violet and the indigo, being the most refrangible, are the only rays that are admitted, the others—red, orange, etc., being dispersed in the water. In another part of the coast there is another grotto which exhibits phenomena precisely similar, except that the objects in this one

Capricornus

are green instead of blue. It is hence called the *Grotta verde* (Green grotto).

Capricornus (Lat. *caper*, "a goat," and *cornu*, "a horn"), "the Goat," one of the 12 signs of the Zodiac, between Sagittarius and Aquarius; also the corresponding zodiacal constellation, one of Ptolemy's original 48. One of its brightest stars, Alpha, is a wide double, easily separated by the naked eye by any one with good eyesight. Capricornus is surrounded by Aquila, Aquarius, Piscis Austrinus, Microscopium, and Sagittarius.

Capridæ, a family of ruminant mammals, of which the genus *Capra*, or goat, is the type.

Caprification, a process of fertilizing or accelerating the production of fruit, practiced in the Levant, particularly with the wild fig. It consists in suspending on the cultivated fig branches of the wild fig, which bring with them a small insect which penetrates the female flowers, carrying the



CAPRICORNUS.

pollen of the male flower on its body, or punctures the fruit in order to lay its eggs, which hastens the ripening, and may be the only effect. The Egyptians pretend to obtain the same result by puncturing the eye of the fruit with a needle dipped in oil.

Caprifoliaceæ, a natural order of *monopetalous dicotyledons*. It includes a number of erect or twining shrubs and herbaceous plants, comprising the honeysuckle, elder, viburnum, and snowberry. The characteristics of the order are opposite leaves without stipules, free anthers, epipetalous stamens, and fruit not splitting open when ripe.

Caprimulgidæ, the goat-suckers, a family of insessorial, fissirostral birds, nearly allied to the *Hirundinidæ*, or swallow tribe.

Caprivi, Georg Leo, Graf von (kä-prē-vē), sometimes called CAPRIVI DE CAPRARA

Capsicum

DE MONTECUCULI, a German soldier and statesman; born in Berlin, Feb. 24, 1831; entered the army in 1849; fought in the campaigns of 1864 and 1866; and in the Franco-German war of 1870 was chief of staff to the 10th Army Corps. In 1883-1888 he was at the head of the Admiralty; in 1888 he became commander of his old army corps. Hence he was removed, on the fall of Bismarck, in 1890, to become Imperial Chancellor and Prussian Prime Minister. His principal measures were the army bills of 1892 and 1893, and the commercial treaty with Russia in 1894, in which year he resigned. He died at Skyren, Feb. 6, 1899.

Caproic Acid (Sym. $C_6H_{12}O_2 = C_6H_{11}.CO.OH$), a monatomic, fatty acid, which occurs as a glyceride in the butter of cow's milk, and in cocoanut oil; it is produced by the action of alkalies on amyl-cyanide, and as a sodium salt by the action of CO_2 on sodium amyl. It is a clear oil, sp. gr. 0.931 at 15° , boils at 195° , solidifies at -9° . Its salts are called caproates; they are soluble and crystallizable. A strong solution of the potassium salts yields, by electrolysis, diamyl $C_{10}H_{22}$.

Capron, Allen Kissam, an American military officer (son of Allyn Capron); born in Brooklyn, N. Y., June 24, 1871. He enlisted as a private (1890), and rose to a second lieutenancy (1893), joining the "Rough Riders" on the outbreak of the war with Spain. He was made a captain for bravery, and was killed at Las Guasimas, Cuba, June 24, 1898.

Capron, Allyn, an American military officer; born in Tampa, Fla., Aug. 27, 1846. He was a son of Capt. Erastus A. Capron, killed in the Mexican War, and was graduated at West Point in 1867. He rose to the rank of captain (1888), and in the war with Spain led an advance at the battle of Santiago. He further distinguished himself at El Caney. He contracted typhoid in Cuba and died at Fort Myer, Va., Sept. 18, 1898.

Capsicum, a genus of plants of the order *Solanaceæ*, consisting of annual or biennial plants, bearing membranous pods containing several seeds, noted for their hot, pungent qualities. *C. annuum*, a native of South America, furnishes the fruits known as chillies. These, as well as the fruits of *C. frutescens* and other species, are used to form cayenne pepper. For this purpose the ripe fruits are dried in the sun or in an oven, and then ground to powder, which is mixed with a large quantity of wheat flour. The mixed powder is then turned into cakes with leaven; these are baked till they become as hard as biscuit, and are then ground and sifted. Cayenne pepper is largely adulterated with red lead and other substances. *C. fructus* is the dried ripe

fruit of *C. fastigiatum*, imported from Zanzibar. It is a small, oblong, scarlet, membranous pod, divided internally into two or three cells containing numerous flat, white, reniform seeds. It has no odor; its taste is hot and acrid. Capsicum fruits are used medicinally, in powder or as a tincture, externally, or as a gargle in cases of malignant sore throat, and internally as a stimulant in cases of impaired digestion. See CAYENNE PEPPER.

Capstan, a strong, massive apparatus of wood or iron made to revolve, and shaped like a truncated cone, and having the upper part provided with holes for the reception of bars or levers with which to cause it to revolve, and thus raise a heavy weight by winding a rope round it. It is especially used on shipboard for weighing the anchor. Capstans are single or double, according as they have one or two barrels upon the same spindle. The double capstan is revolved by two sets of men on two decks. They are known as "fore" or "aft" capstans, according to position. The fore capstan stands between the heel of the bowsprit and the foremast; the aft capstan abaft the mainmast. The drum capstan, for weighing heavy anchors, was invented by Sir Samuel Morland about 1661.

Captain, one who is at the head or has authority over others, especially: (1) The military officer who commands a company, whether of infantry, cavalry, or artillery. (2) An officer in the navy commanding a ship of war. The naval captain is next in rank above the commander, and in the United States ranks with a colonel. Captains are generally appointed from the rank of commander in the order of seniority by the President, subject to the Senate's approval. Captain of the fleet, in the British navy, a flag-officer temporarily appointed by the admiralty, who acts as adjutant-general of the force, sees to the carrying out of the orders of the commander-in-chief, and to proper discipline being maintained in the fleet. (3) The master of a merchant vessel.

Caption, in law, a certificate stating the time and place of executing a commission in chancery, or of taking a deposition, or of the finding of an indictment, and the court or authority before which such act was performed, and such other particulars as are necessary to render it legal and valid.

Capua (ancient Capoa or Capua), a strongly fortified city of Southern Italy, province Caserta, Terra di Lavoro, on the left bank of the Volturno, in a fine plain 18 miles N. of Naples. The city has a citadel, the work of Vauban, and is reckoned one of the keys of the kingdom. It is a finely built place and contains many handsome public edifices. Its trade is unimportant.

The ancient Capua was situated about 2½ miles from the modern city. The remains of its amphitheatre, said to have been capable of containing 100,000 spectators, and of some of its tombs, attest its former splendor and magnificence. The amazing fertility of its territory, and the commercial spirit of its inhabitants, rendered Capua one of the largest and richest cities of ancient Italy. It was destroyed by the Saracens, A. D. 840.

Capuchin Monkey (kap-ū-shēn'), a name given to various species of South American monkeys of the genus *Cebus*. The hair of their heads is so arranged that it has the appearance of a capuchin's cowl, hence the name. The name is most frequently given to the Sai (*Cebus capucinus*), the horned Sapajou (*C. fatuellus*), as well as to *Pithecia chiropes*, a monkey belonging to an allied species.

Capuchins, a branch of the Franciscan order of monks, so called from their peculiar capuche or cowl—a pointed hood attached to the ordinary Franciscan coat, and said to have been worn by St. Francis himself. This branch was founded by Matthew de Baschi, an Italian, but with him may be named the famous Lewis de Fossembrun. The Capuchins sought to restore the original rigor of the institutes of St. Francis, which Pope Innocent IV. had relaxed by granting the right to possess property to the members of the Franciscan order. In 1525 they received the solemn sanction of Pope Clement VII. Because of their severe austerity, and especially for the innovation of the capuche, they were much persecuted by the other Franciscans. Bernardo Ochino—their first Vicar-General—became a Protestant, as, afterward, did also their third. Eventually, however, they spread in great numbers over Italy, Germany, France, and Spain. In the 17th century they showed much zeal in prosecuting missions to Africa.

Capulets and Montagues, the English spelling of the names of the Cappelletti and Montecchi, two noble families of Northern Italy, according to tradition of Verona, chiefly memorable from their connection with the legend on which Shakespeare has founded his tragedy of "Romeo and Juliet."

Caputiati, a Christian sect which arose in France in the 12th century. They wore on their heads a leaden image of the virgin Mary. They wished "liberty," equality, and the abolition of all civil government. Hugo, Bishop of Auxerre, suppressed them by military force.

Caput Mortuum, literally, a dead head; a fanciful term much used by the old chemists to denote the residuum of chemicals when all their volatile matters had escaped; hence, anything from which all that rendered it valuable has been taken away.

Capybara

Capybara, the *Hydrochærus capybara*, or Watercavy of Brazil, an animal allied to the Guinea-pig. It is about three feet in length, and has the general appearance of a hippopotamus in miniature. It is of the rodent family *Cavidæ*.

Carabidæ, a family of beetles, usually large, adorned with brilliant metallic colors, and either wingless or having wings not adapted for flying. The bombardier beetle belongs to this family.

Carabine. See CARBINE.

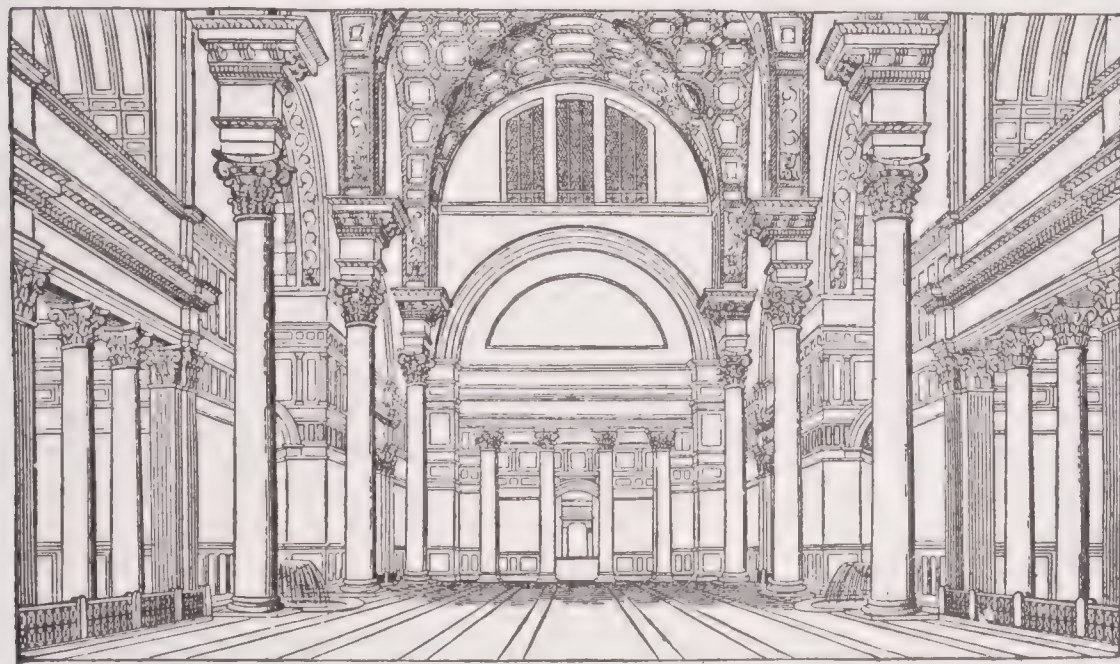
Carabobo, a State of Venezuela, between the Caribbean Sea and the State of Zamora; area, 2,974 square miles; population, 198,021, mostly inhabiting the fertile depression of Lake Valencia, where large crops of coffee, sugar, and excellent cacao are grown. Capital, Valencia; chief port, Puerto Cabello.

Caracal, a species of lynx, the *Felis caracal* of Linnæus, of a reddish-brown color, with black ears, tipped with long black hair. It is a native of Africa, India, Persia, and Turkey.

Caracci

transition to the *Vulturidæ*. They are found in South America, and feed on carrion.

Caracas (kä-räk'äs), the capital of the Republic of Venezuela and of the Federal District, 6 miles (24 by rail) S. of La Guaira, its port. Built on the S. slope of the Avila (8,635 feet), it is 3,025 feet above the tide-level, and enjoys from this elevation a healthful air and a temperature ranging between 48° and 100° F. The streets, built at right angles, are broad and well paved. There are a handsome promenade and numerous public parks and gardens; excellent water and gas plants; street railways; and the termini of several steam railways. The most notable edifices are the Federal Palaces and other official buildings, including the president's "Yellow House"; the university, whose library (30,000 vols.) is open to the public; the Exhibition Palace; the cathedral; the magnificent basilica of St. Ann (£200,000); and over a score of hospitals and charitable institutions. Besides the university, there are colleges of medicine, law, and engineering, and other technical schools, and in the Federal District 204 schools of all grades have an attendance of almost 12,000. Pop. (1891), 72,429.



HALL IN BATHS OF CARACALLA.

Caracalla, Marcus Aurelius Antoninus, eldest son of the Emperor Severus, was born in Lyons, A. D. 188. On the death of his father he succeeded to the throne with his brother, Antoninus Geta, whom he speedily murdered. To effect his own security upwards of 20,000 other victims were butchered. He was himself assassinated by Macrinus, the pretorian prefect, near Edessa, in 217. Among the buildings of Caracalla in Rome, the baths—Thermæ Caracallæ—near Porta Capena, were most celebrated, and their ruins are still magnificent.

Caracara, the name given to the birds of the sub-family *Polyborinæ*, which is an aberrant one belonging to the *Falconidæ*, but constituting apparently the point of

born in 1555, was placed at an early age with Prospero Fontana to study painting. He made such slow progress that his master dissuaded him from the pursuit; upon which he left Fontana, and thenceforth studied the works only of the great masters, for which purpose he traveled to Venice and Parma. Returning to Bologna, he found his cousins, Agostino and Annibale, born in 1560, so well inclined to his art, that he persuaded their father, a respectable tailor, to leave their education to him. Agostino, born in 1558, learned engraving from Cornelius Cort, and attained such excellence that many of his engravings are only distinguishable from his master's by the superiority of the drawing; his works in that style are highly valued. He

Caracci, Ludovico, Agostino, and Annibale (kä-rä'chē), three of the first painters of Italy, kinsmen, fellow-students, and co-laborers, natives of Bologna, and founders of the Bolognese School. Ludovico,

Caracci

never practiced painting, however, with any constancy. Ludovico retained Annibale with himself. Annibale exhibited a perfect contrast to the phlegmatic calmness of Ludovico, to the accomplished fickleness of Agostino, and to the amiable mildness of both: he was rude and impatient in temper, though of so open and generous a nature that he is said to have kept his colors and his money in the same box, both of which were equally at the disposal of his scholars. Like Ludovico he traveled about from place to place, improving himself by all that he saw, and aiming to combine in his own works the excellencies of the great works that he studied. The three opened an academy in Ludovico's studio, which became famous for the illustrious pupils whom it sent forth. The fame of the Caracci reaching Rome, Annibale was invited by Cardinal Odoardo Farnese to adorn his palace with paintings. He went, accompanied by Agostino, but their usual dissensions arose, and Annibale's intolerant devotion to labor drove away his more festive comrade. Annibale spent eight years of his life on his admirable work of the Farnese Gallery, for which he is said to have received only \$500, a meanness of remuneration, as Lanzi justly observes, almost incredible. He did little after this, and died in 1609. He was buried, according to his own desire, by the side of Raphael. Agostino died in 1602; Ludovico lived until 1619. The works of the three kinsmen are principally found in Bologna and Rome. The Farnese Gallery is considered the greatest work of Annibale. The Louvre contains "St. John the Baptist," by Ludovico, and the "Communion of St. Jerome," by Agostino, which are respectively reckoned their best works in oil.

Caraccioli, Francesco (kā-räch'ō-lē), an Italian admiral, born in Naples about 1748. In 1798 he entered the service of the Parthenopean Republic, and repelled, with a few vessels, an attempt of the Sicilian-English fleet to effect a landing. When Ruffo took Naples in 1799 Caraccioli was arrested, and, contrary to the terms of capitulation, was condemned to death, and hanged at the yard-arm of a Neapolitan frigate, Lord Nelson consenting to his execution, June 29, 1799.

Caractacus, a king of the Britons, for nine years (43-50 A. D.) warred gallantly against the Roman invaders, but at length was completely overthrown by Ostorius in a battle near the border of South Wales. His wife and daughters fell into the hands of the victors, and his brothers surrendered. Caractacus himself fled to Cartimandua, queen of the Brigantes, who delivered him up. He was carried to Rome, 51 A. D., and exhibited in a triumphal proces-

sion by the Emperor Claudius, who was greatly impressed by his dauntless bearing and language. According to tradition he died in Rome about A. D. 54.

Carafa, Michele, an Italian composer; born in Naples, Nov. 28, 1785. After some musical study, he entered the army of Murat, then king of Naples, and served as an ordnance officer in the Russian campaign of 1812. From 1814 he devoted himself to composition, and produced a series of operas, of which "Masaniello" (1828) has generally been considered the best. For many years he was professor of composition in the Paris Conservatory. He died in Paris, July 26, 1872.

Caraffa, Carlo, an Italian soldier and prelate; born in 1517. He fought in the Netherlands; joined the Knights of Malta, and was made a cardinal by his uncle, Pope Paul IV. Paul had ultimately to banish the cardinal and his brothers from Rome for extortion; and in 1561 Pope Pius IV. caused him to be put to death.

Carambola, the fruit of *Averrhoa carambola*, an East Indian evergreen tree or bush belonging to the *Geraniaceæ*; sometimes called coromandel gooseberry. It is similar in shape and size to a duck's or a hen's egg, with a thin, smooth, yellow rind, divided by five longitudinal ribs, and a pulp of agreeable flavor, in some varieties sweet and in others acid. It is extensively cultivated in India, has been successfully introduced in the West Indies, and has been grown in a limited way in lower California. The pulp is used in making tarts, sherbets, preserves, etc. In the irritability of its leaves the carambola is much like the sensitive plant, and it also exhibits to a noteworthy degree the phenomenon known as the sleep of plants. See SLEEP.

Caramel, the product of the application of heat to sugar. It is also formed during the roasting of all materials containing sugar, such as malt, coffee, and chicory. It is a dark-brown, almost tasteless substance, with a high luster, and may readily be dissolved in water. Caramel is used as a coloring agent in spirits, gravies, soups, vinegar, etc. The term is also applied to a form of confectionery.

Carapa, a small genus of trees, belonging to the order *Meliaceæ*, and a native of Guiana and adjacent regions, the West Indies, and Guinea. The leaves are generally imparipinnate; the flowers have a calyx of four or sometimes five distinct sepals, and a corolla of the same number of oblong, egg-shaped, spreading petals. The fruit is large, and contains numerous oily seeds, from which is extracted oil of carapa, suitable for burning in lamps and also used as a protection against insect pests.

Carapace, the upper part of the hard shell or case of chelonian reptiles, as the

Carat

tortoise or turtle, the lower part being called *plastron*. The same name is also given to the covering of the anterior superior surface of the *Crustacea*.

Carat, a weight of $3\frac{1}{2}$ grains; the twenty-fourth part of an ounce. It is used by jewelers to express the fineness of gold, the whole mass being supposed to be divided into 24 parts, and said to be so many carats fine, according to the number of twenty-fourth parts of pure gold contained in it. Twenty-four carat means all gold, 18 carat three-quarters gold. Fine gold consists of 22 carats of pure gold and two of alloy. The United States gold coinage is in these proportions. A double eagle weighs 516 grains, 464.4 grains of this being fine gold.

Carausius (kar-ō'shus), a Roman general, a native of Batavia. He was sent by the Emperor Maximilian to defend the Atlantic coasts against the Franks and Saxons; but foreseeing impending disgrace, he landed in Britain and got himself proclaimed emperor by his legions (287 A. D.). In this province he was able to maintain himself six years, when he was assassinated at York by one of his officers named Allectus (293 A. D.).

Caravaggio, Michelangelo Amerighi, or Merighi da (kar-a-vad'jō), a celebrated painter, born in Caravaggio in 1569. He attained distinction as a colorist of the Neapolitan school, being considered the head of the so-called Naturalists' school. He was coarse and violent in his character and habits, and was in continual trouble through his quarrelsome disposition. Among his chief pictures are the "Card Player" (at Dresden), the "Burial of Christ," "St. Sebastian," "Supper at Emmaus," and a "Holy Family." He died near Rome in 1609.

Caravan, a Persian word used to denote large companies which travel together in Asia and Africa for the sake of security from robbers, having in view, principally, trade or pilgrimages. In Mohammedan countries caravans of pilgrims are annually formed to make the journey to Mecca. The most important are those which annually set out from Damascus and Cairo. Camels are used as a means of conveyance on account of their remarkable powers of endurance.

Caravansary, or Caravansera, a large public building, or inn, for the reception and lodgment of caravans in the desert. Though serving instead of inns, there is this essential difference between them, that the traveler finds nothing in the caravansary for the use either of himself or his cattle, but must carry all his provisions and necessaries with him. Caravansaries are also numerous in cities, where they

Carbineers

serve not only as inns, but as shops, warehouses, and even exchanges.

Caravel, the name of different kinds of vessels, particularly a small ship used by the Spaniards and Portuguese in the 15th and 16th centuries for long voyages. It was narrow at the poop, wide at the bow, and carried a double tower at its stern and a single one at its bows. It had four masts and a bowsprit, and the principal sails were lateen sails. It was in command of three such caravels that Columbus crossed the Atlantic and discovered America.

Caraway (*Carum Carvi* or *Carui*), a species of *Umbelliferae*, which has long been valued and cultivated in Europe for the sake of the well-known aromatic "caraway seeds" which it bears; these being, however, in strictness not seeds, but the *mericarps*, into which the fruit in this order splits when ripening. Their properties are due to the volatile caraway-oil, which is contained in the large oil-glands (*vittæ*) of the fruit, and is distilled on a large scale, chiefly for the preparation of the liqueur known as kummel, but also for use in perfumery and in pharmacy, as an aromatic stimulant, and flavoring ingredient. Caraways are, however, chiefly used entire as a spice by bakers and confectioners, and the cultivation of the plant thus attains considerable importance, particularly in Germany and Holland.

Carbazotic Acid, Trinitrophenol, Nitrophenisic acid; Picric acid. Gr. *pikros* = bitter, $C_6H_3N_3O_7 = C_6H_2(NO_2)_3(OH)$. Prepared from the impure nitrophenisic acid. It is also obtained by the action of nitric acid and indigo, silk, wool, resin, etc. It crystallizes in yellow crystals, soluble in water, has a very bitter taste, and dyes silk and wool yellow, but does not dye cotton, hemp, and flax. Its salts are called *picrates*. Potassium picrate is very slightly soluble in water; when heated it explodes with great energy. Carbazotic acid is a nitro-substitution compound of phenol.

Carbide, a compound formed by the union of carbon with an element, as iron or hydrogen.

Carbine, a fire-arm used by cavalry and artillery, shorter in the barrel than the ordinary musket or rifle. It was used by light cavalry as early as the 16th century.

Carbineers, or Carabineers, formerly light horsemen, used chiefly to watch and harass the enemy, defend narrow passes, and act as skirmishers. A corps under this name was raised in France in 1560; but the designation is no longer used in that country. In the English army, all cavalry were at one time often styled carbineers, but now there is only one regi-

Carbohydrate

ment, the 6th Dragoon Guards, known by this title; and the distinction between them and other heavy cavalry is merely nominal.

Carbohydrate, any one of a large group of compounds, containing six carbon atoms or some multiple of six, and hydrogen and oxygen in the proportion in which they form water: that is, twice as many hydrogen as oxygen atoms.

Carbolic Acid, $C_6H_5.OH =$ Phenyl Alcohol, Phenol, Phenic acid, Coal-tar Creasote. Phenol is a secondary monatomic aromatic alcohol, obtained by the dry distillation of salicylic acid. It is also formed by the dry distillation of coal, in the coal-tar oil. When pure it forms white deliquescent crystals melting at 35° to an oily liquid, which boils at 184° . It has a penetrating odor and burning taste; it is neutral; it coagulates albumen and has powerful antiseptic properties. It is used as a disinfectant, and to preserve meat, etc. It dissolves in alkalis, forming compounds called *phenates*. Potassium phenate crystallizes in white needles; when it is heated with iodides of ethyl, methyl, etc., double ethers are formed, as methyl-phenate, $C_6H_5OCH_3$. Chlorine, bromine iodine, and nitric acid form with it substitution compounds. Phenol is benzene with one molecule of (OH) substituted for one atom of H.

Carbon, the name of the element which exists, more or less pure, in charcoal, coke, coal and such bodies. It is very widely distributed, and is an essential constituent of the tissues of plants and animals. It also occurs in the mineral kingdom, chiefly as carbonic acid, which is either free, as in the atmosphere; or combined, as in limestone, dolomite, marble, and all the other carbonates.

The element is capable of existing in three forms, in which its properties differ in almost every respect; they are the diamond, graphite or plumbago, and charcoal in all its varieties. Carbon is therefore an instance of allotropy. Further, as the crystals of the diamond and those of plumbago belong to different systems carbon is called a dimorphous body.

1. The diamond is the purest form of carbon. It has always been esteemed as the most valuable of the gems, a superiority which it owes to its hardness, luster, and high refractive power. The diamond uniformly occurs crystallized, and presents a great variety of forms, all of which yield readily to mechanical division parallel to the planes of the regular octahedron, which, therefore, is the form of the primary crystal, and under which figure it is sometimes found in nature. The faces of its crystals are very frequently curved, so as to communicate to them a rounded appearance, and one form of it, with 48 rounded faces, becomes almost a sphere. The faces of the

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crystals are often striated parallel to the edges of the octahedron, and they often exhibit also impressions or indentations which are frequently of a triangular shape. Twin crystals are not uncommon. Notwithstanding the ancient belief that a true diamond could bear the blow of a hammer, it is rather a brittle stone, not only splitting along the cleavage planes, but breaking elsewhere with a conchoidal fracture. The hardness of the diamond is indicated as 10 on the mineralogical scale, but it is so greatly superior to that of any other mineral that this is merely an arbitrary expression. They are commonly limpid and colorless, or they may be of a yellowish, bluish, yellowish-brown, black-brown, Prussian blue, or rose-red color. The specific gravity of the diamond is 3.5. From its hardness the diamond can be worn down only by rubbing one diamond against another, and is polished only by the finer diamond powder. (See DIAMOND.)

From the fact that transparent inflammable bodies refract light in a ratio greater than their densities, Sir Isaac Newton conjectured that the diamond might consist of an unctuous matter coagulated. The Florentine academicians had rendered its combustibility probable, by exposing it to the solar rays of a powerful burning-glass, and observing that it gradually disappeared, or was consumed. Subsequent experiments settled the question by proving that the diamond lost none of its weight when calcined out of contact with the air, but on the contrary, that it was dissipated when heated in contact with it. It still remained, however, to be discovered what was the true nature of the diamond. This was accomplished by Lavoisier, who inclosed diamonds in jars filled with atmospheric air or oxygen gas, and after having caused them to disappear by the heat of a burning-glass, examined the air in the vessels. He found it to exhibit precisely the same properties as the air which results from the combustion of charcoal. Since then the diamond has been repeatedly burned in order to investigate its composition, and to fix the combining weight of carbon. It has thus been ascertained that the diamond is pure carbon, but that there is sometimes a slight fixed residue, consisting of iron and silica, but whether or not essential to the diamond is not quite certain. The combining weight assigned to carbon from these experiments is 12. Morveau demonstrated the nature of the diamond by another kind of arrangement. A diamond was inclosed in a cavity made in a piece of pure soft iron; a stopper of the same metal was driven into it, and the mass was put into a small crucible, which was covered, and this into a second; the space between them being filled with pure silicious sand. The whole was exposed for

some time to an intense heat. When examined, the diamond had disappeared, and the iron with which it had been in contact was converted into steel. Now steel is a compound of iron and carbon; and as the diamond was not visible, and as there was no source from which the carbon could have been obtained, the conclusion was unavoidable that the diamond was pure carbon. Yet so different is this mineral from charcoal that it was for a time imagined that it contained some other element than carbon; but the numerous and delicate experiments of Sir H. Davy and several other chemists failed of detecting anything else in its composition; and although there exists so great a difference between the diamond and charcoal in their external properties, they are now believed to be identical. The diamond is therefore pure carbon, and differs from charcoal (leaving out of question its trifling impurities) only in its external properties.

2. Graphite, plumbago, or blacklead is the next purest form of carbon. It is hardly so pure as diamond, for it contains sometimes as much as 5 per cent. of foreign matter, chiefly iron and silica. It has a steel-gray or leaden color, and metallic luster; it is soft and makes a streak on paper; it is a good conductor of electricity. It occurs in two forms: in one it crystallizes in the hexagonal system, in six-sided plates, and sometimes in masses; in the other it is amorphous, and is called plumbago. It used to be obtained in quantity in Cumberland, but the supply from that quarter is at present exhausted. It is found principally in Germany, the United States, and other countries.

Besides these physical differences between it and the other forms of carbon, it is distinguished from them by yielding a crystalline acid when repeatedly treated with oxidizing agents. This substance is termed graphitic acid, and from a consideration of its properties graphite has had assigned to it the number 33 as its combining weight. (See GRAPHITE.)

Lastly, carbon in an amorphous state forms the chief constituent of all the varieties of coke, charcoal, and coal. In the whole of them, however, there are impurities, generally earthy matter, which constitute the ash, while in coal the carbon is combined with hydrogen, nitrogen, oxygen, and probably other elements. (See COAL.)

Lampblack is charcoal in a state of minute division, and is prepared for the demands of the trade from the dregs which remain after the eliquation of pitch, or else from small pieces of fir wood, which are burned in furnaces of a peculiar construction, the smoke of which is made to pass through a long horizontal flue, terminating in a close, boarded chamber. The roof of

this chamber is made of coarse cloth, through which the current of air escapes, while the soot, or lampblack, remains behind. Coke is a peculiar kind of charcoal, which remains in the retort after the heating of coal to produce the coal gas. Gas carbon is a very hard variety of coke which collects when gaseous hydrocarbons are heated in red-hot vessels. It is a good conductor of electricity, and is used in certain forms of the galvanic battery.

Bone black, ivory black, or animal charcoal, is obtained from bones made red-hot in a covered crucible, and consists of charcoal mixed with the earthy matters of the bone. It is used in vast quantities by sugar refiners to decolorize the syrup preparatory to crystallizing the sugar. (See BONE BLACK.)

Charcoal is prepared by piling billets of wood in a pyramidal form, with vacuities between them for the admission of air, covering them with earth, and setting fire to them. In consequence of the heat, part of the combustible substance is consumed, part is volatilized, together with a portion of water, and there remains behind the carbon of the wood, retaining the form of the ligneous tissue. Another process consists in heating the wood in close vessels, by which the volatile parts are driven off, and a charcoal remains in the retorts, not so dense as that obtained by the other process. When required pure, and in small quantities for the purposes of the chemist, it may be obtained by immersing the wood in sand contained in a crucible exposed to heat. According to the experiments of Messrs. Allen and Pepys, the weight of charcoal obtained from 100 parts of different woods was as follows: Fir, 18.17; lignum vitæ, 17.25; box, 20.25; beech, 15; oak, 17.40; mahogany, 15.75. Wood charcoal, well prepared, is of a deep black color, brittle and porous, tasteless and inodorous. It is infusible in any heat a furnace can raise; but by the intense heat of a powerful galvanic apparatus it is hardened, and at length is volatilized, presenting a surface with a distinct appearance of having undergone fusion. The density of charcoal when freed from air is little short of that of the diamond itself, although its specific gravity has usually been considered as low as 2. Charcoal is insoluble in water, and is not affected by it at low temperatures; hence, wooden stakes which are to be immersed in water are often charred to preserve them.

Owing to its peculiarly porous texture charcoal possesses the property of absorbing a large quantity of air or other gases at common temperatures, and of yielding the greater part of them when heated. It appears, from the researches of Saussure, that different gases are absorbed by it in different proportions. He found that char-

Carbon

coal prepared from boxwood absorbs, during the space of 24 or 36 hours, of

Ammoniacal gas,	90 times its volume;
Hydrochloric acid,	85 do.
Carbonic acid,	35 do.
Oxygen,	9.25 do.
Hydrogen,	1.75 do.

Charcoal likewise absorbs the odoriferous and coloring principles of most animal and vegetable substances. Thus, all saline substances which, from the adherence of vegetable or animal extractive matter, are of brown color—as crude tartar, crude niter, impure carbonate of ammonia, and other salts—may, after being digested through the medium of water with charcoal, be obtained white by a second crystallization. Resins, gum resins, asafetida, opium, balsams, essential oils, and many other substances, even those that have the strongest smell, are rendered nearly inodorous when they are rubbed with charcoal and water, or when solutions of them in alcohol are macerated with the charcoal, or filtrated repeatedly through it. A number of the vegetable tinctures and infusions also lose their color, smell, and much of their taste by the same process. Common vinegar on being boiled with charcoal powder becomes colorless. Malt spirit by distillation with charcoal is freed from its disagreeable flavor. In the same manner wines also become colorless, and distilled waters lose their odors. Water which, from having been long kept in wooden vessels, as during long voyages, has acquired an offensive smell, is deprived of it by filtration through charcoal powder, or even by agitation with it for a few minutes, especially when a few drops of sulphuric acid have also been added. Hence, also, it has been found that by charring the inside of casks for keeping water, it may be preserved a long time without spoiling. Charcoal can even remove or prevent the putrescence of animal matter. If a piece of flesh has become tainted, the taste and smell may in a great measure be removed by rubbing it with charcoal powder; and it may be preserved fresh for some time by burying it in the same substance. To produce these effects, however, it is necessary that the charcoal should have been well calcined and newly prepared.

The uses of charcoal are extensive. It is used as fuel in various arts, where a strong heat is required without smoke, and in various metallurgic operations. By cementation with charcoal, iron is converted into steel. It is used in the manufacture of gunpowder. In its finer state of aggregation, under the form of ivory black, lampblack, etc., it is the basis of black paint; and mixed with fat oils and resinous matter to give a due consistence, it forms the composition of printing ink.

Carbon

Carbon can be made to combine directly or indirectly with several of the elements. With hydrogen especially it forms a very large number of compounds, called hydrocarbons, which are possessed of the most diverse properties, chemical and physical. It is a matter of some difficulty, however, to make hydrogen and carbon combine direct. With oxygen, again, carbon forms only two compounds, but union between the two elements is easily effected. Thus, when charcoal is heated to a certain degree in the open air or in oxygen gas, it takes fire and burns with the production of an elastic vapor, which is commonly called carbonic acid gas, or more strictly carbonic anhydride. This gas is usually obtained, however, by other processes. It exists, combined with lime, in the different varieties of limestone, marble, and chalk; and if any of these substances be exposed to a strong heat, the carbonic acid is liberated and the lime remains. An easier mode of obtaining the gas in quantity is to decompose the limestone with hydrochloric or nitric acid.

From the experiment of the direct formation of this anhydride, by the combustion of charcoal in oxygen gas, its composition has been determined to be 27.27 carbon and 72.72 oxygen. Tennant illustrated its nature analytically, by passing the vapor of phosphorus over chalk, or the carbonate of calcium heated to redness in a glass tube. The phosphorus took oxygen from the carbonic anhydride, charcoal in the form of a light, black powder was deposited, and the phosphoric acid which was formed united with the lime.

Carbonic anhydride is a colorless gas which requires a pressure of 38 atmospheres to condense it into a liquid. By allowing this liquid to evaporate, part of it passes into the state of solid carbonic anhydride. Its specific gravity compared with common air is 1.5277. It extinguishes the combustion of ordinary substances, and is incapable of supporting the respiration of animals, its presence, even in a moderate proportion, being soon fatal. An animal cannot live in air which contains sufficient carbonic acid gas to extinguish a lighted candle; and hence the practical rule of letting down a burning taper into old wells or pits before any one ventures to descend. When an attempt is made to inspire pure carbonic anhydride a violent spasm of the glottis takes place, which prevents the gas from entering the lungs. If it be so much diluted with air as to admit of its passing the glottis, it then acts as a narcotic poison on the system. It is this gas which so often proves destructive to persons sleeping in a confined room with a pan of burning charcoal.

At the ordinary temperature and pressure water dissolves about an equal vol-

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ume of carbonic acid gas, but it will take up much more if the pressure be increased. Water and other liquids which have been charged with the gas under pressure lose this excess when the pressure is withdrawn. The effervescence accompanying the opening of a bottle of beer, or soda water, or champagne, is due to escaping carbonic acid gas. These beverages, as well as carbonic acid water, owe part of their agreeable pungency to the acid; and the flatness which they acquire when exposed to the air, and the mawkishness of boiled water, is due to some extent to the loss of the dissolved gas. Carbonic acid water has a slight acid reaction, and has considerable solvent powers. On the addition to it of sufficient limewater a white precipitate of carbonate of calcium is produced. This precipitate is soluble in carbonic acid, but if the solution be boiled the excess of acid is expelled, and the carbonate of calcium is reprecipitated.

Carbonic acid gas occurs in great abundance in nature, both free and in combination, and it is produced by a number of actions going on at the earth's surface. Free, it exists uniformly diffused through the atmosphere to the extent of about 4 parts in 10,000, and this proportion is found in air collected even at the tops of mountains and in balloons. There is a continual production of the gas going on by the combustion of fuel, by respiration (as can be shown by breathing for a short time into limewater), by fermentation, and by the decay of animal and vegetable matter. In some localities, too, immense quantities of the gas are emitted from the ground, or from mineral springs or wells, as in the Grotto del Cane, the Cave of Montjoly in Auvergne, in the valley of Wehr, in the Eifel, and at many other places. Yet notwithstanding the bulk of the atmosphere is so vast and the gases diffuse so rapidly that no change in the quantity in the atmosphere is perceptible. The increase is further prevented by plants, which in sunlight decompose carbonic acid, fixing the carbon in their tissues and liberating oxygen. In combination with various metals carbonic acid is an abundant substance. The compounds are called carbonates, and some of them, such as the carbonates of calcium and magnesium, form great rock masses, and occur in all countries and in all formations. Other carbonates, though not so widely distributed, are very valuable as ores of different metals; for example, malachite or carbonate of copper; calamine or carbonate of zinc; witherite or carbonate of barium; carbonate of iron, which, mixed with clay, constitutes clayband, and with clay and coaly matter blackband ironstone, and so on. Other carbonates, of the greatest importance in technology, are manufactured

Carbonari

from native compounds — such as washing soda from common salt, pearl ash from carnallite, white lead from metallic lead. The carbonates, with the exception of the alkaline carbonates, are insoluble in water, though some dissolve in carbonic acid water. They are crystalline, and are decomposed by treatment with an acid, and from most of them the acid is expelled by heating to a sufficiently high temperature. In this way limestone is converted into lime by burning in a kiln.

There is another gaseous compound of carbon with oxygen called carbonic oxide, which is produced whenever carbonic anhydride at a red heat is brought in contact with some substance which has a strong affinity for oxygen. This condition is fulfilled by igniting chalk, or any of the carbonates, with iron filings or charcoal. The carbonate is reduced to its caustic state, and the carbonic anhydride is converted into carbonic oxide by yielding oxygen to the iron or the charcoal. When the first is used an oxide of iron is the product; when charcoal is employed the charcoal itself is converted into carbonic oxide. A more convenient method is to heat crystals of oxalic acid with oil of vitriol. When the oil of vitriol becomes hot, it withdraws the elements of water from the oxalic acid, carbonic anhydride and carbonic oxide are evolved, and are then separated by passing them through caustic potash or limewater, which absorbs the anhydride, but allows the oxide to pass. Its specific gravity is 0.9721. It is colorless and insipid. Limewater does not absorb it, nor is its transparency affected by it. When a light is applied to a jar of carbonic oxide, the gas takes fire, and burns calmly at its surface, with a lambent, blue flame, forming carbonic anhydride. The same lambent, blue flame may be often seen on the top of a bright coal fire. It is not only incapable of supporting respiration, but is a very active poison; so that the presence of even small quantities of it in the air may be injurious. The composition of carbonic oxide has been ascertained by exploding 100 measures of the gas mixed with 50 of oxygen. In this way 100 measures of carbonic anhydride are obtained, from which it can be shown that carbonic oxide contains just half the quantity of oxygen that carbonic anhydride contains. By weight it consists of 12 parts of carbon and 16 parts of oxygen in every 28 parts; its formula is CO. Carbonic oxide combines with chlorine, forming a substance called phosgene gas. See CARBON OXYCHLORIDE.

Carbonari (kär-bön-ā'rē), the name given to a secret political association, formed in Italy at the beginning of the 19th century, its professed aim being the reorganization and reform of the government of that country. Members of all classes were found in

Carbon Disulphide

its ranks. In 1814, they formed a plan, subsequently abandoned, of creating a revolution in Naples. In 1820, a constitution was proclaimed at Nola. The same thing occurred at Naples and other places. Ferdinand I. of Naples made concessions; the forces of the Carbonari under General Pepe entered his capital July 9, and the king swore to observe the new constitution on the 13th. The Emperors of Austria and Russia, and the Prince of Prussia, met at Troppau, in October, and invited Ferdinand to meet them at Laybach, to which town the Congress was transferred in January, 1821, where measures were determined for an armed interference for the suppression of the revolution. The Austrians entered Italy early in 1821, Naples capitulated March 20, and the revolutionary parliament was closed four days afterwards. By an ordinance dated April 10, any person attending the meetings of the Carbonari was to be punished capitally. The society, however, continued to exist, and spreading through France, caused insurrections at Rochelle, Colmar, Toulon, and Marseilles, in 1821, and its influences are supposed to have contributed to the revolution of 1848 in France and Germany. The numerous outbreaks that have occurred in the Italian peninsula since 1821, may be all traced, directly or indirectly, to the machinations of the Carbonari. The Calderaii, "tinkers or braziers who use the coals," was the name given to a loyal society.

Carbon Disulphide, or Bisulphide, a colorless liquid produced by burning carbon in an atmosphere of sulphur, or by distilling certain of the metallic sulphides with charcoal; sp. gr. 1.268. It is of great use in manufacturing processes.

Carbondale, a city in Lackawanna county, Pa., on the Lackawanna river, and the Erie, the New York, Ontario and Western, and the Delaware and Hudson railroads; 16 miles N. E. of Scranton. It is in the center of an extensive coal mining district; and contains many machine shops, car shops, foundries, etc. It has a gravity railroad, a series of inclined planes on which coal trains are sent over the Moosic mountains to Honesdale (19 miles) by the force of gravity alone. Carbondale has a National bank, several churches, a Roman Catholic academy, several newspapers, and an assessed property valuation of \$3,000,000. Pop. (1900) 13,536; (1910) 17,040.

Carbonic Acid. See CARBON.

Carbonic Anhydride. See CARBON.

Carbonic Oxide. See CARBON.

Carboniferous, a term applied to the extensive and thick series of strata with which seams of paleozoic coal are more or less immediately associated. It is applied as well to that great system of formations

Carboniferous System

which yield our main supply of coal, or to some divisions of that system, such as the Carboniferous limestone and the Carboniferous slates. It is also applied to the fossils found in any stratum belonging to the system.

Carboniferous System, the Carboniferous succeeds the old Red Sandstone or some other member of the Devonian system, and passes upward into the Permian series. Its constituent groups vary much in the thicknesses of their sandstones, clays, limestones, and coals in different parts of the world, according to their conditions of deposition in conterminous seas, estuaries, and lagoons.

Carboniferous fossils comprise labyrinthodont and other amphibia; heterocerical fishes of many forms; numerous insects, myriapods, and arachnids; crustaceans (including the last of the trilobites and the eurypterids) of all orders except the highest decapods; mollusks of all the known orders; polyzoa; corals of the "rugose" kind; foraminifera; and some plants of the conifer and cycad groups, but far more of the fern, equisetum, and lycopod orders.

The Carboniferous Limestone consists of corals, encrinites, shells, and foraminifera of a great sea, with muds, sands, and coalbeds on its margins, both at first (*Tuedian*), and afterward (*Yoredale*). These constitute the coal-measures of Russia, Styria, Italy, Corsica, the Boulonnais, etc., and the Lower Coal-measures of Scotland.

The Millstone Grit next formed, in shallow water, of widespread sheets of sand and shingle, has a few scattered fossil plants and shells, and thin seams of coal.

"Measures" is a mining term for strata, retained for the coal-measures, which consist of numerous successive groups of (1) clay, (2) coal, (3) shale, and (4) sandstone, each varying from a few inches to some feet in thickness. These originated as maritime flats with luxuriant jungles, subjected to inundations of fresh and brackish waters, with mud and sand, and sometimes of sea-water, leaving a limestone of sea-shells.

The thick forests of gigantic lycopods, equisetes, and ferns covered their floors with accumulated exuviae, and thick layers of each season's spore-dust. Storms tore down the clustered trunks, and covered them with the mud and sand of inundations.

The "underclay," or "seat-earth," under each coal-seam was the soil in which the trees (*Sigillaria*, *Lepidodendron*, and *Calamites*) grew, and is a pure clay used for firebricks, encaustic tiles, etc.

The "roof-shale" over the coal, forming a tough roof to the galleries in mining, was brought by floods, together with its waterlogged fern-fronds and trunks, and branches

Carbon Oxychloride

of the larger plants. This and other shales ("batt," etc.) contain some beds of Anthracosia and other aquatic mollusks, also a few land shells, numerous entomostraca, and some higher crustacea, a few arachnids, insects, and myriapods, with occasional amphibia, and abundant remains of heterocercal fishes. These fossils are often imbedded in ironstone, concreted in the shales.

Thick sand-drifts, of frequent occurrence, formed the sandstones ("post," etc.), containing scattered plant-remains.

Carbon Oxychloride, Phosgene gas, Carbonyl chloride, COCl_2 . Obtained by exposing dry CO and Cl_2 to direct sunlight, also by passing carbon monoxide into boiling antimony pentachloride, and by the oxidation of chloroform. It is collected over mercury. It condenses into a liquid at 0° . It is decomposed by water forming carbon dioxide and hydrochloric acid. Treated with dry ammonia gas NH_3 , it forms urea $\text{CO}(\text{NH}_2)_2$ and ammonium chloride.

Carborundum, an artificial abrasive, composed of carbon and clay fused together at a high temperature. It was discovered in 1891 by Edward G. Acheson, while endeavoring to produce artificial diamonds. In his first experiment he used an iron bowl lined with carbon and filled with a mixture of clay and carbon. In the center of this mixture a carbon rod was introduced and an electric arc produced between this rod and the carbon lining of the bowl. After the fusion was completed it was found that very hard crystals of bright blue color were formed. These crystals had the power of scratching the diamond and were found upon chemical analysis to consist of a carbide of silicon. Carborundum is now produced on a large scale at Niagara Falls. The furnace is simply a brick box 16 feet long by 5 feet square, left open at the top. When charged, the furnace is filled with a mixture of sand, coke, sawdust, and salt, except along the central axis line, which is occupied by a cylinder of coke. This cylinder is 21 inches in diameter and is composed of coarse fragments of coke. It is built up in the furnace during the operation of charging the finer material. This central core is a poor conductor for the heavy electric current sent through the furnace, and by its resistance develops heat of nearly $4,000^\circ\text{C}$. required for the production of carborundum. An electric current of enormous volume, beginning with 1,000 amperes and reaching as high as 4,000, is sent through the coke cylinder for 24 hours, at the end of which time the operation is complete. Upon opening the furnace, the charge around the core, for the distance of about a foot, is found to be con-

Carburetted Hydrogen

verted into carborundum. After removal from the furnace, the crystals are broken apart by crushers and subjected for several days to the action of dilute sulphuric acid, which dissolves out all foreign matter. Carborundum is insoluble in all known solvents, is practically infusible and has a sp. gr. of 3.23. The principal use of carborundum is as an abrasive, and for this purpose it is usually made into wheels. One such wheel will cut four times as fast as the best emery wheel. The cement generally employed to hold the abrasive in the desired form is a kind of porcelain, made by mixing the carborundum with pure clay and ground feldspar and firing it for several days in a furnace similar to a porcelain furnace. The cost of carborundum is greater than that of emery, but its superior wearing power makes it cheaper in the end.

Carboy, a large and somewhat globular bottle of green glass protected by an outside covering of wickerwork or other material, for carrying vitriol or other corrosive liquid.

Carbuncle, a beautiful gem of a deep-red color with a mixture of scarlet, found in the East Indies. When held up to the sun it loses its deep tinge, and becomes exactly the color of a burning coal. The carbuncle of the ancients is supposed to have been a garnet.

Carbuncle, in surgery, an inflammation of the true skin and tissue beneath it akin to that occurring in boils. It is more extensive than the latter, and instead of one has several cores. It is associated with a bad state of general health, from which condition its danger arises, for it may threaten life by exhaustion or blood poisoning. With regard to the local treatment, the principal thing to be done is to make a free incision into the tumor; as much of the contents as possible should then be pressed out, and a poultice applied. The patient's strength should be supported by nourishing and easily-digested food, and tonics and cordials should be administered.

Carburet, the old name for CARBIDE (*q. v.*).

Carburetted Hydrogen, the name given to two compounds of carbon and hydrogen, one known as light carburetted hydrogen, and the other as olefiant gas. The former is the compound CH_4 which occurs in coal-mines (fire-damp) and about the neighborhood of stagnant pools. Mixed with atmospheric air from 7 to 14 times that of the gas it explodes. The latter is obtained from distilling coal or fat substances in close vessels. Its symbol is C_2H_4 , and it explodes when mixed with 10 or 12 volumes of atmospheric air.

Carcajou

Carcajou, a species of badger found in North America, *Meles labradorica*.

Carcanet, a necklace or collar of jewels.

Carcass, in military language, an iron case, with several apertures, filled with combustible materials, which is discharged from a mortar, howitzer, or gun, and intended to set fire to buildings, ships, and wooden defenses.

Carcassonne (kär-kä-sön'), the *Carcaso* of Cæsar, a town in the French department of Aude, on the Aude river and the Canal du Midi, 56 miles S. E. of Toulouse by rail. It is divided by the river into two parts, the old and the new town, which are connected by two bridges dating from 1184 and 1846. The new town is well and regularly built; but the old town or *cit  *, built on a height, is much more picturesque, with its ramparts and towers, some parts of them dating from the time of the Visigoths, and the rest, with the many-towered castle, from the 11th or 13th century. In 1210 this old town suffered greatly at the hands of the fierce bigot Simon de Montfort and his crusaders, who here burned 400 of the Albigenses. In 1356 it effectually resisted the Black Prince. Of several fine churches the finest is St. Nazaire. Cloth-making is the staple industry; and there are also manufactures of paper, leather, linen, and soap. Pop. (1901) 30,720.

Carcharodon, various fossil sharks known by their teeth, which have been found in the Eocene of Sheppey, as well as in the cretaceous rocks, while some dredged up by the "Challenger" expedition are believed to be Miocene.

Carchemish, an ancient city on the Upper Euphrates, N. E. of the modern Aleppo, was long the N. capital of the Hittites (*q. v.*), and was a city of great size and importance. It was identified by George Smith with Jerabl  s or Jerabis.

Card, an instrument for combing, opening, and breaking wool, flax, etc., and freeing it from the coarser parts and from extraneous matter. It is made by inserting bent teeth of wire in a thick piece of oblong board to which a handle is attached. But wool and cotton are now generally carded in mills by teeth fixed on a wheel moved by machinery. The word is derived through the French *carde*, a teasel, from L. *carduus*, a thistle, teasels having been used for cards.

Cardamine, an extensive genus of herbaceous cruciferous plants. *Cardamine pratensis*, the Cuckoo-flower or Lady's-smock, is a common but pretty meadow-plant, with large pale lilac flowers. A double variety is sometimes found wild. *C. hirsuta* is a common weed everywhere, varying in size, according to soil, from 6 to 18 inches in

Cardi

height. The leaves and flowers of this species form an agreeable salad. This species produces young plants from the leaves, all that is necessary being to place them on a moist grassy or mossy surface. *C. amara* is also not unfrequent.

Cardamoms, the aromatic capsules of different species of plants of the natural order *Zingiberace  * (gingers), employed in medicine as well as an ingredient in sauces and curries. The cardamoms known in the shops are the large, supposed to be produced by *Amomum angustifolium*, a Madagascar plant; the middle-sized and the small, both supposed to be the produce of *A. Cardamomum*, a native of Sumatra and other eastern islands. Those recognized in the United States pharmacop  ia, called true or official cardamoms and known in commerce as Malabar cardamoms, are the produce of *Elettaria* (*Alpinia*) *Cardamomum*, a native of the mountains of Malabar and Canara. Ceylon cardamoms are the fruit of *A. grana-paradisi*.

Cardan, Jerome (k  r'-dan), an Italian physician, born in 1501. Though he appears to have been a consummate empiric, he certainly had considerable talent. He was an excellent mathematician, but so addicted to astrology, that having predicted the time of his death, it is said he starved himself in order to verify his prediction. His works on various subjects were printed in 10 volumes, folio, at Lyons, in 1663. He died in 1576.

Cardboard, pasteboard paper stiffened by several layers being joined together. Bristol board is all white paper, and is made of two or more sheets, according to the thickness required. Other qualities are made by inclosing common thick paper between sheets of white or colored paper of the required quality.

Cardenas, a seaport of Cuba, on the N. coast, 75 miles E. of Havana, with which it is connected by rail. It has a good harbor, and exports sugar. Pop. (1907) 24,280, mostly whites. During the blockade of the Cuban coast in the war between the United States and Spain a severe engagement took place here on May 11, 1898.

Cardi, Lodovico (k  r'de), surnamed CIVOLI or CIGOLI, an Italian painter and architect, born in 1559. He studied painting, and afterward formed his style on the works of Andrea del Sarto, Correggio, and Baroccio. His architectural works possess considerable merit. Among his pictures are: "The Conversion of St. Paul at Rome," "The Martyrdom of Stephen," "The Trinity," "Mary Magdalene," and "Ecce Homo" at Florence. He painted many altar-pieces, excelled to some degree as an engraver, and wrote a treatise on "Perspective." He died in 1631.

Cardia

Cardia, the heart; also the upper orifice of the stomach, called, on account of its vicinity to the heart, by the same Greek name. Cardialgia is the name commonly applied to the particular variety of pain called heartburn, arising from a disordered stomach, and accompanied by acid eructations.

Cardiadæ, a family of the acephalous *Testaceæ*, with equivalve, convex, bivalve shells, having salient summits curved toward the hinge, which, when viewed sideways, give them the appearance of a heart.

Cardiff ("the city on the Taff"), a municipal and parliamentary borough and seaport, the county town of Glamorgan-shire, Wales, situated at the mouth of the Taff on the estuary of the Severn. It is a rapidly increasing town, and the principal outlet for the mineral produce and manufactures of South Wales. Iron shipbuilding is carried on, and there are iron and other works on a large scale. Among the chief buildings are the county buildings, town-hall, infirmary, university college (for S. Wales and Monmouthshire), law courts, free library, museum, etc. The docks are extensive and well constructed (total area about 200 acres), and various improvements to the port have been lately carried out. As regards tonnage entered and cleared, Cardiff is now the third port in the United Kingdom; in respect of coal exported it is the first. There is here a castle which dates from 1080. It is the property of the Marquis of Bute, who has modernized it, and converted part of it into a residence. The development of Cardiff has been greatly furthered by those in charge of the Bute property, which embraces most of the town. **Pop. (1901)** 164,420.

Cardiff Giant, the name given to a rude statue 10½ feet high, dug up, in 1869, at Cardiff, N. Y., and exhibited for months as a petrification. The persons who thus deluded the public at last confessed that the "Giant" had been cut from a block of gypsum quarried at Fort Dodge, Ia., sculptured at Chicago, conveyed to Cardiff, and there buried and "accidentally discovered."

Cardigan, James Thomas Brudenell, seventh Earl of, born in Hampshire, Oct. 16, 1797; sat in the House of Commons from 1818 to 1837, when he succeeded his father. He entered the army in 1824, and rapidly bought himself into the command of the 15th Hussars, which he resigned in 1833, on the acquittal of an officer whom he had illegally put under arrest. From 1836 to 1847 he commanded the 11th Hussars, on which he spent £10,000 a year, and which he made the smartest cavalry regiment in the service. He never was in any degree popular with his officers, and his

Cardinal

treatment of them brought about a duel with Capt. Harvey Tuckett, for which in 1841 Cardigan was tried before the House of Lords, but escaped through a legal quibble. He commanded a cavalry brigade under Lord Lucan in the Crimea, and led the famous charge of the Six Hundred at Balaklava. He was inspector-general of cavalry, 1855-1860, and died in Deene Park, March 28, 1868.

Cardigan Bay, a semicircular bend at St. George's Channel, on the W. coast of Wales, 54 miles wide from N. to S., and 35 miles deep, with a sweep of coast of 130 miles. It has 3 to 30 fathoms water, with three reefs. A strong current sweeps round the bay from S. to N. Almost all the harbors on the coast are obstructed by bars.

Cardinal, a word first used of any cleric regularly settled (*incardinatus*, "in-hinged") in any Church, then from the 8th century of the clergy in the cathedral, the bishop being regarded as the *cardo* or "hinge" of the diocese. Next, the forged decretals speak of the Pope as the *cardo* or "hinge" of the whole Church, and Leo IX. claims a high and singular position for the clergy of the Roman Church; but not till the time of Pius V. was the title formally restricted to its modern use, according to which it signifies the counsellors of the Pope who, next to him, hold the highest dignity in the church over which he rules.

The present college of cardinals has arisen (1) from the deacons who from early times assisted the Bishop of Rome, and who were originally seven in number; (2) from the presbyters who remained in the chief church, or administered *tituli*—*i. e.*, subordinate churches erected as need arose in the city; (3) from bishops who resided in the Roman diocese and helped the bishop proper. The *Liber Pontificalis* makes mention of such assistant bishops in Stephen IV.'s pontificate (768-772). After many fluctuations, the number of cardinal bishops was fixed by Sixtus V. at 6, of cardinal priests at 50, of cardinal deacons at 14, making 70 cardinals in all.

According to the present law the appointment (*creatio*) of cardinals rests with the Pope, who generally consults the existing cardinals, and often receives proposals from secular governments. Their seniority dates from the Pope's nomination, even if that nomination be made *in petto*—*i. e.*, even if the Pope merely states that he has determined to create a new cardinal without mentioning who he is, provided always that the Pope lives to proclaim the cardinal by name. The same qualifications of age, learning, character, etc., are required in the case of a cardinal and of a bishop. The cardinals in Conclave elect the new

Cardinal

Pope, have constant access to him, and form his chief council. They have a vote at general councils, and since the 13th century, precedence over all other members. They have quasi-episcopal jurisdiction within the churches from which they take their titles. They have had since Urban VIII. the title of "Eminence." The body of cardinals is called the Sacred College. Their insignia are the red cardinal's hat, which is given them by the Pope, and not worn, but suspended in the church of their title, and finally buried with them; the red *biretta*, the sapphire ring, the mitre of white silk, the purple cassock, etc. Cardinals, however, who belong to a religious order, retain the color proper to it in their cassocks. If a cardinal holds an episcopal see, he must reside there; otherwise he must not leave Rome without permission. At the head of the college of cardinals stands the dean, who is usually Bishop of Ostia and senior of the cardinal bishops. It is he who consecrates the newly-elected Pope, if not already a bishop. The chief affairs of the Roman Catholic church are in the hands of the cardinals not as such, but as the chief members of the Roman (administrative) congregation; but the cardinals possess no constitutional rights under the government of the papacy. They cannot even meet together without the Pope's leave. From Pole's death (1558) there was no English cardinal till Wiseman's time (1850); in the United States the first cardinal was McCloskey (1875); the second, Gibbons (1886).

Cardinal Bird, *Cardinalis virginianus*, a North American bird of the finch family, with a fine red plumage, and a crest on the head. Its song resembles that of the nightingale, hence one of its common names.

Virginian Nightingale. In size it is about equal to the starling. Called also scarlet grosbeak or cardinal grosbeak and redbird.

Cardinal Flower, the name commonly given to *Lobelia cardinalis*, because of its large, very showy, and intensely red flowers; it is a native of North America, but is much cultivated in gardens in Great Britain.

Cardinal Points, the N., S., E., and W. points of the horizon; the four intersections of the horizon with the meridian and the prime vertical circle.

Cardinal Virtues, or **Principal Virtues**, in morals, a name applied to justice, prudence, temperance, and fortitude.

Carding, the process wool, cotton, flax, etc., undergo previous to spinning to lay the fibers all in one direction, and remove all foreign substances.

Cards

Carditis, inflammation of the heart substance. Inflammation of the lining membrane is *endocarditis*, of the external membrane, *pericarditis*. See HEART.

Cardium, the cockle; a genus of testaceous animals, having the shell bivalve ventricose, the umbones prominent, the margins crenulated. *C. edule* is the cockle; *C. aculeatum*, the Great Prickly Cockle. There are 200 recent species known and 300 fossil, the latter from the Upper Silurian onward.

Cardoon, the *Cynara Cardunculus*, a perennial plant belonging to the same genus as the artichoke, and somewhat resembling it. It is a native of Canada. The thick, fleshy stalks and ribs of its leaves are blanched and eaten as an esculent vegetable. In this country they are not much esteemed, but form an important object in France.

Cards, oblong pieces of pasteboard, inscribed with certain figures and points, and used in various games of skill and hazard. The origin of this invention is obscure. While it has by some been erroneously attributed to the Romans, by others it has been traced, perhaps with more plausibility, to an Asiatic source. The claim, advanced by Mezerai, on behalf of the French, is certainly untenable. Cards may have been used in France in 1390; but that they were not invented to amuse Charles VI. is evident from the fact that they are mentioned in the Stadtbuch of Augsburg for the year 1275. Tiraboschi speaks of them as used in Italy before the close of the 13th century; and the game is noticed in many German books throughout the 14th century. The figures of the four suits were symbolical representations of the four great classes of men, and the names attached to these figures in England arose from a misapprehension of the names originally assigned to them. Thus, by the hearts are meant the *gens de cœur* (cœur), the choir-men or ecclesiastics, and hence these are called *copas*, or chalices, by the Spaniards; whose word *espada*, sword, indicating the nobility and warriors of the State, has been corrupted into the English spade. The clubs were originally *trèfles* (trefoil leaves), and denoted the peasantry; while the citizens and merchants were marked by the diamonds (*carreaux*, square tiles). The word knave (German, *knab*, boy), was used, of course, in its older sense of servant, or attendant on the knights. The French Cards long retained the names of the four kings, David, Alexander, Cæsar, and Charles, who marked respectively the Jewish, Greek, Roman, and Frank empires. The queens, Argine, Judith, Esther, and Pallas, are not so easily accounted for. The first name furnishes an

anagram of *regina*, or queen; the others may have been chosen as types of the moral qualities of wisdom, purity, and courage. The modern pack of Cards consists of fifty-two cards in four suits—two red, hearts and diamonds, and two black, spades and clubs; each suit consisting of three court or picture cards, the king, queen, and knave, and ten other cards distinguished by the number of their “pips” or spots, from ten to one respectively. The lowest of these is always called the “ace,” and the two and three are often called the “deuce,” and “tray.” The natural rank of the cards in each suit is, king highest, and so on down to ace lowest; but in many games this rank is varied, as in Whist, where the ace is put highest of all, above the king; in Écarté, where it is put between the knave and the ten; and in Bézique, where it is made the highest, but where the ten is put between it and the king. In Quadrille, the rank of some of the Cards is variable in every hand. Sometimes the pack of Cards is reduced to 32, by excluding the six, five, four, three, and two of each suit; it is then called a “piquet pack.” An immense variety of games are played with Cards, some involving chance only, some combining chance and skill, the best of them furnishing very agreeable and intellectual amusement. Some are round games, in which any number of persons may join, as Poker, Hearts, Loo, Pope Joan, etc.; some are for four persons, as Whist and Euchre; some for two, as Piquet, Écarté, Bézique, Cribbage; and even for one, called Solitaire.

Carducci, Giosue (kär-dö'chi), an Italian poet and philologist, born in Valdicastello, Tuscany, July 27, 1836. He was made professor of Italian literature in the University of Bologna in 1860. He had previously written essays on the history of literature; and a small volume of lyrics, “Rimes” (1857). But his poetical genius is better shown in the collections of his fugitive pieces published a little later: “Serious Trifles” and “The Decennials.” His “Hymn to Satan” (1863), published under the pseudonym “Enotrio Romano,” made an extraordinary impression, and was formally defended in “Satan and Satanic Polemics” (1879). The breadth and range of his genius, as well as his mastery of poetic form, are seen in the “Poems of Enotrio Romano” (1871); “New Poems”; “Iambics and Epodes”; “New Rimes.” He died Feb. 15, 1907.

Care Sunday, according to Bellenden, the Sunday immediately preceding Good Friday; but generally used to signify the fifth in Lent.

Carew, Thomas, an English poet; born in 1598. He stood high in favor with

Charles I., and was an intimate friend of the greatest poets and scholars of his time in England, including Ben Jonson, Sir John Suckling, and Sir Kenelm Digby. His poems are light and airy, sometimes licentious, always graceful and elegant in form. They are mostly songs or odes; he also wrote “*Cœlum Britannicum*,” a masque performed at Whitehall (1633), with Charles I. and his courtiers in the cast. He died in 1639.

Carex, a genus of plants, of the natural order *Cyperaceæ* (Sedges). There are numerous species found in cold, damp climates, the genus *Cyperus* taking the place of *Carex* in the tropics. Carices are in-nutritious to cattle. *C. arenaria* binds together the sand of the sea-shore. Its rootstock, with those of *C. disticha* and *C. hirta*, is used under the name of German sarsaparilla in skin diseases and in secondary syphilis, being reputed to be diaphoretic and diuretic. The Laplanders protect their hands and feet against frost bites by placing the leaves of *C. sylvatica* in their gloves and shoes. The leaves of some species are used for tying the hops to the poles in English hop-grounds, and in Italy they are placed between the staves of wine casks, are woven over Florence flasks, and sometimes used for making chair bottoms.

Carey, Henry, an English poet and playwright; born about 1696; as the author of “Sally in Our Alley” his claim to the notice of posterity is a strong one, and “Namby Pamby” is another of his good songs. His farces, among them “Hanging and Marriage,” are not so lively. He died in London in 1743.

Carey, Henry Charles, an American economist, born in Philadelphia, Dec. 15, 1793; trained in his father's publishing house, he accumulated a competence from the business and retired to devote himself to study. The “Essay on the Rate of Wages” (1836) and “The Principles of Political Economy” (1837-1840) won him an authoritative international position, in spite of what was then an extravagantly unorthodox opposition to Adam Smith and his followers. He next produced: “The Credit System in France, Great Britain, and the United States” (1838); “The Past, The Present, and The Future” (1848); and “The Principles of Social Science” (1858-1859). He died in Philadelphia, Oct. 13, 1879.

Carey, Mathew, an American publisher and prose writer, born in Ireland, Jan. 28, 1760. The best known of his political writings was his “Olive Branch” (1814). It was an effort to promote harmony among political parties during the War of 1812. It passed through ten editions. In 1819 he published his “Irish Vindications,” and

Carey

in 1822, "Essays on Political Economy." He died in Philadelphia, Pa., Sept. 16, 1839.

Carey, Sir Robert, youngest son of Lord Hunsdon, born about 1560, and rose to eminence in the service of Queen Elizabeth, for the last 10 years of whose reign he was English warden on the Border marches. He was present at her death bed (1603), and in two and a half days galloped with the news to Edinburgh. Charles I., at his coronation, created him Earl of Monmouth, a title that became extinct on his death without issue, April 12, 1639. His "Memoirs," the best edition of which is Scott's (Edin. 1808), are interesting from their notices of events connected with Border history.

Carey, William, an English Oriental scholar and missionary, born in Northamptonshire, Aug. 17, 1761. He was early apprenticed to a shoemaker, but his natural turn for languages, and his zeal for the spread of the Gospel, were too strong to be overcome. With the little assistance he could procure he acquired Latin, Greek, and Hebrew, and likewise studied theology. In 1786 he became pastor of a Baptist congregation at Moulton, and in 1787 was appointed to a similar situation in Leicester. In 1793 he sailed for the East Indies as a Baptist missionary, and in 1800, in conjunction with Marshman, Ward, and others, he founded the missionary college at Serampore. Here he had a printing press, and issued various translations of the Scriptures. His first work was a "Bengali Grammar." It was followed by the "Hitopadesha," in the Mahratta tongue, a "Grammar of the Telinga and Carnatic," and a "Bengali Lexicon." Under his direction the whole Bible was translated into 6, and the New Testament into 21 Hindustani dialects. He was long professor of Sanskrit, Mahratta, and Bengali, in Calcutta. He died in Serampore, India, June 9, 1834. His son, FELIX CAREY, born in 1786, died 1822, was the author of a "Burmese Grammar," and translated several English works into Bengali, Sanskrit, and Burmese.

Cargill, Donald, a Scotch clergyman, born about 1610. He studied at Aberdeen, and became minister of the Barony Church in Glasgow in 1650. In 1679 he took part in the battle of Bothwell Bridge, where he was wounded. He had a principal hand in the Queensferry and Sanquhar Declarations. For formally excommunicating Charles II., the Duke of York, and others, he was executed at Edinburgh for high treason, in 1681.

Carhart, Henry Smith, an American scientist, born in Coeymans, N. Y., March 27, 1844. He was graduated at Wesleyan

Caribbean Sea

University in 1869, and since then has taught physics and chemistry. Since 1886 he has been Professor of Physics at the University of Michigan. He has written "Primary Batteries," "University Physics," "Electrical Measurements," etc.

Caria (kā'rē-a), a country of Asia Minor, whose boundaries have been dissimilar in different ages. Generally speaking, it was at the S. of Ionia, at the E. and N. of the Icarian Sea, and at the W. of Phrygia Major and Lycia. It has been called Phœnicia, because a Phœnician colony first settled there. It afterwards received the name of Caria, from Car, one of its kings, who first invented the auguries of birds. Its chief town was Halicarnassus.

Cariacou (kar'yä-kö), the Virginia deer (*Cervus virginianus*), found in all parts of North America up to 43° N. lat. It is smaller than the common stag, and its color varies with the season. In spring it is reddish-brown, in autumn slaty-blue, and in winter dull-brown. Written also *Carjacou*.

Cariamä, a bird, a native of Brazil and Paraguay, the *Palamedea cristata* of Gmelin, *Dicholoptrus cristatus* of Illiger, and *C. cristata* of some other ornithologists. It is of most retired habits. It is doubtful to what family it belongs, resembling, as it does in various points, the *Grallatores*, the *Struthionidæ*, and the *Galinaceæ*. The head is crested.

Carib, the name given by the early European navigators to the inhabitants or aborigines found on the smaller of the West India Islands, and also inhabiting some part of the adjacent American continent. The natives of the larger and more northern islands entertained a great dread of this race of Carib from their more warlike and savage nature; and the Spaniards, finding them always a bold and determined enemy, did their utmost to exterminate the whole race, and finally expelled all but a mere remnant from their native possessions. Those who escaped the Spanish sword sought refuge in that part of Southern America near the mouth of the Orinoco, except a few whom the English removed and landed on the island of Ruatan, in the Bay of Honduras. The Carib have always been distinguished from the rest of the American peoples by their athletic stature, firmness, courage, and resolution. They treat all other aborigines with contempt, and consider themselves superior to every other race. They were formerly accused of cannibalism, and, there is much reason to suspect, with justice.

Caribbean Sea, the grandest inlet of the Western hemisphere—corresponding in several respects to the Mediterranean in

the eastern—is separated from the Gulf of Mexico by Yucatan, and from the Atlantic Ocean by the great arch of the Antilles. It forms the turning-point in the vast cycle of waters known as the Gulf Stream, that wheels round, with the regularity of time itself, from Southern Africa to Northern Europe. It pours its waters into the Gulf of Mexico on the W., which shoots forth, on the E., the Florida Stream with the computed volume of 3,000 Mississippis. To supply this enormous efflux, the Caribbean Sea draws on the Atlantic, laying under contribution nearly all the trade-wind regions of that ocean, so as literally to become the receptacle of the Amazon and the Orinoco.

Caribbee Bark, the bark of the *Exostemma caribæum*, a tree growing in the West Indies, closely allied to Cinchona, and occasionally substituted for the true species of the latter. It is called also St. Lucia Bark.

Caribbees, or **Lesser Antilles**, usually divided into the 'Windward and Leeward Islands, a section of the West India Islands.

Cariboo, or **Caribou**, an animal, the *Cervus silvestris*, or American Woodland Reindeer, the Attehk of the Cree, and Tantseeah of the Copper Indians. It is employed by the Laplanders to draw their sledges.

Carica (from Caria, a district of Asia Minor, whence it was supposed to have come), a genus of plants, the typical one of the order of *Papayads* (*Papayaceæ*). It contains about ten species, all natives of tropical America. They are small trees without branches, and with large, variously-lobed leaves, resembling those of some kinds of palm. They exude an acrid, milky juice when wounded. The most remarkable species is the *Carica Papaya*, the Papaw-tree, a small tree, seldom above 20 feet high, with a stem about a foot in diameter, tapering gradually to the top, where it is about four or five inches. The fruit is of a dingy orange-yellow color, oblong, about 10 inches long by three or four broad. The juice of this tree is believed in the West Indies to have the remarkable property of rendering the toughest meat tender, and even the flesh of pigs or poultry fed on the fruit or leaves is certain to be tender. The ripe fruit is made into sauce or preserved in sugar, and the juice of the unripe fruit is used to remove freckles. The leaves are employed as a substitute for soap. *C. digitata*, a tree which grows in Brazil, where it is called *chamburu*, is regarded almost with superstitious awe as a deadly poison.

Caricature, a representation of the qualities and peculiarities of an object, but in such a way that beauties are concealed and

peculiarities or defects exaggerated, so as to make the person or thing ridiculous, while a general likeness is retained. Though a degenerate, it is one of the oldest forms of art. Egyptian art has numerous specimens of caricature, and it has an important place in Greek and Roman art. It flourished in every European nation during the Middle Ages, and in the present day it is the chief feature in the so-called comic journals.

Caries (kā'ri-ēz), a disease of bone analogous to ulceration in soft tissues. The bone breaks down, or may be said to melt down into unhealthy matter, which works its way to the surface and bursts. Excision of the carious portion of the bone is often effected with good results, but the disease often results in death. Caries of the teeth is decay of the dentine or body of the tooth.

Carillon (car-ē'yōn), a species of chime, played by hand or clockwork on a number of bells, forming a complete series or scale of tones or semi-tones, like those of the organ or harpsichord.

Carimata, a name applied to the strait between Borneo and Billiton; also to a cluster of a hundred islets and reefs (area, 57 square miles; population, 500) in that strait; and lastly, to the principal member of the group, whose highest point reaches 2,600 feet.

Carina ("the Keel"), one of the three constellations into which Lacaille and Gould have divided Argo. Of the Greek letters which Lacaille assigned to the whole of the old Ship-Argo, Carina contains *a*, *x*, *e*, *B*, *t*, *v*, *w*, *O*, and *n*; and these should now be used with the suffix *Carinæ* instead of *Argûs*, as formerly. The constellation lies within 40° of the South Pole, surrounded by Chamæleon, Volans, Pictor, Puppis, Vela, Centaurus, and Musca.

Carinaria, a genus of heteropodous Mollusca, having the heart, liver, and organs of generation covered by a slender, symmetrical, and conical shell, the point of which is bent backward, and frequently relieved by a crest, under the anterior edge of which float the feathers of the branchiæ. It belongs to the order *Nucleobranchiata* and the family *Firolidæ*. The species are found far out upon the ocean, where they feed upon floating medusæ, and other *Acal-ephæ*. Eight are known recent, and one fossil, from the miocene of Turin.

Carinatae, an order of birds classified by Professor Huxley. They have the sternum raised into a median ridge or keel. To it belong all ordinary birds, those ranked under his other two orders, *Ratitæ* and *Saururæ*, being of an abnormal or aberrant character. If Carinatae be considered a

Carinate Birds

sub-class, then its divisions, *Natatores*, *Grallatores*, *Rasores*, *Scansores*, *Insessores*, and *Raptores*, will rank as orders; if it be called an order, then these will be sub-orders.

Carinate Birds, the technical name for the ordinary flying birds, in which the muscles working the wings are partly inserted on a prominent keel (Lat. *carina*) on the breast-bone.

Carinthia (Ger. *Kärnthen*), a W. duchy or province of Austria, on the borders of Italy; area, 4,006 square miles. It is extremely mountainous, generally sterile, and one of the most thinly populated provinces of Austria. The principal river is the Drave. The iron, lead, and calamine mines are the main sources of its wealth, though there are several manufactories of woolens, cottons, silk stuffs, etc., most of which are in Klagenfurt, the capital. Pop. (1891), 361,008.

Carisbrooke, a village near the center of the Isle of Wight, and overlooked by the ruins of its ancient castle, where Charles I. was imprisoned 13 months previous to his trial and execution.

Carissimi, Giacomo (kär-is'ē-mē), an Italian musician, born in Marino about 1604. He was a church-music composer, and excelled in the monodic style and in recitative. His great work is an oratorio called "Jephtha." He died in Rome, Jan. 12, 1674.

Carlen, Emilia Flygare (flē-gär'ē-kär-lān'), a Swedish novelist, born at Strömstad, Aug. 8, 1807. Her first story was

"Waldemar Klein" (1838). A long series of novels followed, most notable among them being: "Gustav Lindorm" (1839); "The Professor" (1840); "Chamberlain Lassmann" (1842); "A Warehouse on



EMILIA CARLEN.

the Cliffs" (1860), her best story. Her latest work was "Reminiscences of Swedish Literary Life" (1878). She had clear insight into the conditions of human life, especially of life in the middle class, and she describes it with admirable fidelity. She died in Stockholm, Feb. 5, 1892.

Carli

Carlen, Rosa, a Swedish novelist, born in 1836. Her first story, "Agnes Tell" (1861), had a very favorable reception. Then followed: "Tuva" (1862); "Helena, a Woman's History" (1863); "Three Years and Three Days" (1864); "The Gypsy's Son" (1866), which is regarded as her most perfect work. She died in 1883.

Carleton, Henry Guy, an American journalist and dramatist, born in Fort Union, New Mexico, June 21, 1855. He pursued journalism in New Orleans and New York City, and has written several plays, including: "Memnon, a Tragedy"; "Victor Durand" (1884); and "The Pembertons" (1890). He died Dec. 10, 1910.

Carleton, Will, an American poet, born in Hudson, Mich., Oct. 21, 1845. He is best known in literature by his ballads of home life, many of them having gained great popularity. His books include: "Poems" (1871); "Farm Legends" (1875); "City Ballads" (1888); and "City Legends" (1889).

Carleton, William, an Irish novelist, born in Prillisk, County Tyrone, in 1794. His intimate acquaintance with the traits and tendencies of Irish peasant character, and his harmless, graceful, and unwearying humor, were conspicuous in his first success, "Traits and Stories of the Irish Peasantry." Then came: "Willy Reilly"; "The Fair of Emyvale," "Fardorougha the Miser," and several other novels of great power, in which much that seems anomalous in the manners and methods of the author's countrymen is made clear through the medium of a happy style and a realistic humor. He died in Dublin, Jan. 30, 1869.

Carleton College, a co-educational institution in Northfield, Minn.; organized in 1866 under the auspices of the Congregational Church; has grounds and buildings valued at over \$265,000; aggregate endowment, \$385,000; volumes in the library, 23,000; scientific apparatus, \$60,000; income, about \$70,000; scholarships, 21; professors and instructors 20; average number of students, 330; graduates, over 700.

Carli, Giovanni Rinaldo (kär'lē), an Italian economist and archaeologist, born in Capo d'Istria, April 11, 1720. In 1741 he was appointed professor of astronomy at Venice, and in 1754-1760 published his great numismatic work, "Della Moneta." For his merits as a financier, Carli was made by the Emperor Joseph president of the Council of Commerce at Milan. His works embrace Istrian and other antiquities, dissertations on classical subjects, against sorcery, and against Rousseau's

theory of natural religion. He died Feb. 22, 1795.

Carlile, Richard, an English Radical, born in Ashburton, Devonshire, Dec. 8, 1790. After some education at the village free school he served in a chemist's shop, and afterward as apprentice to a tinman. Paine's "Rights of Man" converted him into a Radical propagandist, and in 1817 he began to vend a London weekly, "Black Dwarf," next sold thousands of Southey's "Wat Tyler," reprinted Hone's "Parodies," and wrote a series of imitations of these, for which he was rewarded with eighteen weeks in the King's Bench. For reprinting Paine's works and some similar books, he was sentenced, after a three days' trial, in November, 1819, to a fine of £1,500 and three years' imprisonment. He at once began to issue his periodical, "The Republican," of which the first 12 volumes are dated from his prison. He died Feb. 10, 1843.

Carline Thistle, a kind of thistle, *Carlina vulgaris*. Named, according to the legend, after Charles the Great (Charlemagne), to whom it was pointed out by an angel as the cure for a pestilence which had broken out in his army.

Carlisle (kar-lil), an ancient city of England; the capital of Cumberlandshire; at the confluence of the Caldew and Eden rivers. It has steamboat and railroad communications with Liverpool, Belfast, etc. Gingham, cotton checks, etc., are its chief manufactures. Its most noted building is a cathedral founded by William Rufus, and containing perhaps the finest choir in England. There is also a castle, founded in 1092. Carlisle was the ancient capital of the kings of Cumbria, and was sacked by the Danes (900). During the English and Scotch border-wars it was frequently besieged. It was here that Buccleuch rescued Kinmont Willie. During the Civil War the town twice surrendered to the Parliamentarians (1645 and 1648). Pop. (1891) 39,176; (1901) 45,478.

Carlisle, borough and county-seat of Cumberland county, Pa.; on the Cumberland Valley, and the Gettysburg and Harrisburg railroads; 18 miles W. of Harrisburg. It is the farming and manufacturing trade center of Cumberland county, and is the site of Dickinson College, Metzger Female College, and the United States Indian Training School. It has a National bank, large manufacturing establishments, Hamilton Library, Todd Hospital, and an assessed property valuation of \$3,000,000. It was the headquarters of Washington during the Whiskey Rebellion in 1794, and was bombarded by the Confederates in 1863. Pop. (1900) 9,626; (1910) 10,303.

Carlisle, Earls of, a title of the descendants of Charles Howard (1629-1685), the second son of Sir William Howard, of Nawarth, Cumberland; who, by adherence to Cromwell and afterward to Charles II. rose to be first earl of Carlisle. He also received the titles Baron Gilsland and Viscount Morpeth (1657). The seventh earl was George William Frederick Howard, born in London in 1802; he graduated at Oxford; became chief secretary for Ireland (1835-1841); succeeded to the peerage (1848); was twice appointed by Palmerston Lord Lieutenant of Ireland (1855 and 1859). He was author of a volume of poems and of a "Diary in Turkish and Greek Waters." He died in 1864. His brother, William George Howard (1808-1889), rector of Londesborough, became eighth earl. George James Howard (1843-) is ninth earl.

Carlisle, John Griffin, an American statesman, born in Kenton county, Ky., Sept. 5, 1835; received a common-school education, studied law, and was admitted to the bar (1858). He served several terms in the lower house of the State Legislature. During the Civil War he actively opposed secession, and in 1866 and 1869 was a member of the State Senate. He was lieutenant-governor of Kentucky (1871-1875), was elected to Congress (1876), and five times reelected. His ability soon made him one of the Democratic leaders. In the 48th, 49th, and 50th Congresses he was chosen Speaker. In 1890 he was elected United States Senator, but resigned in March, 1893, to accept the portfolio of Secretary of the Treasury in President Cleveland's Cabinet. At the close of his term he settled in New York City to practice law. He died July 31, 1910.

Carlists, a Spanish political faction which advocates the claims of Carlos of Bourbon and his descendants to the Spanish throne. In 1833 the Carlists, whose chief strength lay in the Basque provinces, and who, because of their tenets of absolutism and priestcraft, were secretly favored by the Pope and the eastern powers, raised the standard of revolt. They had the advantage until 1836, when Espartero inflicted on them a terrific defeat at Luchana. In August, 1839, their commander, Maroto, treacherously made peace, and the remaining Carlists soon fled to France. In 1873 the grandson of the first pretender raised another revolt in the Basque provinces of Navarre and Biscay, but after several sharp conflicts the rebels were hemmed in along the N. coast, and in 1876 the pretender and his chief supporters fled into France.

Carll, John Franklin, an American geologist, born in Long Island, N. Y., May 7,

Carlos

1828. He became identified with coal oil development early in life, and has perfected many oil pumping devices. Since 1874 he has been connected with the Pennsylvania Geological Survey.

Carlos, Don, Infant of Spain, son of Philip II. and Maria of Portugal; born in Valladolid, July 8, 1545. His mother died four days after his birth. He himself was sickly, and one of his legs was shorter than the other. The extreme indulgence with which he was educated by Joan, sister of the king, confirmed his violent, obstinate, and vindictive disposition. In 1560 Philip caused him to be acknowledged heir of the throne by the Estates assembled at Toledo, and in 1562 he sent him to the University of Alcalá de Henares in hopes that the study of the sciences would soften his turbulent character. An unlucky fall threw him into a burning fever, and the physicians lost all hopes of his recovery. The king hastened to his son, and as it was recollected that the prince had a great veneration for St. Didacius, Philip commanded the corpse of the saint to be brought in a procession. It was laid upon the bed of the sick prince, and his hot face covered with a cold shroud. He fell asleep; when he awoke the fever had left him; he demanded food, and recovered. All believed a miracle had been wrought, and Philip requested the canonization of Didacius. Contemporary historians differ in the description of the prince. According to some he had a thirst for glory, an elevated courage, pride, and a love of power. According to others he was fond of whatever was strange and uncommon; an accident or opposition irritated him to frenzy; address and submission softened him. He is also represented as a favorer of the insurgents in the Netherlands, and in particular as an enemy of the Inquisition; yet he possessed neither knowledge nor principles, nor even sufficient understanding to be capable of liberal views. With him all was passionate excitement, which resistance converted into fury. Llorente has corrected the accounts of the character and fate of this prince from authentic sources in his work on the "Spanish Inquisition." According to him Don Carlos was arrogant, brutal, ignorant, and ill-educated. This much is certain, that at the Congress of Cateau Cambrésis (1559) the marriage of Don Carlos with Elizabeth, daughter of Henry II. of France, was proposed; but Philip, being left a widower by the death of Mary of England, took the place of his son. Don Carlos is said to have loved Elizabeth, and to have never forgiven his father for having deprived him of her. Llorente proves, however, that Don Carlos never had fallen in love with the queen, and that she was never too intimate with him. In 1563

Carlos

Philip, who had no other heir than Don Carlos, sent for his nephews, the Archdukes Rodolph and Ernestus, to secure to them the succession to his dominions. Don Carlos, who lived in continual misunderstanding with his father, resolved in 1565 to leave Spain, and was on the point of embarking when Ruy Gomez de Silva dissuaded him from his resolution. In 1567, when the rebellion in the Low Countries disquieted Philip, Don Carlos wrote to several grandees of the kingdom that he had the intention of going to Germany. He disclosed his plan to his uncle, Don Juan of Austria, who mildly dissuaded him from it, and represented to him that most of the grandees to whom he had written would not omit to inform the king. This was in fact done; and indeed Don Juan himself told Philip what Don Carlos had confided to him. It is believed that he was touched by the sufferings of the people of the Netherlands. Philip himself seemed to believe that his son intended to go to the Netherlands. The Baron Montigny lost his head on this account. Don Carlos had often shown a vehement desire to participate in the government. But Philip, jealous of his own authority, treated his son coolly and with reserve, while he gave his confidence to the Duke of Alva, to Ruy Gomez de Silva, Don Juan of Austria, and Spinola. Don Carlos could not bear that Alva should have received the government of Flanders, which he had requested for himself. The architect of the escorial, Louis de Foix, gives the following facts relating to Don Carlos. The prince had always under his pillow two naked swords, two loaded pistols, and at the side of his bed several guns, and a chest full of other firearms. He was often heard to complain that his father had deprived him of his bride. On Christmas evening he confessed to a priest that he had resolved to murder a man. The priest, therefore, refused him absolution. The prior of the monastery of Atocha artfully drew from him expressions from which it could be inferred that he meditated an attempt on his own father. The confession was then communicated to the king, who exclaimed, "I am the man whom my son intends to murder; but I shall take measures to prevent it." Thus Philip, impelled by hatred or fear, by policy or superstition, resolved on the destruction of his only son, in whom he saw only a criminal, unworthy of the crown. On the night of Jan. 18, 1568, while Don Carlos was buried in a deep sleep, Count Lerma entered his chamber and removed his arms. Then appeared the king, preceded by Ruy Gomez de Silva, the Duke of Feria, the grand prior of the order of St. John, brother of the Duke of Alva, and several officers of the guard, and state councillors; Don Carlos still slept. They

Carlos

awoke him; he beheld the king his father, and exclaimed, "I am a dead man." Then addressing Philip, he said, "Does your majesty wish to kill me? I am not mad, but reduced to despair by my sufferings." He conjured with tears those who were present to put him to death. "I am not come," answered the king, "to put you to death, but to punish you as a father, and to bring you back to your duty." He then commanded him to rise, deprived him of his domestics, ordered a box of papers under his bed to be seized, and committed him to the care of the Duke of Fria and six noblemen, enjoining them not to permit him to write nor to speak to any one. These guards clothed Don Carlos in a mourning dress, took from his chamber the tapestry, the furniture, and even his bed, leaving him nothing but a mattress. Don Carlos, full of rage and despair, caused a large fire to be kindled, under pretext of the extreme cold of the winter, and threw himself suddenly into the flames. It was with difficulty that he was rescued. He attempted by turns to finish his life by thirst, by hunger, by eating to excess. After Philip had endeavored to justify his measures to the Pope and the principal sovereigns of Europe, and had also given notice to the superior clergy, to the courts of justice, and to the cities of his empire, of what had passed, he referred the case of the prince, not to the Inquisition, but to the council of State, under the direction of Cardinal Espinosa, who was State councillor, grand inquisitor, and president of the junta of Castile. This court is said, after a minute examination and hearing many witnesses, to have condemned him to death. Other accounts, however, state that he died of a malignant fever before any judgment was passed, after having taken the sacrament with much devotion, and having asked his father's pardon, July 24, 1808. The melancholy fate of Don Carlos has served as a subject for several tragedies—those of Schiller, Alfieri, Otway, and Campistron.

Carlos, Don, Duke of Madrid, nephew of Don Carlos of Montemolin, born March 30, 1848. On the death of his uncle (1861) he became head of the Carlist party. In 1867 he married the daughter of Duke Charles III. of Parma. In 1872 he issued a manifesto to the Carlist party at Madrid and appeared in the Basque provinces, but was badly defeated at Oroquieta and fled back to France. In 1873 he reappeared in the N. provinces of Spain; captured the stronghold Estella, and had soon overrun Navarre, Catalonia, Aragon, and Valencia, with the exception of the great cities. He was aided with money by all the priests and Legitimists of Europe. By February, 1876, the rebels were hemmed in along the N. coast, and the majority surrendered

Carlsbad

at Pamplona. He himself fled over the French border, and has since lived in exile and comparative poverty. During the Spanish-American War he came into notice again, and on April 13, 1898, from his retreat in Switzerland, issued a manifesto to his supporters; but he accomplished nothing, and again went into retirement. He died July 18, 1909.

Carlos I., King of Portugal; born in Lisbon, Sept. 28, 1863; son of King Luiz I. In May, 1886, he married Marie Amélie de Bourbon, daughter of the Count of Paris. Almost immediately after his accession to the throne in 1889 a revolution broke out in Brazil, which resulted in the overthrow of the empire and the formation of a republic. In the financial straits to which Portugal was reduced in 1892, the king and his family surrendered 20 per cent. of their personal revenue. He was assassinated at Lisbon, Feb. 1, 1908.

Carlotta, Ex-empress of Mexico, born in Brussels, June 7, 1840, the daughter of Leopold I. of Belgium. She was married to Maximilian, Archduke of Austria (1857). She accompanied her husband to Mexico in 1864, but in 1866 returned to Europe to solicit aid from the French Emperor and from the Pope. Her failure and the news of her husband's overthrow unbalanced her mind. She still lives at Brussels.

Carlovingians (kar-lō-vin'yans), the second dynasty of the French or Franklin kings, which supplanted the Merovingians, deriving the name from Charles Martel or his grandson Charlemagne (that is, Karl or Charles the Great). Charles Martel (715-741) and his son Pepin (741-768) were succeeded by Charlemagne and his brother Carloman (768-771). Charlemagne became sole king in 771, and was succeeded in the Empire of the West by his son Louis le Debonnaire (814). He divided his empire among his sons, and at his death (840) his son Charles the Bald became King of France. He died in 877, and was succeeded by a number of feeble princes. The dynasty came to an end with Louis V., who died in 987.

Carlovitz, Carlovicz, or Carlovitza, a town of the Austrian empire, on the frontier of Slavonia. The great vine mountain in the vicinity yields the best and strongest qualities of Hungarian wines. A peace was concluded here in 1699, between Austria, Poland, Russia, Venice, and Turkey. In 1848-1849, Carlovitz was the focus of the Servian rebellion against Hungary, and the theater of collision between the Servians and the Magyars, and at a later period between the Hungarians and the Austrians.

Carlsbad, a town in Bohemia, on the Tepl, near its influx to the Eger, 116 miles W. by N. of Prague. It is widely cele-

Carlskrona

brated for its hot mineral springs, and is frequented in summer by visitors of the most aristocratic character from all parts of Europe. The permanent population numbers over 15,000 persons, all very industrious, making jewelry, porcelain, and various articles such as are likely to find ready purchasers among the visitors, who in the season—April to October—number from 25,000 to 30,000. Set in most lovely scenery, the town is well built, and offers good accommodation for its guests. The temperature of the hot springs varies from 117° to 167° F. The principal spring, the Sprudel, has a very large volume, and is forced up to a height of three feet from the ground. Altogether, the daily flow of the springs of Carlsbad is estimated at 2,000,000 gallons. The principal ingredient in the water is sulphate of soda. The whole town of Carlsbad appears to stand on a vast caldron of boiling water, which is kept from bursting only by the safety-valves the springs provide. Ascribing its foundation to the Emperor Charles IV. (1347), Carlsbad was made a free town by Joseph I.

Carlskrona, the capital of a Swedish province, built on five rocky islets in the Baltic, 240 miles S. S. W. of Stockholm. It was founded in 1680 by Charles XI., who gave it his own name, and made it the great naval station and arsenal of Sweden, instead of Stockholm. It has a magnificent harbor, with a sufficient depth of water to float the largest vessels. The only practicable entrance is strongly defended. Pop. (1905) 26,673.

Carlsruhe, or **Karlsruhe** (kärls'rö-è), the capital of the grand-duchy of Baden, situated 5 miles E. of the Rhine, and 39 W. N. W. of Stuttgart, 34 S. S. W. of Heidelberg. Founded in 1715, and built in the form of a fan, with 32 streets radiating from the palace, it has a number of fine buildings—the palace itself (1751–1776), the parliament-house (1845), the theater (1853), the town-hall (1821), the museum (1852), with the ducal library of 150,000 volumes. Before the palace stands a bronze statue of the city's founder, the Margrave Charles William; and in the market-place is a stone pyramid inclosing his remains. The manufactures include machines of various sorts, engines, locomotives, railway carriages and wagons, jewelry, carpets, chemical products, and cloth. Pop. (1905) 111,249.

Carlstadt, a fortified town of Croatia, Austro-Hungary, on the Kulpa, 32 miles S. W. of Agram by rail. It is the seat of a Greek bishopric, and has a large transit trade. Carlstadt, in Bavaria, on the Maine, is 15 miles N. N. W. of Würzburg.

Carlstadt, Andreas Rudolf Bodenstein,

Carlyle

a German reformer, born in Carlstadt in 1480. He was appointed professor of theology at Wittenberg in 1513. About 1517 he became one of Luther's warmest supporters. He was excommunicated by the bull against Luther, and was the first to appeal from the Pope to a general council. While Luther was at the Wartburg Carlstadt instigated the people and students to the destruction of the altars and the images of the saints, greatly to the displeasure of Luther. In 1524 he declared himself publicly the opponent of Luther, and commenced the controversy respecting the sacrament, denying the bodily presence of Christ in the sacramental elements. This controversy ended in the separation of the Calvinists and Lutherans. After many misfortunes he settled as vicar and professor of theology at Basel, where he died, Dec. 25, 1541.

Carlyle, Alexander, a minister of the Scottish Church; born in Dumfriesshire, Jan. 26, 1722; son of a parish minister. He was educated at the Universities of Edinburgh and Glasgow; afterward studied at the University of Leyden; and was a volunteer in the 1745 rebellion. Having been licensed as a preacher, in 1747 he was presented to the parish of Inveresk, in Mid-Lothian. Here he continued to the end of his life, which terminated on Aug. 25, 1805. His wife and children all pre-deceased him. Dr. Carlyle was one of the leaders of the Moderate party in the Scottish Church, the party which, during the latter half of the 18th century, ruled with such predominating sway, and included the names of Robertson, Blair, and Home among its members. As an eloquent debater and skillful ecclesiastical leader in the General Assembly he had no rival. He strenuously resisted all attempts to give additional influence to the popular element in ecclesiastical matters. Notwithstanding his literary abilities, he never came forward as a claimant before the public for any literary honors. He, however, left behind him a well-known autobiography, which though commenced in his 79th year, is a singularly interesting production, both from the vigor and sprightliness of its style, and the pictures which it presents of Scottish society in the 18th century. After remaining for a long time in manuscript it was published in 1860, under the editorship of John Hill Burton.

Carlyle, Jane Welsh, wife of Thomas Carlyle; born in Haddington, Scotland, July 14, 1801. She claimed descent from William Wallace and John Knox and was from youth remarkable for beauty, wit and intellect. Her "Letters," edited by her husband, were published in 1883, the work being given to the world by J. A. Froude. She died in London, April 21, 1866.

Carlyle, Thomas, an English author, born in Ecclefechan, Dumfriesshire, Scotland, Dec. 4, 1795. He was the eldest son of James Carlyle, a mason, afterward a farmer, and was intended for the Church, with which object he was carefully educated at the parish school and afterwards at the burgh school of Annan. In his 15th year he was sent to the University of Edinburgh, where he developed a strong taste for mathematics. Having renounced the idea of becoming a minister, after finishing his curriculum (in 1814) he became a teacher for about four years, first at Annan, afterward at Kirkcaldy. In 1818 he removed to Edinburgh, where he supported himself by literary work, devoted much time to the study of German, and went through a varied and extensive course of reading in history, poetry, romance, and other fields.

His first literary productions were short biographies and other articles for the "Ed-



THOMAS CARLYLE.

inburgh Encyclopædia." His career as an author may be said to have begun with the issue in monthly portions of his "Life of Schiller" in the London Magazine, in 1823, this work being enlarged and published separately in 1825. In 1824 he published a translation of Legendre's "Geometry," with an essay on proportion by himself prefixed. The same year appeared his translation of Goethe's "Wilhelm Meister's Apprenticeship." He was next engaged in translating specimens of the German romance writers, published in four volumes in 1827. In 1827 he married Miss Jane Bailie Welsh, daughter of a doctor at Haddington, and a lineal descendant of John Knox. After his marriage he resided for a time in Edinburgh, and then withdrew to Craigenputtock, a farm in Dumfriesshire belonging to his wife. Here he wrote a number of critical and biographical articles for various periodicals, and here was written "Sartor

Resartus," the most original of his works. The writing of "Sartor Resartus" seems to have been finished in 1831, but the publishers were shy of it, and it was not given to the public till 1833-1834, through the medium of "Fraser's Magazine."

The publication of "Sartor" soon made Carlyle famous, and on his removal to London early in 1834 he became a prominent member of a brilliant literary circle embracing John Stuart Mill, Leigh Hunt, John Sterling, Julius Charles and Augustus William Hare, F. D. Maurice, etc. He fixed his abode at Cheyne Row, Chelsea, where his life henceforth was mainly spent. His next work of importance was on the "French Revolution," published in 1837. About this time and in one or two subsequent years he delivered several series of lectures, the most important of these, "On Heroes and Hero-worship," being published in 1840. "Chartism," published in 1839, and "Past and Present," in 1843, were small works bearing more or less on the affairs of the time. In 1845 appeared his "Oliver Cromwell's Letters and Speeches, with Elucidations," a work of great research, and brilliantly successful in vindicating the character of the great Protector. In 1850 came out his "Latter-day Pamphlets." This work was very repulsive to many from the exaggeration of its language, and its advocacy of harsh and coercive measures. He next wrote a life of his friend, John Sterling, published in 1851, and regarded as a finished and artistic performance.

The largest and most laborious work of his life, "The History of Friedrich II. of Prussia, called Frederick the Great," next appeared, the first two volumes in 1858, the second two in 1862, and the last two in 1865, and after this time little came from his pen. In 1866, having been elected Lord Rector of Edinburgh University, he delivered an installation address to the students "On the Choice of Books." While still in Scotland the sad news reached him that his wife had died suddenly in London. This was a severe blow to Carlyle. Mrs. Carlyle, besides being a woman of exceptional intellect, was a most devoted and affectionate wife. From this time his productions were mostly articles or letters on topics of the day, including "Shooting Niagara," and "After?" in which he gave vent to his serious misgivings as to the result of the Reform Bill of 1867. An unimportant historical sketch, "The Early Kings of Norway," appeared in 1874, but was written long before. Toward the end of his life he was offered a government pension and a baronetcy, but declined both.

He left the estate of Craigenputtock to the University of Edinburgh, settling that the income from it should form ten bur-

Carman

saries to be annually competed for—five for proficiency in mathematics and five for classics (including English). He had appointed James Anthony Froude his literary executor, who, in conformity with his trust, published “Reminiscences of Thomas Carlyle” (1881); “Thomas Carlyle: the First Forty Years of His Life” (1882); “Letters of Jane Welsh Carlyle” (1883); and “Thomas Carlyle: Life in London” (1884). The character of Carlyle presented in these volumes gave an unexpected shock to the public, and a bitter controversy has raged regarding Froude’s conduct in the matter. Carlyle died in Chelsea, Feb. 5, 1881.

Carman, Bliss, a Canadian poet; born in Fredericton, N. B., April 15, 1861. His first publication, “Low Tide on Grand Pré: A Book of Lyrics” (1893), had a very favorable reception. Other volumes of his collected poems are: “Sons from Vagabondia” (1894); “Behind the Arras: A Book of the Unseen” (1895). His poems usually appear first in American magazines and other periodicals.

Carman, Elbert S., an American editor, born in Hempstead, N. Y., in 1836, was graduated at Brown University in 1858, began contributing to the “Turf, Field and Farm” and similar publications early in life, and became owner and editor of the “Rural New Yorker” in 1876. In connection with the last publication he established a farm at River Edge, N. J., where he gave much of his time to testing new plants, vines and seeds, and also to originating new varieties of vegetables, fruits and grains. He died in New York City, Feb. 28, 1900.

Carman, Ezra Ayers, an American military officer; born in Metuchen, N. J., Feb. 27, 1834; was graduated at the Western Military Institute, Kentucky, in 1855; Assistant Professor of Mathematics in the University of Nashville in 1855–1856; served through the Civil War in the Army of the Potomac and the Army of the Cumberland; and attained the rank of Brigadier-General of volunteers. He was comptroller of Jersey City in 1871–1875; clerk in the United States Department of Agriculture in 1877–1885; and a member of the Antietam Battlefield Board. He died in 1909.

Carmagnole (kär-man-yō’la) (from *Carmagnola*, in Piedmont), a dance accompanied by singing. Many of the wildest excesses of the French revolution of 1792 were associated with this dance. It was afterward applied to the bombastic reports of the French successes in battle. The name was also given to a sort of jacket worn as a symbol of patriotism.

Carmaux (kär-mō’), a great coal-mining center in the French department of Tarn,

Carmen Sylva

9 miles N. E. of Albi by rail. Serious strikes and riots occurred at this place in 1892.

Carmel, a range of hills in Palestine, extending from the Plain of Esdraelon to the Mediterranean, and terminating in a steep promontory on the S. of the Bay of Acre. It has a length of about 16 miles, and its highest point is 1,810 feet above the level of the sea. Many churches and monasteries have in different times been built along the range.

Carmelites, mendicant friars of the order of Our Lady of Mount Carmel, whose habit is a cassock, scapular, and hood of brown color, and a white cloak, from which they received the name of White Friars. They claim to be in direct succession from Elijah, but their real founder was Berthold, a Calabrian, who, with a few companions, migrated to Mount Carmel about the middle of the 12th century, and built a humble cottage with a chapel, where he and his associates led a laborious and solitary life. In 1209, Albert, patriarch of Jerusalem, gave the solitaries a rigid rule, containing articles, and enjoining the most severe discipline. After their establishment in Europe, their rule was in some respects altered, the first time by Pope Innocent IV., and afterward by Eugenius IV. and Pius II. The order is divided into two branches, viz., the Carmelites of the earlier observance, called moderate or mitigated, and those of the strict observance, who are known as the barefooted Carmelites.

Carmen Sylva, the pen-name of Elizabeth, Queen of Rumania, born Dec. 29, 1843; the daughter of Prince Hermann of Wied Neuwied, and Maria of Nassau; married King (then Prince) Charles of Rumania in 1869. Her only child, a daugh-



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ter, died in 1874, and out of this great sorrow of her life arose her literary activity. Two poems, printed privately at Leipzig in 1880 under the name “Carmen

Carminative

Sylva," were followed by "Storms" (Bonn, 1881), "Leidens Erdengang" (Berlin, 1882; translated into English as "Pilgrim Sorrow" by Helen Zimmern, 1884), "Jehovah" (Leipzig, 1882), "Ein Gebet" (Berlin, 1882), and "Thoughts of a Queen" (Paris, 1882). Many of the translations in "Rumanian Poetry" (Leipsic, 1881) are from her pen. Another book, in which she worked into literary form many native traditions of her adopted country, is "Pelesch-Marchen" (Leipsic, 1883). In the war of 1877-1878, as *muma rântilor* ("mother of the wounded"), she endeared herself to her people by her devotion to the wounded soldiers, and since that time she has diligently fostered the national women's industries.

Carminative, a substance which acts as a stimulant to the stomach, causing expulsion of flatulence, also allaying pain and spasm of the intestines. They generally contain a volatile oil; most of the ordinary condiments, as pepper, mustard, ginger, cinnamon, cloves, nutmeg, oil of peppermint, etc., are carminative. They are used in cases of distension, and colic of the stomach or intestines from flatulence, also as adjuncts to purgatives to prevent griping, and to promote digestion in cases of atonic dyspepsia.

Carmine, the fine red coloring matter or principle of cochineal, from which it is prepared in several ways, the result being the precipitation of the carmine. It is used to some extent in dyeing, in water-color painting, to color artificial flowers, confectionery, etc. Other preparations get the same name.

Carmona, a town of Andalusia, Spain, 27 miles E. N. E. of Seville by rail, is picturesquely situated, and commands an imposing view of the valley of the Guadalquivir. Julius Cæsar speaks of Carmo or Carmona as "by far the strongest city of the whole province of further Spain." Recent important excavations on the site of the ancient necropolis, to the W. of the modern town, have brought to light a large number of tombs and funeral triclinia in almost perfect preservation. Considerable portions of the Moorish wall and Alcazar still remain.

Carna, the divinity who protected the vital parts of the human body.

Carnac, a village of Brittany, France, department of Morbihan, on a height near the coast, 15 miles S. E. of Lorient, and remarkable for the so-called Druidical monuments in this vicinity. These consist of 11 rows of unhewn stones, which differ greatly both in size and height, the largest being 22 feet above ground, while some are quite small. These avenues originally extended for several miles, but many of the stones have been cleared away for agricultural

Carnation

improvements. They are evidently of very ancient date, but their origin is unknown.

Carnahuba. See CARNAUBA.

Carnallite (named after Von Carnall, of the Prussian mines), a milk-white mineral from Strassfurt and Persia. It is strongly phosphorescent, massive and granular. Composition: Chloride of magnesium, 34.20; chloride of potassium, 26.88; water, 33.92.

Carnaria. See CARNIVORA.

Carnarvon, Henry Howard Molyneux Herbert, Earl of, born June 24, 1831; from Eton passed to Christ Church, Oxford, where in 1852 he took a first-class in classics. He had succeeded his father as fourth earl in 1849, so now entered the Upper House as a Conservative, and in 1866 accepted from Lord Derby the office of Colonial Secretary. As such he had moved the second reading of an important bill for the confederation of the British North American colonies, when, with the future Marquis of Salisbury, he resigned office upon the Reform Bill of 1867, which he regarded as democratic and dangerous. On Disraeli's return to power in 1874, Lord Carnarvon resumed office as Colonial Secretary, once more, however, to resign in January, 1878, in consequence of the dispatch of the British fleet to the Dardanelles. During the brief Conservative administration of 1885-1886 he was Lord-Lieutenant of Ireland, and his negotiations with Mr. Parnell gave rise, two years later, to considerable controversy. He was author of "The Druses of Mount Lebanon" (1860), "Reminiscences of Athens and the Morea" (1869), and translations of the "Agamemnon" (1879), and the "Odyssey" (1886). He died June 28, 1890.

Carnatic, a region on the E. or Coromandel coast of India, now included in the province of Madras, extending inland to the Eastern Ghats, and lengthwise from Cape Comorin to 16° N. It extended for about 600 miles along the E. coast, and from 50 to 100 miles inland. The name Karnataka was originally applied by its Mohammedan conquerors to Mysore and the country above the Ghats. In course of time the same term has come to be applied exclusively to the country below the Ghats. The Carnatic is no longer an administrative division, but is memorable as the theater of the struggle between France and England for supremacy in India.

Carnation, in the fine arts, flesh color; the parts of a picture which are naked or without drapery, exhibiting the natural color of the flesh.

Carnation, the popular name of varieties of *Dianthus Caryophyllus*, the clove-pink. The carnations of the florists are much prized for the beautiful colors of their

Carnauba

sweet-scented double flowers. They are arranged into three classes according to color, viz., *bizarres*, *flakes*, and *picotees*.

Carnauba, the Brazilian name of the palm *Corypha cerifera*, which has its leaves coated with waxy scales, yielding by boiling a useful wax. The fruit and pith are eaten, the leaves are variously employed, and the wood in building.

Carneades (kär-nē'a-dēz), a Greek philosopher, born in Cyrene, in Africa, about 213 B. c. He studied logic at Athens under Diogenes, but became a partisan of the Academy, and an enemy of the Stoics, whose stern and almost dogmatic ethics did not suit his sceptical predilections. He was in fact, one of the most important of the ancient sceptics, and held that no criterion of truth exists either in the senses or the understanding of man. He was founder of the Third or New Academy. In 155 B. c., along with Diogenes and Critolaus, he was sent as ambassador to Rome, where he delivered two orations on justice, in the first of which he eulogized the virtue, and in the second proved that it did not exist. Honest Cato, who had no relish for intellectual jugglery, and thought it a knavish excellence at the best, moved the senate to send the philosopher home to his school, lest the Roman youth should be demoralized. Carneades died at Athens, 129 B. c.

Carnegie, Andrew, an American manufacturer and philanthropist; born in Dunfermline, Scotland, Nov. 25, 1837. In



ANDREW CARNEGIE.

1848, just after his family had emigrated to America, he got a job as a "bobbin boy" in a cotton factory of Allegheny City. His wages were one dollar and twenty cents a week. He then became successively telegraph messenger boy, operator, railway employee of the Pennsylvania Company, and superintendent of the Pittsburgh division of the system. His fortune was begun through the Woodruff Sleeping-car Company, and increased by land invest-

Carnegie Institution

ments near Oil City, Pa. In 1868 he laid the foundations of his great steel industries, which were finally consolidated in 1899 as the Carnegie Steel Company. In 1901 he retired, and the company was merged into the greatest corporation the world has ever known, the "billion dollar" United States Steel Corporation.

After his retirement he distinguished himself by making great gifts of money for educational and philanthropic purposes, the total amount being estimated in 1911 at over \$200,000,000. The most noteworthy of his gifts were \$30,000,000 for public libraries in the United States; \$16,000,000 for the Carnegie Institute at Pittsburg, Pa.; \$15,000,000 for college professors' pensions; \$25,000,000 for the Carnegie Institution at Washington, D. C.; \$10,000,000 for a Carnegie Peace Foundation; \$10,000,000 for libraries in foreign countries; \$10,000,000 for Scotch universities; \$5,000,000 for a Hero Fund in the United States, \$1,250,000 for one in Scotland, \$1,250,000 for one in Germany, and \$1,000,000 for one in France; \$5,000,000 for Carnegie Steel Company employees; \$5,000,000 for Dunfermline (Scotland) endowment; \$4,000,000 for Carnegie Technical Institute at Pittsburg; \$1,750,000 for Temple of Peace at The Hague; \$1,500,000 for the Allied Engineers' Societies in New York; \$750,000 for building for the International Bureau of American Republics at Washington, D. C.; \$18,000,000 to colleges in the United States; \$20,000,000 in miscellaneous gifts in the United States; and \$2,500,000 in the same in Europe. His publications include "Triumphant Democracy," "The Gospel of Wealth," "The Empire of Business," "Problems of To-Day." He has spoken and written much against war.

Carnegie Institution, an educational body in Washington, D. C., founded by Andrew Carnegie, incorporated in 1902, and placed by Congress under the control of a board of 24 trustees in 1904. Its aims are: (1) To increase the efficiency of the universities and other institutions of learning throughout the country by utilizing and adding to their existing facilities, and by aiding teachers in the various institutions for the experimental and other work in these institutions as far as may be advisable. (2) To discover the exceptional man in every department of study, whenever and wherever found to enable him by financial aid to make the work for which he seems especially designed his life work. (3) To promote original research, paying great attention thereto as being one of the chief purposes of this institution. (4) To increase the facilities for higher education. (5) To enable such students as may find Washington the best point for their special studies to avail themselves of such advantages as may be open to them in the museums, libraries, laboratories, observatory, meteorological, pisci-

Carniola

cultural, and forestry schools and kindred institutions of the several departments of the government. (6) To insure the prompt publication and distribution of the results of scientific investigation, a field considered to be highly important.

The trustees assembled in Washington on Jan. 29, 1902, received from Mr. Carnegie the deed of gift of \$10,000,000 (subsequently increased), and elected Daniel C. Gilman, LL.D., president of the Institution.

Carniola (German, KRAIN), a crownland and titular duchy of Austria-Hungary, with an area of 3,856 square miles. This province is very mountainous, and abounds in caverns and lakes. Owing to the many forests, arable land is scarce, and though some of the districts produce considerable wheat, barley, and wine, the region, upon the whole, is regarded as infertile. Quicksilver is the chief mineral, the greatest amount coming from the famous Idria mines; ores of lead, iron, and zinc are also mined. Manufacturing industry is limited, the main branches being weaving and the making of leather goods. As to internal administration the crownland is divided into eleven districts and the city of Laibach, which is the capital. The people are almost entirely Slavonic. Pop. (1900) 508,150.

Carnival, the festival celebrated in Roman Catholic countries, and especially in Rome and Naples, with great mirth and freedom during the week before the beginning of Lent. In the United States carnivals are annually celebrated in New Orleans, in St. Louis and in Memphis. That at New Orleans is especially spectacular, the festivities being prolonged three days and attracting thousands of visitors.

Carnivora. All animals which prey upon other animals are carnivorous, but the term *Carnivora*, as the designation of a group, is now restricted to that order of mammals to which the cat, dog, bear, and seal belong. The head is small in proportion to the bulk of the body, and the skin is well covered with hair. The limbs, four in number, are fully developed, and are adapted either for walking or swimming. Two sets of teeth, deciduous or milk and permanent, are always developed in succession, and in both sets incisors, canines, and molars are distinguishable. The order is divided into two groups, the *Fissipedia*, which include the animals popularly known as carnivorous, namely, lion, wolf, bear, etc., whose life is terrestrial, and the *Pinipedia*, or those which are specially adapted for aquatic life.

1. *Fissipedia*.—All the carnivores of this division, except the sea-otter (*Enhydra*), have six incisor teeth in each jaw, the canine teeth are prominent, and one of the

Carnivora

molar series in each jaw is usually compressed laterally, so as to present a cutting edge. The toes are furnished with claws, and the anterior limbs are used for seizing and holding prey as well as for walking, but the thumb cannot be carried across the palm of the hand, so as to oppose the other digits. The skull is contracted behind the orbits, so as to give an hour-glass form when seen from above, and the posterior or cranial portion may be short and rounded as in the cat, or elongated as in the otter. The facial portion, of equal dimensions with the cranial in the cat, is in the wolf very much larger. The hollow formed by this constriction on other side of the head is bridged over by the wide zygomatic arch, and thus gives abundant room for the powerful muscles of mastication. The posterior teeth are divided into premolars and molars, the last of the premolar series in the upper, and the first of the molar series in the lower jaw presenting the lateral compression and trenchant margin which earns for them the name of sectorial or carnassial teeth. Behind the carnassial the molars have tuberculated crowns which fit them, among other uses, to retain the food while it is cut by those in front; the number of these teeth is less the more purely animal is the diet. The stomach is simple and undivided, and, as a general rule, is more rounded in the flesh-eating genera. The limbs terminate in digits, which are never fewer than four, and are furnished with sharp claws, which, in the *Felidæ*, are retractile within sheaths of the integument on the dorsal surface of the toes. In walking, the extremities of the toes are applied to the ground, as in the digitigrade cat and dog; or the whole sole of the foot is put down, as in the plantigrade bear. Some of our illustrations show this clearly. The dhole, one of the digitigrade *Canidæ*, or dogs, is represented with as much of the hind foot applied to the ground in sitting as the bear applies when in the erect attitude. The six families included under the fissipede carnivores are—1. *Felidæ*: lion, tiger, leopard, cat, etc. These are all digitigrade, and possess retractile claws. In external form and dentition they present the highest type of the carnivorous structure. 2. *Canidæ*: wolf, dog, jackal, fox, etc. The claws are not retractile, and the gape is longer. The toes in this and the previous family are five on the anterior and four on the posterior extremities. 3. *Hyænidæ*: hyena, aard-wolf, etc. The hyenas have the anterior limbs longer than the posterior, and both terminate in four toes. The skull and dentition approximate to those of the *Felidæ*. 4. *Viverridæ*: the supple elongated bodies of these animals are intermediate between those of the cats and the martens. Some, as the civet, genet, zibet, have the claws retractile; in

Carnivora

others, as the ichneumon and rasse, they are not retractile. Those mentioned are digitigrade, but the suricate of Central Africa is plantigrade. In this family glands are found under the tail, the secretions of which have powerful odors, and are used as perfumes. The civet is collected from time to time from animals kept for the purpose in Africa. The diet of this family is not purely animal. 5. *Mustelidæ*: the members of this family have elongated bodies with short limbs, terminating usually in five-toed feet, with retractile or non-retractile claws. The marten, weasel, polecat, ermine, glutton or wolverine, the most rapacious and cunning member of the group, constitute one sub-family of exclusively terrestrial life. They are digitigrade, and have retractile claws, as have also the members of another sub-family, the *Lutrinæ*, or otters, in which the toes are webbed and the tail is broad, provisions for its largely aquatic life to which the thick close fur is also an adaptation. The clumsy honey-eating ratel (*Mellivora*) of South Africa belongs to the plantigrade division, with non-retractile claws, characters shared also by the badgers (*Meles*), the skunk (*Mephitis*) of North America, and the teledu (*Mydaus*) of Java. 6. *Ursidæ*: in this family the carnassial tooth is no longer trenchant, but tuberculated. All are plantigrade, but the habits and aspect vary considerably: thus, the binturong (*Arctictis*) of Java, the kinkajou (*Cercoleptes*) of Northern South America, and the panda (*Ailurus*) of East India, resemble in figure the *Mustelidæ*, but possess a prehensile tail. The raccoon (*Procyon*) and coatimondi, both American genera, differ from the foregoing in having the toes straight, not bent, and the claws are non-retractile. The bears (*Ursinæ*) connect the terrestrial carnivores with the seals. These, the bulkiest of the order, have a very wide geographical range, the polar bear living, as its trivial name indicates, in the extreme N., while the brown bear ranges through the N. parts of the European, Asiatic, and American continents; and the Syrian, Tibetan, sloth, and Malayan bears, form a series of distinct species passing through all the climates of the Northern Hemisphere. The bears are omnivorous, and, at least the females, have a winter sleep. The raccoon and its allies are sometimes made a family with the name *Procyonidæ*.

2. *Pinnipedia*.—The aquatic carnivores comprise three families, represented by the walrus or seahorse (*Trichehus*), the eared seals (*Otaria*), and the common seals (*Phoca*). They are related to the preceding families through the otters and the bears, and agree in having the extremities modified into swimming organs or flippers, and the teeth more nearly uniform in character. The walrus, which approaches nearest in

Carnivorous Plants

form to the bears, has the tail connected for half its length to the hind limbs by a fold of skin, and the hind legs are directed backward. In the eared seals the hind legs and tail are more closely connected, and in the seal the hind legs and tail form one uninterrupted swimming fin, so that in them the hind limbs can no longer support the body. The teeth of the walrus are similar in shape, except the canines of the upper jaw, which are prolonged into tusks, descending below the lower jaw. None of the teeth have ever more than two fangs, thus indicating an approach to the dentition of the porpoise. The otaria is distinguished from the common seal by the existence of short conspicuous ears, and by the character of the fur, which constitutes the finer and more expensive sealskin of commerce. The figures on the third plate illustrate the form and skeleton of the seals; the crested seal, fig. 20, showing the curious male ornament of a cutaneous sac which can be inflated at will, the female possessing no such structure.

The *Carnivora* are found fossil in the Eocene, Tertiary, and in all subsequent deposits.

Carnivorous Plants, plants which derive nourishment directly from the bodies of insects or other small creatures entrapped by them in various ways. Such plants, which number several hundreds, mostly belong to the natural orders *Sarraceniacæ* or pitcher plants (genera *Sarracenia*, *Darlingtonia*, etc.), *Droseraceæ* (genera *Drosera*, *Dionæa*, *Aldrovanda*, etc.), *Lentibulariaceæ* (genera *Pinguicula*, *Utricularia*, etc.), *Nepenthaceæ* (genus *Nepenthes*). In all these the apparatus for catching insects consists of a modified leaf or portion of a leaf, and in some the modifications are so curious and the adaptations so perfect that the plant seems almost endowed with intelligence. In the pitcher-plant order the leaf consists of a longer or shorter tube ventrally winged and sometimes crowned by a sort of hood. Insects are enticed to the leaves by means of a sugary secretion near the mouth, and sometimes also continued down the edge of the wing so as to form what has been described as a "saccharine trail" from near the ground up to the orifice. The tube when not hooded may contain rain in addition to the internally secreted juice, but in the hooded forms rain is excluded. In *Nepenthes* the sessile leaf-blade is continued as a twining tendril which bears on its summit a pitcher closed in the younger plants by a hinged lid. The species of *Drosera* or sun-dew, of which some are common in British bogs, have their leaves provided with stalked glands which exude a clear juice. When an insect alights on any of these glands, those in the neighborhood bend toward it in order to secure it more

effectively. In the allied *Dionaea muscipula* or Venus' fly-trap of Carolina, however, the leaf-blade bears on its apex a sort of trap consisting of two pieces hinged together. These have bristles on their outer ends and a few sensitive hairs on their inner faces, and if any of the hairs or the hinge is touched by an insect the trap closes and secures it. The common butterwort of Great Britain (*Pinguicula vulgaris*) also has leaves which catch insects (and vegetable matters) by means of sensitive glandular hairs, and the bladderworts (*Utricularia*) are provided with small submerged ascidia or pitchers. The chief English work on this subject is Darwin's "Insectivorous Plants" (1875). Consult also Kerner's "Natural History of Plants."

Carnochan, John Murray (kär'no-kan), an American surgeon, famous for his bold and skillful operations; born in Savannah, Ga., July 4, 1817; studied at Edinburgh and at various European universities; and began his practice in New York City in 1847. In 1851 he became professor of surgery at the New York Medical College, and surgeon-in-chief to the State Immigrant Hospital. At one time he cured neuralgia by excising the whole trunk of the second branch of the fifth pair of nerves. In 1852 he tied the femoral artery to cure exaggerated nutrition. He also tied the primitive carotid artery on both sides, to cure elephantiasis of the neck. In 1853 he excised the entire radius, in 1854 the entire ulna. He published a treatise on "Congenital Dislocations," and a translation of Rokitauský's "Pathological Anatomy." He died in New York, Oct. 28, 1887.

Carnot, Lazare Hippolyte (kär-nō'), a French Democrat, born in St. Omer, April 6, 1801. He was in early life a disciple of St. Simon, but, like others, left that school on account of the lax morals advocated by *Enfantin*—protesting against "the organization of adultery"—and devoted himself to the inculcation of a more orthodox and virtuous socialism in various periodicals. After the February Revolution (1848) he was appointed Minister of Public Instruction, but soon resigned. In 1863 he entered the Corps Législatif, and the National Assembly in 1871. He was elected a senator for life in 1875, and died March 16, 1888. He wrote a "Statement" of St. Simonianism and "Memoires" of Henri Gregoire and of Barrère.

Carnot, Lazare Nicolas Marguerite, a French statesman, general, and strategist; born in Burgundy, May 13, 1753. When the Revolution broke out he was captain in the corps of engineers. In 1791 he was appointed deputy to the constituent assembly. In the following March he was

sent to the Army of the North, where he took command and successfully repulsed the enemy. On his return he was made member of the Committee of Public Safety, and directed and organized the French armies with great ability and success. As a member of the Committee Carnot was formally responsible for the decrees of Robespierre, but being incessantly occupied in his department knew really little of the atrocities to which the sanction of his name was lent. In 1797 Carnot, having unsuccessfully opposed Barras, had to escape to Germany, but returned, and was appointed Minister of War by Napoleon (1800). But he remained in principle an inflexible Republican, voted against the consulship for life, and protested against Napoleon's assumption of the imperial dignity. For seven years after this Carnot remained in retirement, publishing several valuable military works. In 1814 Napoleon gave him the chief command at Antwerp, and in 1815 the post of Minister of the Interior. After the Emperor's second fall he retired from France. He died in Magdeburg, Prussia, Aug. 3, 1823.

Carnot, Marie François Sadi, President of the French Republic; born in Limoges, Aug. 11, 1837; a grandson of the famous war minister of the Revolution. He was educated at the *École Polytechnique* and the *École des Ponts et Chaussées*, Paris. He was assigned to duty in the engineer corps. During the siege of Paris in 1871 he was made prefect of the Seine-Inférieure and showed great ability as commissary-general. In politics he was an earnest Republican. Elected to the National Assembly in 1871 by the Côte d'Or, he soon rose to prominence. In 1876 he was chosen secretary of the Chamber of Deputies; in 1878 Secretary of Public Works. He was Minister of Public Works in 1881-1882 and 1886. In December, 1887, on the resignation of M. Grévy he was chosen President. The policy which he announced in his inaugural message, and which was consistently and successfully carried out during his administration, was one of peace with foreign nations, careful development of the army and navy, and economy in all departments. The support and confidence of the Conservative Republicans fortified him against the Socialists, the Anarchists, and the supporters of Boulanger. An attempt to involve his name in the Panama scandal failed utterly. While attending an exposition at Lyons, June 24, 1894, he was stabbed by a fanatical Italian Anarchist, and died the next day.

Carnot's Principle. Sadi Carnot, a son of the republican war minister of France, published in 1824 his "Réflexions sur la Puissance motrice du Feu." In it he announced the principle that is known in con-

nection with his name. The following is a statement of it. Considering a perfect thermodynamic engine, the criterion of which is its reversibility, Carnot shows that the efficiency of such an engine is the greatest that can be obtained with a given range of temperature. The denial of perpetual motion in its most logical form follows directly from the principle. Sir William Thomson states the denial thus: It is impossible by means of inanimate material agency to derive mechanical effect from any portion of matter by cooling it below the temperature of the coldest of the surrounding objects. It follows from Carnot's principle that all reversible engines, whatever be the substance employed, whether, for example, an air engine or a water engine is used, have the same efficiency, provided that they work between the same temperatures of source and refrigerator.

Caro, Annibale, an Italian author; born near Ancona, 1507. He was secretary to several members of the great Farnese family. He devoted himself to numismatics and the Tuscan language, and became famous for the purity and elegance of his style. Among his works are "Translations of the *Æneid* and of Aristotle's *Rhetoric*." He died in Rome in 1566.

Caro, Miguel Antonio, a Colombian prose-writer and poet; born in Bogotá, Colombia, Nov. 10, 1843. He was an editor and contributor to periodicals. His principal works are: "Poems" (1866); "Hours of Love," a prose book; and a translation into Spanish verse of Vergil's complete works (3 vols., 1873-1875). He was a correspondent of the Royal Spanish Academy, and in 1886 was national librarian. He died Aug. 5, 1909.

Carob, a tree, the *Ceratonia siliqua*, a native of the Levant. It is an evergreen, and produces long horn-like pods filled with a mealy, succulent pulp of sweetish taste, used for food for horses, and sometimes even for human beings, and called St. John's bread. The root is purgative. The fruits of a carob-tree were probably the "husks" which the prodigal in his depressed condition would fain have eaten. (Luke xv: 16).

Carol, a song of praise sung at Christmas-tide. It originally meant a song accompanied with dancing, in which sense it is frequently used by the old poets. It appears to have been danced by many performers, by taking hands, forming a ring, and singing as they went round. Bishop Taylor says that the oldest carol was that sung by the heavenly host when the birth of the Saviour was announced to the shepherds on the plains of Bethlehem. It is probable that the practice of singing carols at Christmas-tide arose in imitation of this, as the majority of the carols declared the good

tidings of great joy; and the title of Noels, nowells, or novelles, applied to carols, would seem to bear out this idea. Carol singing is of great antiquity among Christian communities, as the carol by Aurelius Prudentius, of the 4th century, will show.

Caroline Marie, Queen of Naples; daughter of Francis I. and Maria Theresa of Austria; born Aug. 13, 1752. She married Ferdinand IV. of Naples in 1768. Under her influence Ferdinand declared war against France in 1798. The French advanced upon Naples and she fled with her husband to seek protection at the hands of the English. She subsequently returned to Naples, but for conspiring against Napoleon was again driven into exile. She died in Vienna, Sept. 8, 1814.

Caroline, Queen of England; daughter of the Duke of Brunswick-Wolfenbüttel; born May 17, 1768. In 1795 she was married to the Prince of Wales, afterward George IV. The marriage was not to his liking, and after the birth of the Princess Charlotte he separated from her. Many reports were circulated against her honor, and a ministerial committee was formed to inquire into her conduct. But the people in general sympathized with her, regarding her as an ill-treated wife. In 1814 she made a journey through Germany, Italy, Greece, etc., to Jerusalem, in which an Italian, Bergami, was her confidant and attendant. When the Prince of Wales ascended the throne in 1820 he offered her an income of £50,000 on condition that she would never return to England. She refused, and in June of the same year entered London amid public demonstrations of welcome. The government now instituted proceedings against her for adultery, but the public feeling and the splendid defense of Brougham obliged the ministry to give up the divorce bill after it had passed the lords. Though banished from the court, the queen then assumed a style suitable to her rank. She died Aug. 7, 1821.

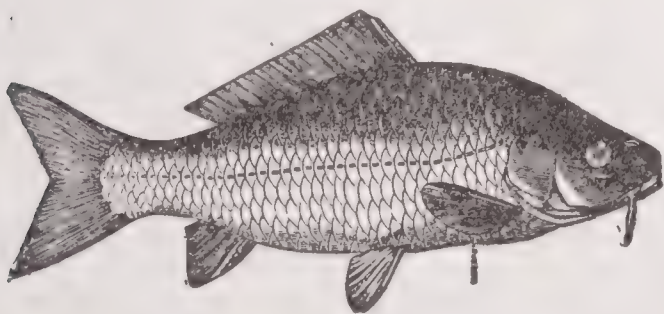
Caroline Islands, a group in the Western Pacific, lying between the Marshall and Pelew islands, with an area of about 270 square miles, and a population of some 22,000; but the Pelew (*q. v.*) group is generally included in the Caroline Archipelago (area, 560 square miles; population 36,000), which thus stretches across 32° of lon. and 9 of lat. There are some 500 small atolls in the archipelago, but three-fourths of both area and population are included in the five volcanic islands of Babelthouap, Yap, Rouk, Ponapé (Ascension), and Kusari (Strong Island); these are all fertile and well watered, and many of the low-lying lagoons, though less so, are well wooded and to some extent inhabited. The climate is moist, but not unhealthy,

and is tempered by cooling breezes. The people belong to the brown Polynesian stock, are strongly built, and are gentle, amiable, and intelligent; they are bold sailors, and carry on a brisk trade with the Ladrões to the N. where they have several settlements. Besides the usual products of the Polynesian islands, copra has been largely exported, the German factories alone transmitting 1,000 tons yearly. The islands were discovered in 1527 by the Portuguese, and called Sequeira; in 1686 they were annexed and rechristened in honor of Charles II. by the Spaniards, who, however, shortly changed the name to New Philippines. After the failure of several missionary attempts in the 18th century, Spain took little active interest in the group until August, 1885, when the German flag was hoisted on Yap. The sharp dispute which followed was submitted to the Pope as arbitrator, who decided in favor of Spain, but reserved to Germany special trade privileges. In 1887 disturbances broke out at Ponapé, in which the governor, who had arrested one of the American Protestant missionaries, was killed by the natives; but the rising was shortly put down. In February, 1899, Germany purchased from Spain the Caroline and Pelew islands, and all of the Ladrões excepting Guam, which had been ceded to the United States in the treaty of peace.

Carolus, a gold coin struck in the reign of Charles I., and originally 20 shillings in value, afterward 23 shillings. The name was given also to various other coins.

Carolus Duran. See DURAN, CAROLUS.

Carotid (kar-ot'id), [Gr. *karōtides* = the great arteries of the neck; from *karoō* = I make drowsy, put to sleep, from the old belief that sleep or drowsiness was caused by the flow of blood through them], the name of an artery on each side of the neck. The common carotids are two considerable arteries that ascend on the fore part of the cervical vertebra to the head to supply it with blood. The right common carotid is given off from the *arteria innominata*; the left arises from the arch of the aorta.



CARP.

Carp, a fresh-water fish, *Cyprinus cyprio* (Linn.), the type of the family *Cyprinidae*.

It is a native of Asia, but has been extensively introduced into Europe and the United States, especially in the latter, where it has been widely distributed by the Federal fish commissioners. It is often bred in ponds.

Carpaccio, Vittore (kär-päch'ō), an Italian painter, one of the most celebrated masters of the old Venetian school; born probably in Venice about 1450-1455. His distinguished characteristics are natural expression, vivid conception, correct arrangement, and great variety of figures and costumes. He also excelled as an architectural and landscape painter. His favorite employment was the dramatic representation of sacred subjects, several of which he has illustrated by a series of paintings. He died in Venice after 1521.

Carpathian Mountains (German, *Karpathen*), a range of mountains in Southern Europe, chiefly in Austria, forming a great semicircular belt of nearly 800 miles in length. The Carpathian chain may be divided into two great sections—the West Carpathians, in Hungary, to the N. W., and the East Carpathians, in Transylvania, to the S. E., with lower ranges stretching between. To the Western Carpathians belongs the remarkable group of the Tatra. The greatest height of the East Carpathians is Ruska-Poyana, 9,909 feet; of the West Carpathians, the Eisthalerspitze, 8,521 feet; many other peaks have an elevation over 8,000 feet. The outer bend of the Carpathians is much steeper than that which descends towards the valleys of Transylvania and Hungary. The only important rivers which actually rise in the chain are the Vistula, the Dniester, and the Theiss. The Carpathian range is rich in minerals, including gold, silver, quicksilver, copper, and iron. Salt occurs in beds which have sometimes a thickness of 600 or 700 feet. On the plateaux corn and fruit are grown to the height of 1,500 feet. Higher up the mountain steeps are covered with forests of pine. There is much remarkable scenery.

Carpeaux, Jean Baptiste (kär-pō'), a French sculptor, born in Valenciennes, May 14, 1827, and in 1854 obtained the "*Prix de Rome*." His bronze Neapolitan boy attracted notice; and "*Ugolino and his four sons*" (1863), also in bronze, though it defied the canons of sculpture, made him famous. He settled in Paris in 1862. His masterpiece, the marble group, "*The Dance*," in the façade of the New Opera in Paris, fully showed his dramatic power and the exuberance of his imagination; but it provoked much hostile criticism as involving an attempt to stretch beyond their natural province the limits of the plastic art. The most notable of his later works

Carpel

is the great fountain in the Luxembourg Gardens. He died Oct. 11, 1875.

Carpel, the leaf forming the pistil. Several carpels may enter into the composition of one pistil.

Carpentaria, Gulf of, a large gulf on the N. coast of Australia, having Cape York Peninsula, the N. extremity of Queensland, on the E., and Arnhem Land on the W.

Carpenter, Charles Carroll, an American naval officer, born in Greenfield, Mass., Feb. 27, 1834. He was promoted commodore May 15, 1893, and rear-admiral Nov. 11, 1894; was commander-in-chief of the United States Asiatic squadron from Aug. 27, 1894, till Nov. 9, 1895; and was retired on reaching the age-limit Feb. 28, 1896. During the summer of 1895 he rendered invaluable service in China in protecting American missionaries and in coöperating with United States Minister Charles Denby and the British and Chinese authorities to preserve peace, particularly after the Ku-cheng massacre. He died April 1, 1899.

Carpenter, Esther Bernon, an American prose-writer, born in Wakefield, R. I., 1848. She contributed to magazines; published "The Huguenot Influence in Rhode Island," and "South Country Neighbors" (1887). She died in 1893.

Carpenter, Francis Bicknell, an American painter, born in Homer, N. Y., Aug. 6, 1830. He studied with Sanford Thayer at Syracuse, N. Y. (1844), and in 1852 became an associate of the National Academy. Among his works are a portrait of President Fillmore, in the City Hall, New York City; a portrait of President Lincoln, in the capitol at Albany, N. Y., and the "Emancipation Proclamation" (1864), in the capitol at Washington. While executing the last-named painting he was closely associated with President Lincoln, and his observations during this period are embodied in his book entitled "Six Months in the White House with Abraham Lincoln." He died in New York City, May 23, 1900.

Carpenter, Gilbert Saltonstall, an American military officer, born in Medina, O., April 17, 1836; was graduated at Western Reserve College in 1859; was admitted to the bar in 1861, and immediately afterward entered the Union army with the 19th Ohio Volunteer Infantry. Soon afterward he was transferred to the 18th United States Infantry, with which he served through the Civil War, in which he received the brevet of captain for gallantry in the battle of Stone river. Subsequently he rendered service in various Indian campaigns; was commissioned a brigadier-general of volunteers in the war with Spain in 1898; and became colonel of the 18th United

Carpenter

States Infantry in 1899, and Brigadier-General and retired in 1900. He died Aug. 12, 1904.

Carpenter, Louis G., an American engineer, born in Orion, Mich., March 28, 1861; was graduated at Michigan Agricultural College in 1869, and after serving there as instructor in Mathematics and Engineering took post-graduate courses at the University of Michigan and Johns Hopkins University. In 1888 he became Professor of Engineering at the Colorado Agricultural College and meteorologist and irrigation engineer at the Agricultural Experiment Station, and organized the first course in irrigation engineering given in any American college. He founded the American Society of Irrigation Engineers in 1891.

Carpenter, Louis H., an American military officer, born in Glassboro, N. J., Feb. 11, 1839; began studying at the University of Pennsylvania, but withdrew in 1861 and entered the Sixth United States Cavalry. He served in the Army of the Potomac through numerous engagements, was an aide-de-camp to General Sheridan, was commissioned colonel of volunteers in 1865, subsequently served in various Indian campaigns, became colonel of the Fifth United States Cavalry in 1897, and brigadier-general of volunteers in 1898, and brigadier-general, U. S. A., Oct. 18, 1899, for services in the Spanish-American war, and particularly as commander of the Department of Porto Principe, Cuba. He was retired Oct. 19, 1899.

Carpenter, Mary, an English philanthropist, born in Exeter, April 3, 1807, eldest child of Lant Carpenter (1780-1840). Trained as a teacher, and afterwards a governess, she took an active part in the movement for the reformation of neglected children, and besides advocating their cause in her writings, she founded a ragged school, several reformatories for girls, one of which, the Red Lodge Reformatory, she superintended. The visit of Rammohun Roy to Great Britain, in 1833, and of Tuckerman, the Boston philanthropist, had helped to turn her attention and sympathy toward India, and toward the destitute children of her own country. She founded in 1835 a "working and visiting society," of which she was secretary for more than 20 years. She opened a ragged school in one of the worst parts of Bristol in 1846, and boys' and girls' reformatories at Kingswood and at the Red Lodge (1852-1854); and in 1852 gave evidence before a parliamentary committee on juvenile delinquency. She promoted the Industrial Schools Act of 1857, and some of her proposals were adopted in the amended Acts of 1861 and 1866. In the prosecution of her philanthropic

labors she visited India four times, had an interview with the Queen in 1868 in connection with her work; and in 1870 instituted the National Indian Association, whose journal she edited. She attended Darmstadt at a congress on women's work as a guest of the Princess Alice, and visited the United States in 1873. Her plan of day-feeding industrial schools in connection with school boards was adopted in 1876. She died June 14, 1877. Besides her reformatory writings she published "Our Convicts" (1864), a book which drew public attention to the treatment of young criminals; "The Last Days of the Rajah Rammohun Roy" (1866), and "Six Months in India" (1868).

Carpenter, Matthew Hale, an American legislator, born in Moretown, Vt., Dec. 22, 1824. He studied at West Point, 1843-1844; was admitted to the bar in 1845, and afterwards studied under Rufus Choate. He removed in 1848 to Wisconsin, where he acquired a great reputation as a lawyer and orator. He was sent to the United States Senate from Wisconsin in 1869 and in 1879. He died in Washington, D. C., Feb. 24, 1881.

Carpenter, Stephen Cutter, an American journalist, born in England. He came to the United States in 1803, and settled in Charleston, S. C., where he founded and published with John Bristed the "Monthly Register Magazine and Review of the United States." Later he was editor of the "Mirror of Taste and Dramatic Censor," in which appeared some clever sketches of American actors. His works include: "Memoirs of Jefferson, Containing a Concise History of the United States from the Acknowledgment of Their Independence, with a View of the Rise and Progress of French Influence and French Principles in that Country" (2 vols., 1809); "Select American Speeches, Forensic and Parliamentary, with Prefatory Remarks, a Sequel to Dr. Chapman's Select Speeches" (1815); and under the pen-name of "Donald Campbell," "Overland Journey to India" (2d ed. 1809-1810), and "Letter on the Present Times." He died about 1820.

Carpenter, William Benjamin, an English physiologist, born in Exeter, Oct. 29, 1813. He studied medicine at University College, London, and at Edinburgh University, subsequently held several lectureships in London, and ultimately became registrar at London University (1856-1879). He wrote several well-known works on physiology: "Principles of General and Comparative Physiology"; "Principles of Mental Physiology"; "Principles of Human Physiology"; a "Manual of Zoology," etc. He took a leading part in the expeditions sent out by government in 1868-

1870 for deep-sea exploration in the North Atlantic. He was chosen president of the British Association at Brighton in 1872. He died Nov. 13, 1885.

Carpenter, William Henry, an American philologist, born in Utica, New York, July 15, 1853. He received a university education in the United States and Europe, became instructor in rhetoric and lecturer on North European Literature in Cornell University in 1883, instructor of German and Scandinavian Languages in Columbia University, adjunct Professor of Germanic Languages and Literature in the same institution in 1890, and subsequently Professor of Germanic Philology there. He has published numerous works in the line of his specialty.

Carpentry, the art of combining pieces of timber to support a weight or sustain pressure. The work of the carpenter is intended to give stability to a structure, that of the joiner is applied to finishing and decoration. An explanation of some of the terms employed in carpentry may be useful. The term frame is applied to any assemblage of pieces of timber firmly connected together. The points of meeting of the pieces of timber in a frame are called joints. Lengthening a beam is uniting pieces of timber into one length by joining their extremities. When neatness is not required this is done by fishing, that is, placing a piece of timber on each side of where the beams meet and securing it by bolts passed through the whole. When the width of the beam must be kept the same throughout scarfing is employed. This is cutting from each beam a part of the thickness of the timber, and on opposite sides, so that the pieces may be jointed together and bolted or hooped. When greater strength is required than can be produced by a single beam, building and trussing beams are resorted to. Building beams is combining two or more beams in depth so as to have the effect of one. In trussing the beam is cut in two in the direction of its length, and supported with cross-beams, as in roofing. Mortise and tenon is a mode of jointing timber. An excavation called the mortise is made in one piece, and a projecting tongue to fit it called the tenon in the other. The timber framework of floors is called naked flooring, and is single if there be but a single series of joists, double if there are cross-binding joists, and framed if there are girders or beams in addition to the joists. The roof is the framework by which the covering of a building is supported. It may consist of a series of sloping pieces of timber, with one end resting on one wall and the other end meeting in a point with a corresponding piece resting on the opposite wall: these are called

rafters. There is usually a third piece which connects the lower extremities of the rafters and prevents them from spreading. This is called a tie, and the whole frame a couple. The principal instruments used in carpentry are saws, as the circular-, band-, and tenon-saws; planes, as the jack-plane, smoothing-plane, moulding-plane, etc.; chisels, gouges, brad-awls, gimlets, descriptions of which will be found in their places.

Carpet, a thick fabric, generally composed wholly or principally of wool, for covering the floors of apartments, staircases, and passages in the interior of a house. They were originally introduced from the East, where they were fabricated in pieces, like the modern rugs, for sitting on—a use obviously suggested by the Eastern habit of sitting cross-legged upon the floor. Eastern carpets are still highly thought of in Europe, to which they are largely imported. The Persian, Turkish, and Indian carpets are all woven by hand, and the design is formed by knotting into the warp tufts of woolen threads of the proper color. Of carpets made in the United States and Europe Brussels carpet is a common and highly-esteemed variety. It is composed of linen thread and worsted, the latter forming the pattern. The linen basis does not appear on the surface, being concealed by the worsted, which is drawn through the reticulations and looped over wires that are afterward withdrawn, giving the surface a ribbed appearance. Wilton carpets are similar to Brussels in process of manufacture, but in them the loops are cut open by using wires with a knife-edge, and the surface thus gets a pile. Tapestry carpets have also a pile surface. They are made in a manner similar to that in which Brussels and Wilton carpets are manufactured; but only one yarn is used instead of five or more of different colors, as in the carpets just named. The Kidderminster or Scotch carpet consists of two distinct webs woven at the same time and knitted together by the woof. The pattern is the same on both sides of the cloth, but the colors are reversed. An improvement upon this is the three-ply carpeting, made originally at Kilmarnock. The original Axminster carpets were made on the principle of the Persian or Turkish carpets. Axminster carpets, made in one piece to suit the size of the room, have a fine pile, which is produced by using chenille as the weft, the projecting threads of which form the pile, which is dyed before being used. Carpets of felted wool, with designs printed on them, are also used, and are very cheap. Philadelphia is the leading carpet-manufacturing city in the United States.

Carpet-bagger, a needy or other political adventurer who goes about the country pandering to the prejudices of the ignorant

with the view of getting into place or power, so called because regarded as having no more property than might fill a carpet-bag. Originally applied to needy adventurers of the Northern States, who tried in this way to gain the votes of the negroes of the Southern States after the close of the Civil War.

Carpini, Giovanni Piano (kär-pē'nē), a Franciscan monk, born in South Italy about 1210. He was one of the six friars selected by Pope Innocent IV. to proceed to the court of the Emperor of the Mongols, whose warlike advances in 1246 threw Christendom into consternation, in order to pacify the terrible nomadic warriors, and if possible, convert them to Christianity. He wrote an account of his journey in Latin, an abstract of which was published in the "Voyages and Discoveries" of Hakluyt.

Carpocrates (kär-pok'rā-tēz), a native of Alexandria, who in the 2d century revived several Gnostic errors. He rejected the Old Testament and the gospels of St. Matthew and St. Luke; denied the resurrection of the dead, and advocated the most licentious mode of life. Mosheim calls him "the worst of all the Gnostics."

Carpolites, a term applied to fossils of the nature of fruits, usually found in the Carboniferous system. Their exact place in the vegetable kingdom has not yet been determined.

Carpus, the wrist, so named by anatomists, which is made up of eight little bones, of different figures and thickness, placed in two ranks, four in each rank. They are strongly tied together by the ligaments which come from the radius, and by the annular ligament.

Carpophore, a stalk bearing the pistil, and raising it above the whorl of the stamens, as in *Passiflora*. Also applied to the stalk between the achenes of *Umbelliferæ*.

Carr, Eugene Asa, an American army officer, born in Concord, N. Y., March 20, 1830; graduated at the United States Military Academy in 1850, and joined the Mounted Rifles. He accompanied the Sioux Expedition in 1855, and was active in suppressing the insurrections on the Kansas border in 1856. In 1860 he was engaged in a campaign against the Comanche Indians. He was in active service throughout the Civil War, commanding the 4th Division of the Army of the Southwest, and subsequently acting as commander of the same army. He commanded a division in the Vicksburg campaign in 1863, and led the assault on the works of that city, May 18. In December, 1863, he was assigned to the Army of Arkansas. At the close of the war he was

promoted to Brigadier-General, U. S. A., and brevetted Major-General of volunteers. In 1868-1869 he was engaged against the Sioux and Cheyenne Indians, and afterward took part in other expeditions against hostile Indians. He fought in 13 engagements with Indians, was four times wounded in action, and received a Congressional Medal of Honor and the thanks of the Legislatures of Nebraska, Colorado, and New Mexico. Retired in 1893; died Dec. 2, 1910.

Carr, Joseph Bradford, an American military officer, born in Albany, N. Y., Aug. 16, 1828. He joined the militia in 1849, and rose to the rank of colonel. In 1861 he was appointed colonel of the 28th New York Volunteers, and led them at the battle of Big Bethel and in McClellan's Peninsular campaign. He took part in the battles of Chancellorsville and Gettysburg, and for his bravery throughout the war he was brevetted a Major-General of volunteers. After the war he became prominent in Republican politics in New York State, and was elected Secretary of State in 1879, 1881, and 1883. In 1885 he was an unsuccessful candidate for lieutenant-governor. He died in Troy, N. Y., Feb. 24, 1895.

Carr, Lucien, an American archæologist, born in Missouri in 1829. He received a collegiate education and from 1876 to 1894 was assistant curator in the Peabody Museum. He has written "Mounds of the Mississippi Valley" (1883), "Missouri, a Bone of Contention" (1888), and "Prehistoric Remains of Kentucky" (with Shaler).

Carr, Sir Robert, a British commissioner in New England. In 1664 he was appointed commissioner by Charles II., with Nicolls, Cartwright, and Maverick. On Aug. 27, Carr and Nicolls captured New Amsterdam, and named it New York, in honor of the Duke of York, who afterward reigned as James II. They took Fort Orange on Sept. 24, and named it Albany. He died June 1, 1667.

Carracci, Lodovico, Agostino, and Annibale, Italian painters, the three founders of the Bologna, or, as it has also been called, the eclectic school of painting.

LODOVICO, son of a butcher, born in Bologna, in 1555, appeared at first to be more fit for grinding colors than for transferring them to canvas. But his slowness did not, in fact, arise from deficiency of talent, but from zeal for excellence. He detested all that was called ideal, and studied only nature, which he imitated with great care. At Florence he studied under Andrea del Sarto, and enjoyed the instruction of Passignano. He went to Parma for the purpose of studying Correggio, who was then imitated by almost all the Florentine painters. At Bologna he endeavored to gain popularity for his new principles

among the young artists, and united himself with his relatives, Agostino and Annibale Carracci, whom he sent in 1580 to Parma and Venice. In 1589 they established an academy for painters at Bologna, called the *Accademia degli Incamminati* (from *incamminare*, to put in the way), which they directed jointly till 1600, the year of the departure of Agostino and Annibale for Rome. From that time till his death Lodovico was sole director. The academy was so successful that similar institutions in Bologna had to be closed. Among his most famous pupils were Domenichino and Guido Reni.

The leading principle of Lodovico was that the study of nature must be united with the imitation of the best masters. He soon gave an example of this principle in his "Prophecy of John the Baptist," in the monastery of the Carthusians, imitating in single figures the style of Raphael, Titian, and Tintoretto. The finest works of Lodovico are in Bologna, especially in the picture gallery or *Pinacoteca*, and among them are "The Annunciation," "The Transfiguration," and "St. George and the Dragon." He excelled in architectural views and in drawing, and in general was very thorough in all the branches of his art. He executed several fine engravings. Lodovico died in 1619.

AGOSTINO was born in Bologna in 1557, his father being a cousin of the father of Lodovico. He soon became one of the most accomplished disciples of Lodovico, and excelled particularly in invention. He engraved more pieces than he painted, in order to please his brother Annibale, who became envious of his fame after one of Agostino's pictures had obtained a prize in preference to one of his own, and another excellent picture—the "Communion of St. Jerome"—had gained his brother universal admiration. In 1600 Agostino accompanied Annibale to Rome, and assisted him in painting the Farnesian Gallery. As many persons said that the engraver worked better than the painter, Annibale removed his brother under the pretext that his style, though elegant, was not grand enough. Agostino went then to the court of the Duke of Parma, and painted there a picture representing the heavenly, the earthly, and the venal love. There was only one figure wanting, when, exhausted by labor and mortification, he died in 1602. He wrote a treatise on perspective and architecture. As an engraver he deserves great praise, and often corrected the imperfect outlines of his originals.

ANNIBALE, brother of the foregoing, born in Bologna, in 1560, worked at first with his father, who was a tailor. By the advice of his cousin Lodovico he learned drawing, and made the most astonishing progress, copying first the pieces of Correggio,

Carrageen

Titian, and Paul Veronese, and painting, like them, small pictures, before he undertook large ones. In the academy founded by the Carracci he taught the rules of an arrangement and distribution of figures. He is one of the greatest imitators of Correggio. His "St. Roque Distributing Alms," now in Dresden, was the first painting which gave him reputation. His "Genius of Glory" is likewise celebrated. In the Farnesian Gallery at Rome, which he painted (1600-1604), there breathes an antique elegance and all the grace of Raphael. Imitations are found there of Tibaldi (who painted at Bologna about 1550 with Nicolo del Abate), of Michael Angelo (the style, indeed, somewhat softened), and the excellencies of the Venetian and Lombard schools. Out of Bologna he is acknowledged as the greatest of one Carracci. In that city, however, Lodovico is more admired. Agostino, perhaps had more invention, and Lodovico more talent for teaching; but Annibale had a loftier spirit, and his style is more eloquent and noble. He died in Rome in 1609, and was buried at the side of Raphael in the Pantheon. His best picture is that of "The Three Maries," now at Castle Howard.

Carrageen, or **Carrigeen**, called also Irish moss, a name applied to several species of marine algæ found abundantly near Waterford, Ireland, at a place called Carragheen, from which the name is derived. It abounds also on the rocks in other localities in Great Britain and Ireland, and is found on the E. coast of North America. The species from which the carrageen of commerce is chiefly derived is a red seaweed called *Chondrus crispus*. Carrageen is used for both food and medicine, being considered easy of digestion and having emollient and demulcent qualities. A drink formed from carrageen is frequently used for colds and it may be used to form jelly. It is sometimes comfounded with Iceland moss, which is a lichen.

Carranza, Bartholomæus de, a French theologian, born in Miranda, Navarre, in 1503; entered the Dominican order, became Professor of Theology at Valladolid, and in 1554 accompanied Philip II. to England, where he was confessor to Queen Mary, and where his zealous efforts to reestablish Catholicism gained him the confidence of Philip and the archbishopric of Toledo, the richest in Spain. Here, however, he was accused of heresy, and imprisoned by the Inquisition in 1559. In 1567 he was removed to Rome, and confined in the castle of St. Angelo. He died a few days after his release, May 2, 1576.

Carrara, a town of Central Italy, in the province of Massa-Carrara, on the Lavensa, about four miles from the Mediterranean, and 60 W. N. W. of Florence. An acad-

Carriage

emy of sculpture is established here, and several artists have their residence, attracted by the convenience of obtaining marble almost cost-free; and the sale of rude marble and of sculptured articles forms an important branch of traffic. The famous Carrara marble is a white saccharine limestone, which derives its value from its texture and purity. The quarries have been wrought from the age of Augustus, and seem to be now as inexhaustible as ever.

Carraray, a small island of the Philippine archipelago, about 30 miles long and 6 miles wide. It has coal deposits. The population is sparse and wholly uncivilized, subsisting by trade with the neighboring islands of Samar and Luzon.

Carrel, Nicholas Armand, a French writer, born in Rouen, May 8, 1800. For some years he was an officer in the army, but latterly settled in Paris, and acquired a reputation as an essayist and contributor to the leading opposition papers. In 1827 he published a history of the English Revolution of 1688, and in 1830 united with Thiers and Mignet in editing the "National," which soon rose to be the leading newspaper in opposition to the government of Charles X. After the revolution his colleagues joined the government of Louis Philippe, and he was left with the chief direction of the paper, which still continued in opposition. In 1832 the "National" became openly Republican, and enjoyed great popularity. Carrel was killed July 24, 1836, in a duel with Emile de Girardin.

Carreno, Teresa (kär-ân'yō), a Venezuelan pianist, born in Caracas, Dec. 22, 1853. She was a pupil of Gottschalk and made her début in Europe in 1865. After successful tours in England, the United States and Germany, she was appointed, in 1893, court pianist to the King of Saxony.

Carrhæ, the site of an ancient city in Northwestern Mesopotamia, the Haran of the Bible.

Carriage, a general name for any vehicle intended for the conveyance of passengers either on roads or railways. Carriages are structures mounted on two or more wheels, and in form, build, and accommodation they are exceedingly diverse. The origin of the term is, of course, the same as carry, late Lat. *caricare*, to convey in a cart; *carr-us*, "a car," a word of Celtic origin. Carriages of one kind or other have existed from immemorial antiquity. One of the earliest forms was a bullock carriage, of which some specimens of primitive type may yet be seen in India. The simplest is a short plank of wood, which the passenger bestrides, holding on by two upright handles, and inserting his toes between the wheels and the body of the vehicle. Th

Carrier

practice of laagering wagons was known to the Romans, and is not a modern discovery, made by the South African Dutch Boers. Horne considers that the making of coaches in England commenced in A. D. 1555. Stage-wagons were introduced into England in 1564, and coaches plied for hire in London in 1625.

Carrier, a person, corporation, or vehicle regularly employed in carrying goods, messages, or other articles. Two kinds of carriers are recognized by the law, namely, private carriers and common carriers. Private carriers are persons who, although they do not undertake to transport the goods of all who may choose to employ them, yet agree to carry the goods of some particular person for hire, from one place to another. In such case the carrier incurs no responsibility beyond that of any other bailee for hire, that is to say, the responsibility of ordinary diligence.

Common carriers are persons or companies who undertake for hire to carry goods for the general public from one place to another. A common carrier is bound to provide safe and suitable conveyances, with proper care and management, failing in which he is not exempt from responsibility, though a providential interference (snow, ice, fire, etc.) be the immediate occasion of loss. Carriers are responsible for all losses, except by providential calamity, act of an enemy in time of war, and fault of the shipper. Carriers may limit their responsibility by special contract, but they cannot free themselves from it wholly, nor escape the duty of ordinary care. If a sender misrepresent the character or value of the goods sent, the carrier is not liable if the goods be stolen. But the sender need not disclose the contents of his package unless asked. Common carriers are responsible for the acts of all their agents. Carriers must deliver goods in as good order as when received. They may refuse to take goods not prepared properly for shipment. They may demand prepayment of freight. If payable at the end of the route, they may hold the goods until payment is made. Baggage may be retained for unpaid fare.

Bills of lading, shipment slips, receipts, etc., usually specify all the conditions on which goods are carried, but the law does not sustain all the announcements thus made.

Carrier, Jean Baptiste (kar-yā), an infamous character of the first French revolution, born in 1746. Though an obscure attorney at the beginning of the revolution, he was chosen, in 1792, member of the National Convention. In October, 1793, he was sent to Nantes to suppress the civil war, and to finally put down the Vendéans.

Carrier Pigeon

The prisons were full; there was dearth of provisions, and Carrier determined to lessen the "useless mouths" by summary measures. He first caused priests to be conveyed to a boat with a perforated bottom, under pretense of transporting them, but instead they were drowned by night. This artifice was repeated a number of times, while Carrier also caused multitudes of prisoners to be shot without any pretense of trial. The executioners, it is said, sometimes amused themselves by tying together a young man and woman, and then drowning them; and they called these murders "republican marriages." Some months before the fall of Robespierre, Carrier was recalled. On the 9th Thermidor (July 27), 1794, he was apprehended and brought before the revolutionary tribunal, which condemned him to death, and the guillotine did its work.

Carriere, Eugene (kär-yār'), a French genre-painter, born in Gournay-sur-Marne, in 1849; entered the school of Beaux-Arts, Paris, in 1870, and was the pupil of Cabanel. The "Portrait of a Woman" was his first exhibit in the Salon, 1876. "The Sick Child," "The First Veil," "The Echo Nympe" are some of his other best-known pieces. Carriere helped to decorate the Hotel de Ville, was awarded several medals, and, in 1889, received the decoration of the Legion of Honor. He died March 27, 1906.

Carriere, Moriz, a German philosopher, born in Griedel, Hesse, March 5, 1817. Studied at Giessen, Gottingen, and Berlin, and in 1853 became Professor of Philosophy at Munich. He was one of the founders of the modern school of thought which endeavors to reconcile Deism and Pantheism. His works on æsthetics have been widely read in Germany; his "Æsthetics" reached a third edition in 1884, and so popular was his important work, "Art in its Relation to the Development of Human Culture and Ideals" (5 vols., 1863-1874), that a third edition was commenced in 1876. He also published "Moral Order of the World" (1877), a thoughtful monograph on Cromwell, several volumes of verse, etc. He died in Munich, Jan. 19, 1895.

Carrier Pigeon, a variety of the common domestic pigeon used for the purpose of carrying messages. Several varieties are thus employed, but what is distinctively called the carrier pigeon is a large bird with long wings, large tuberculated mass of naked skin at the base of the beak, and with a circle of naked skin round the eyes. This variety, however, is rather a bird for show than use, and the variety generally employed to carry messages more resembles an ordinary pigeon. The practice of sending letters by pigeons belongs originally to eastern countries, though in other countries

Carrier Pigeon

it has often been adopted, more especially before the invention of the electric telegraph. An actual post-system in which pigeons were the messengers was established at Bagdad by the Sultan Nureddin Mahmud, who died in 1174, and lasted till 1258, when Bagdad fell into the hands of the Mongols, and was destroyed by them. These birds can be utilized in this way only by virtue of what is called their "homing" faculty or instinct, which enables them to find their way back home from surprising distances. But if they are taken to the place from which the message is to be sent and kept there too long, say over a fortnight, they will forget their home and not return to it. They are better to get some training by trying them first with short distances, which are then gradually increased. The missive may be fastened to the wing or the tail, and must be quite small and attached so as not to interfere with the bird's flight. By the use of microphotography long messages may be conveyed in this way, and such were received by the besieged residents in Paris during the Franco-Prussian war of 1870-1871, the birds being conveyed out of the city in balloons. Seventy-two miles in two and a half hours, and 180 in four and a half, have been accomplished by carrier pigeons. Large numbers of these birds are now kept in England, Belgium, France, etc., there being numerous pigeon clubs which hold pigeon races to test the speed of the birds. These pigeons are also kept in several European countries for military purposes. In the United States there are numerous homing clubs, formed for breeding, training, racing, and exhibiting carrier pigeons. During the war with Spain, in 1898, the fleet of vessels that patrolled the Atlantic coast was supplied with a number of carrier pigeons cotes, but happily there was no occasion for testing their effectiveness.

Carrillo, Branlio, a statesman of Costa Rica, born in Cartago in 1800. He was twice president of the republic (1835-1837 and 1838-1842), and greatly promoted its material prosperity. Under his administration roads and bridges were built, the foreign debt was adjusted, and the cultivation of coffee, now the chief staple of the country, was introduced. Carrillo's government was overturned by Morazan in 1842. He was assassinated in Salvador in 1845.

Carrington, Edward, an American military officer, born in Charlotte county, Va., Feb. 11, 1749; was lieutenant-colonel of General Harrison's artillery regiment, quartermaster-general under General Greene, a delegate to the Continental Congress, and foreman of the jury in Aaron Burr's trial for treason. He died Oct. 28, 1810.

Carroll

Carrington, Henry Beebee, an American military officer, born in Wallingford, Conn., March 2, 1824; graduated at Yale in 1845. He began the practice of law in Columbus, O., in 1848, and took an active part in the anti-slavery movement. In the convention which met in 1854 to organize the Republican Party, Carrington was on the committee appointed to correspond with the different States and make the movement National. In 1857 he was on the staff of Governor Chase and helped to organize the State militia in preparation for war. In 1861 he was appointed colonel of the 18th United States infantry, served through the war, and afterward was in service on the plains till 1869; was retired in 1870; Professor of Military Science and Tactics in Wabash College, Ind., till 1873. He wrote "Absaraka, Land of Massacre," "Battles of the American Revolution," and "Battle Maps and Charts of the American Revolution."

Carrington, Paul, an American statesman, born in Charlotte county, Va., Feb. 24, 1733; was graduated at William and Mary College. He was a member of various conventions during the Revolution, and of the Committee of Safety; opposed the Stamp-Act resolutions of Patrick Henry; became a member of the Court of Appeals, and in the Virginia convention voted for the adoption of the Federal Constitution. He died June 22, 1818.

Carrington, Richard Christopher, an English astronomer, born in Chelsea, May 26, 1826. His astronomical work was mostly done at his observatory at Redhill, and consisted of his important catalogue of circumpolar stars, made entirely from his own observations, and likewise his investigations of the position of the solar equator and rotation-period of the sun and of the law of the drift of sun-spots in latitude, all of these being from his own observations of the position of sun-spots continued through many years, and being far more accurate than any before made. He died in Surrey, Nov. 26, 1875.

Carrion=crow, in Great Britain the common crow (*Corvus corōne*), so called because it often feeds on carrion. In the United States the name is given to a small species of vulture called the Black Vulture.

Carrion=flowers, a common name for species of the genus *Stapelia* (natural order *Asclepiadaceæ*), so called because of their putrid odor. In the United States the name is also given to the *Smilax herbacæa*, a liliaceous plant.

Carroll, Charles, the last surviving signer of the Declaration of American Independence, born in Annapolis, Md., Sept. 20, 1737. He studied at Paris, became a member of the Inner Temple at London, re-

Carroll

turned to his native country in 1764, was elected to Congress in 1775, and, along with the other members, signed the Declaration on Aug. 2 of the following year. In 1804, he withdrew to private life at Carrollton, his patrimonial estate, where, as his life advanced, he became an object of universal veneration. He survived by six years all the other signers of the Declaration, and died in Baltimore, Nov. 14, 1832.

Carroll, Henry King, an American religious editor, born in Dennisville, N. J., Nov. 15, 1848. He was on the staff of the "Independent" in 1876-1898, and has written "Religious Forces of the United States," and similar works. He supervised the compilation of religious statistics for the Eleventh Census, and in 1898 was chosen by President McKinley to prepare a report on the internal conditions of Puerto Rico. In 1900 he became a secretary of the Missionary Society of the Methodist Church.

Carroll, John, cousin of Charles Carroll, and first Roman Catholic bishop in the United States; born in Upper Marlboro, Md., Jan. 8, 1785; sent for education at the age of 13 to Flanders. From St. Omer's, where he remained six years, he was transferred to the colleges of Liege and Bruges. He was ordained a priest and became a Jesuit. In 1775 he returned to America, and engaged in the duties of a parish priest. In 1786 he was appointed vicar-general, and settled at Baltimore. In 1790 he was consecrated, in England, Catholic bishop of the United States, and returned with the title of Bishop of Baltimore. A few years before his death he was created archbishop. He died in Georgetown, D. C., Dec. 3, 1815.

Carroll, Lewis. See DODGSON, CHARLES LUTWIDGE.

Carronade. See ORDNANCE.

Carron-oil, a term for a liniment composed of linseed-oil and lime-water, so called from being much used in the case of burns at the Carron Ironworks.

Carrot (*Daucus Carōta*), a biennial umbelliferous plant. In gardens there are three chief varieties. The leaves are tri-pinnate, of a handsome feathery appearance. The plant rises to the height of two feet, and produces white flowers. The root, in its wild state, is small, tapering, of a white color, and strong-flavored; but that of the cultivated variety is large, succulent, and of a red, yellow, or pale straw-color, and shows remarkably the improvement which may be effected by cultivation. It is cultivated for the table and as a food for cattle. Carrots contain a large proportion of sarcharine matter, and attempts have been made to extract sugar from

Carstairs

them. They have been also employed in distillation: 10 pounds weight of carrots will yield about half a pint of very strong ardent spirit. The Peruvian carrot is *Aracācha esculenta*.

Carson, Christopher, commonly called Kit, an American trapper and scout, born in Kentucky, Dec. 4, 1809. He served under General Fremont in his Rocky Mountain expeditions, and fought in the Mexican and Civil Wars, attaining the rank of brevet Brigadier-General. He died at Fort Lynn, Col., May 23, 1868.

Carson, Hampton Lawrence, an American publicist, born in Philadelphia, Pa., Feb. 21, 1852. He was graduated at the University of Pennsylvania (1871), and became a lawyer, rising speedily to prominence by speeches and addresses on topics of the time. He has written "History of the Supreme Court of the United States," and is a Lecturer on Law at the University of Pennsylvania.

Carson and Newman College, a co-educational institution in Jefferson City, Tenn.; chartered in 1851, under the auspices of the Baptist Church; has grounds and buildings valued at over \$175,000; endowment funds, about \$120,000; scientific apparatus, \$2,000; volumes in the library, 3,000; average number of faculty, 20; students, 490; graduates since organization, 500; ordinary income, about \$28,000.

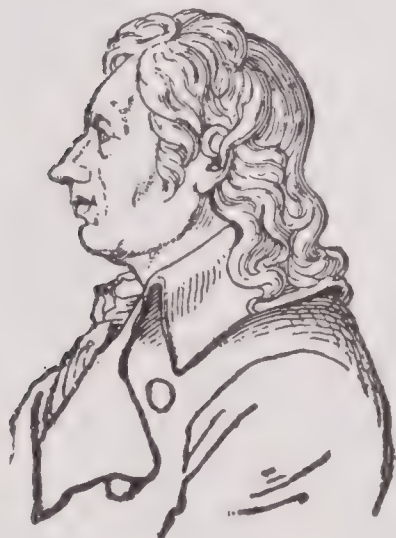
Carson City, city, capital of the State of Nevada; and county-seat of Ormsby county; on the Virginia and Truckee railroad, 32 miles S. E. of Reno. The city is located in a mining district and is the seat of a United States mint. It has several machine and railroad repair shops, State House, State Prison, an orphan's home, and an Indian school. It is only 10 miles from Lake Tahoe, and, on account of its beautiful scenery at the base of the Sierra Nevadas, is a popular summer resort. It has an assessed property valuation of \$1,500,000. Pop. (1900), 2,100; (1910) 2,466.

Carstairs, or Carstares, William, a Scotch clergyman, born near Glasgow, Feb. 11, 1649. He studied at the University of Edinburgh, and afterward at Utrecht. He was introduced to the Prince of Orange, on whom he made a favorable impression. In 1672 he came to London, and two years after he was arrested on account of his connection with the exiles in Holland, and was kept five years a prisoner in Edinburgh Castle. He was released in 1679, and afterward played a part of some importance in the schemes of those who were working in favor of William of Orange. Though he did not approve of it he became privy to the Rye-house plot, in consequence of which he was apprehended and subjected to the

Carstairs

torture, which he endured with great firmness. Being released he returned to Holland, and was received by the Prince of Orange as a sufferer in his cause. His scholarship, sagacity, and political information won for him the confidence of William, who planned the invasion of 1688 mainly by his advice. When William was settled on the throne Carstairs was constantly consulted by him on Scotch affairs. He was the chief agent between the Church of Scotland and the court, and was very instrumental in the establishment of Presbyterianism, to which William was averse. On the death of William he was no longer employed on public business, but Anne retained him as her chaplain royal, and made him principal of the University of Edinburgh. When the union of the two kingdoms was agitated he took a decided part in its favor. He was repeatedly moderator of the General Assembly of the Church. His countrymen have mostly looked upon him as an enlightened patriot. He died Dec. 28, 1715.

Carstens, Asmus Jakob, a Danish artist, born near Sleswick, May 10, 1754. Apprentice for five years to a wine mer-



ASMUS CARSTENS.

chant, in 1776 he went to Copenhagen to study art; for five years (1783-1788) barely supported himself by portrait-painting in Lübeck; and after settling in Berlin, had two years to pass in pinching poverty before his great composition, the "Fall of the Angels" (with 200 figures), gained him an appointment as professor

in the academy, employment from the court, and a pension. He was then enabled to visit Rome, where he devoted himself to the study of the works of Michael Angelo and Raphael; and his influence in elevating later German art, and in inducing a keener study of these masters, cannot be too highly estimated. His numerous drawings mostly represented scenes from the ancient classic poets, with subjects from Shakespeare and Ossian. Having broken with the Berlin Academy, he died in the deepest poverty in Rome, May 25, 1798.

Cart, a species of carriage generally used for carting or carrying from one point to another, goods, soils, manures, or produce. It has but two wheels, in which respect it differs from the ordinary wagon, which has four wheels.

Cartago

Cartagena (kär-tä-hä'nä), capital of the State of Bolivar, Republic of Colombia; on a sandy island off the N. coast, to the S. W. of the mouth of the Magdalena, and communicates by four bridges with its suburb, Jetsemani, on the mainland. Though it has the best harbor on the coast, its trade has greatly fallen off since the rise of Sabanilla; but a canal connecting it with Calamar, on the Magdalena, has been reopened, and a return of prosperity is in view. The imports and exports have an annual value of about \$1,500,000 and \$2,500,000 respectively. Nearly half the imports are British, but the bulk of the foreign export trade is with the United States and Germany. The streets are narrow, with high houses, but the place is well built, and possesses a university, a handsome cathedral, and several churches. Founded in 1533, it was burned by Drake in 1585, but in 1741 repulsed an attack by Admiral Vernon. In 1815 the royalist General Morillo reduced the place by hunger, after a brave defense, but in 1821 it was again freed from the Spanish yoke. Pop. (1905) 14,000.

Cartagena, or Carthage, a fortified town and seaport of Spain, in the province of and 31 miles S. S. E. of Murcia, with a harbor which is one of the largest and safest in the Mediterranean, sheltered by lofty hills. The town is surrounded by a wall; the principal streets are spacious and regular. When Spain was in a more flourishing condition Cartagena carried on a more extensive commerce than now, having also a greater population. It is still a naval and military station, with an arsenal, dockyards, etc. Lead smelting is largely carried on, and there are in the neighborhood rich mines of excellent iron. Esparto grass, lead, iron ore, oranges, etc., are exported. Formerly very unhealthy, it has been greatly improved by draining. Cartagena was founded by the Carthaginians under Hasdrubal about 243 B. C., and was called New Carthage. It was taken by Scipio Africanus B. C. 210, and was long an important Roman town. It was ruined by the Goths, and revived in the time of Philip II. Pop. (1900) 99,871.

Cartago, (1) a river and almost landlocked bay or lagoon, communicating with the Caribbean Sea, near the N. extremity of the Mosquito Coast. (2) A town of Costa Rica, 12 miles E. of the present capital, San José, on a plain to the S. of the constantly smoking volcano of Irazú (11,500 feet). Founded in 1522, the place had 23,000 inhabitants in 1823, and was capital of the State till 1841, when it was all but destroyed by an earthquake. (3) A town of Cauca, in Colombia, founded in 1540, on the Rio Viejo, three miles above its junction with the Cauca, and producing cocoa, tobacco, and coffee.

Carte

Carte, Thomas, an English historian, born in Clifton, Warwickshire, in 1686. He entered the Church, but on the accession of George I. he declined to take the oath of allegiance, and therefore abandoned the priesthood. His opinions were very strong in favor of the Stuart family, and his zeal brought on him some suffering. He died April 7, 1754. So far as great labor and indefatigable research constitute an historian, Carte may lay claim to that character. His principal works consist of an edition of "Thuanus," in 7 vols., fol.; a "Life of James, Duke of Ormonde," in 3 vols. fol., and 4 vols. fol. of the "History of England," bringing it down to the year 1654.

Carte=blanche, a blank sheet of paper to be filled up with such conditions as the person to whom it is given may think proper; hence absolute freedom of action.

Carte=de-visite, a small likeness affixed to a card, so called from photographs of very small size having been originally used as visiting cards.

Cartel, an agreement for the delivery of prisoners or deserters; also, a written challenge to a duel. Cartel-ship, a ship commissioned in war to exchange prisoners.

Carter, Franklin, an American educator, born in Waterbury, Conn., Sept. 30, 1837. He was graduated at Williams College in 1862, was professor of Latin there in 1865-1872, and of German at Yale in 1872-1881, and president of Williams College in 1881-1901.

Carter, Sir Frederic Bowker Terrington, a Canadian jurist, born in St. John's, Newfoundland, Feb. 12, 1819. He was called to the Newfoundland bar in 1842, served in the Newfoundland Assembly from 1855 to 1878, and two years later became Chief Justice of Newfoundland. He has played an important part in shaping Dominion legislation. He was knighted in 1878. He died in St. John's, Feb. 28, 1900.

Carter, George Robert, an American executive; born in Honolulu, Hawaii, Dec. 28, 1866; son of Henry A. P. Carter; received his early education in Honolulu, and was graduated at the Sheffield Scientific School in 1888. In 1891 he was appointed Hawaiian consul at Seattle, Wash.; afterward became confidential financial agent of the Mutual Life Insurance Company of New York; returned to Hawaii in 1896; acted for the auditor-general of the republic during the illness of that official; later became manager of the Hawaiian Trust Company and was a member of the Hawaiian Senate in 1901-1903. On Feb. 22, 1903, he was appointed secretary of the Territory of Hawaii, and in November following succeeded Sanford B. Dole (*q. v.*) as governor.

• **Carter, Samuel Powhatan**, an American naval and military officer, born in Eliz-

Carteret

abethtown, Tenn., Aug. 6, 1819. He became a midshipman in 1840, fought in the Mexican War in coast attack, and in 1856 took part in the capture of the Barrier forts, Canton, China. In 1861 he was detailed to go to Tennessee, where he started the Tennessee brigade. All through the Civil War he was of great service to the government, and for his gallantry was brevetted Major-General of volunteers. In 1882 he was promoted to Rear-Admiral on the retired list. He died in Washington, D. C., May 26, 1891.

Carter, Thomas Henry, an American politician, born in Scioto county, O., Oct. 30, 1854. He was bred to farming, but later became a lawyer, removing to Montana in 1882. He was Montana's first representative in Congress (1891), became United States Senator from that State in 1892, and was chairman of the National Republican Committee in 1892-1896.

Carteret, Sir George (kär-trä' or karter-et'), one of the proprietors of New Jersey, born on the island of Jersey in 1599. He had a distinguished career in the British Navy, although he was expelled from the House of Commons on a charge of misappropriation of navy funds. He early manifested an interest in colonization and became, with Sir John Berkeley, one of the proprietors of New Jersey. He died Jan. 14, 1679.

Carteret, John, Earl Granville, British statesman, born April 22, 1690. He received his education at Westminster School and Christ Church College, Oxford. From Oxford he proceeded to London, plunged into the political and social excitements of the period, made the acquaintance of Swift, and in 1710 married Lady Frances Worsley. Entering the House of Lords on May 25, 1711, as second Baron Carteret, he espoused the side of the Whigs, then led by Stanhope and Sunderland, and in 1714 made his first speech in the House of Lords in support of the Protestant Succession. On the accession of George I., the Whigs came into power, and Carteret became a Lord of the Bedchamber. In 1719 he was appointed by Stanhope ambassador extraordinary to Sweden, and succeeded in arranging two treaties of peace, the first between Sweden, Hanover, and Prussia, and the second between Denmark and Sweden. In 1721 he was appointed to one of the two foreign secretaryships, that for the "Southern Department" of Europe, and as such, attended, in 1723, the congress of Cambria, which attempted the settlement of differences between Germany and Spain, and accompanied George I. to Berlin. In 1724 Carteret was appointed Lord-Lieutenant of Ireland. Though he came into collision with Swift over the Drapier prosecution,

the two became warm friends before Carteret left Ireland. Between 1730 and 1742 Carteret took the lead in the House of Lords of the party opposed to Sir Robert Walpole. When this opposition succeeded in overthrowing Walpole, Carteret became the real head of the administration, but was driven from power by the Pelhams in 1744, about a month after he became Earl Granville on the death of his mother, who had been created Countess Granville in her own right. He died in London, Jan. 2, 1763.

Carteret, Philip, an English navigator. As commander of the "Swallow," he joined an exploring expedition to the Southern seas, discovering Pitcairn, Osnaburg, Queen Charlotte, Sandwich and Solomon Islands, besides correcting several errors of former surveys. All this was accomplished with an unseaworthy ship, and while in precarious health. In 1777 he was ordered to the West Indies, and in 1779 joined Rodney. He retired from the navy in 1794, with the honorary rank of Rear-Admiral, and died in Southampton, July 21, 1796.

Cartesian Curve. See FOLIUM OF DESCARTES.

Cartesian Devil, a contrivance to illustrate the effect of the compression or expansion of air in changing the specific gravity of bodies. It is



CARTESIAN DEVIL.

It is a small glass figure, hollow, and sometimes provided with a hollow bulb on its head. This is to be partly filled with water, and placed in a tall vessel, nearly full of water, and having a piece of caoutchouc secured tightly over the top. On pressing the caoutchouc the air of the vessel will be compressed; this will compress that within the figure or bulb, so admitting more water by a small aperture, and causing the figure to sink. On removing the pressure the air in the figure or bulb will expand, forcing out some of the water, and causing it to rise. It is called also a cartesian diver and bottle-imp.

Cartesianism, system of philosophy taught by Descartes. René Descartes in his 20th year resolved as far as possible to eliminate from his mind all that had ever been taught him by books or by instructors, and think out for himself the entire circle of knowledge. His first pos-

tulate was "*Cogito, ergo sum*" — "I think, therefore I exist." Inquiring next into ideas, which he defined as "all that is in our mind when we conceive a thing, in whatever way we conceive it," he regarded clearness and distinctness as the criterion of a true as distinguished from a false idea. Of all ideas in the human mind that of a God is the clearest, therefore there is a God. As in this clear conception of God infinite veracity is attributed to Him, it is impossible that He could make our faculties deceive us in mathematical and metaphysical demonstrations; these sciences, therefore, are trustworthy. The actual existence of the external world is proved by the prior truth, the existence of God. Creation was and is a manifestation of the Divine will.

Descartes revolutionized mathematics, imparting to it a beneficial impulse. He did likewise to metaphysics. Among his immediate followers in the latter science were Geulinx, Malebranche, and Spinoza. A celebrated opponent was Gassendi. The method of Descartes was adopted by all the philosophers of the rationalistic school who flourished during the latter half of the 17th and the whole of the 18th centuries. In physics he discovered the law of the refraction of a ray of light through a diaphanous body, but his *a priori* method was not the proper instrument for physical investigation, and his researches in that department were comparative failures.

Carthage (L. *Carthago*, Gr. *Karchédōn*), the most famous city of Africa in antiquity, capital of a rich and powerful commercial republic, situated in the territory now belonging to Tunis. Carthage was the latest of the Phœnician colonies in this district, and is supposed to have been founded by settlers from Tyre and from the neighboring Utica about the middle of the 9th century before Christ. The story of Dido and the foundation of Carthage is mere legend or invention. The history of Carthage falls naturally into three epochs. The first, from the foundation to 410 B. C., comprises the rise and culmination of Carthaginian power; the second, from 410 to 265 B. C., is the period of the wars with the Sicilian Greeks; the third, from 265 to 146 B. C., the period of the wars with Rome, ending with the fall of Carthage.

The rise of Carthage may be attributed to the superiority of her site for commercial purposes, and the enterprise of her inhabitants, which soon acquired for her an ascendancy over the earlier Tyrian colonies in the district, Utica, Tunis, Hippo, Septis, and Hadrumetum. Her relations with the native populations, Libyans and nomads, were those of a superior with inferior races. Some of them were directly subject to Carthage, others contrib-

Carthage

uted large sums as tribute, and Libyans formed the main body of infantry as nomads of cavalry in the Carthaginian army. Besides these there were native Carthaginian colonies, small centers and supports for her great commercial system, sprinkled along the whole northern coast of Africa, from Cyrenaica on the E. to the Straits of Gibráltar on the W.

In extending her commerce Carthage was naturally led to the conquest of the various islands which from their position might serve as entrepôts for traffic with the northern shores of the Mediterranean. Sardinia was the first conquest of the Carthaginians, and its capital, Caralis, now Cagliari, was founded by them. Soon after they occupied Corsica, the Balearic, and many smaller islands in the Mediterranean. When the Persians, under Xerxes, invaded Greece, the Carthaginians, who had already several settlements in the W. of Sicily, co-operated by organizing a great expedition of 300,000 men against the Greek cities in Sicily. But the defeat of the Carthaginians at Himera by the Greeks under Gelon of Syracuse effectually checked their further progress (480 B. C.). The war with the Greeks in Sicily was not renewed till 410. Hannibal, the son of Gisco, invaded Sicily, reduced first Selinus and Himera, and then Agrigentum. Syracuse itself was only saved a little later by a pestilence which enfeebled the army of Himileo (396). The struggle between the Greeks and the Carthaginians continued at intervals with varying success, its most remarkable events being the military successes of the Corinthian Timoleon (345-340) at Syracuse, and the invasion of the Carthaginian territory in Africa by Agathocles, B. C. 310.

After the death of Agathocles the Greeks called in Pyrrhus, King of Epirus, to their aid, but notwithstanding numerous defeats (B. C. 277-275), the Carthaginians seemed, after the departure of Pyrrhus, to have the conquest of all Sicily at length within their power. The intervention of the Romans was now invoked, and with their invasion, B. C. 264, the third period of Carthaginian history begins. The first Punic war (L. *Punicus*, Phœnician), in which Rome and Carthage contended for the dominion of Sicily, was prolonged for 23 years, B. C. 264 to 241, and ended, through the exhaustion of the resources of Carthage, in her expulsion from the island. The loss of Sicily led to the acquisition of Spain for Carthage, which was almost solely the work of Hamilcar and Hasdrubal. The second Punic war, arising out of incidents connected with the Carthaginian conquests in Spain, and conducted on the side of the Carthaginians by the genius of Hannibal, and distin-

Carthage

guished by his great march on Rome and the victories of Lake Trasimene, Trebia, and Cannæ, lasted 17 years, B. C. 218 to 201, and after just missing the overthrow of Rome, ended in the complete humiliation of Carthage. The policy of Rome in encouraging the African enemies of Carthage occasioned the third Punic war, in which Rome was the aggressor. This war, begun B. C. 150, ended B. C. 146, in the total destruction of Carthage.

The constitution of Carthage, like her history, remains in many points obscure. The name of king occurs in the Greek accounts of it, but the monarchical constitution, as commonly understood, never appears to have existed in Carthage. The officers called kings by the Greeks were two in number, the heads of an oligarchical republic, and were otherwise called Suffetes, the original name being considered identical with the Hebrew *Shofetim*, judges. These officers were chosen from the principal families, and were elected annually. There was a senate of 300, and a smaller body of 30 chosen from the senate, sometimes another smaller council of 10. In its later ages the state was divided by bitter factions, and liable to violent popular tumults. After the destruction of Carthage her territory became the Roman province of Africa. Twenty-four years after her fall an unsuccessful attempt was made to rebuild Carthage by Caius Gracchus. This was finally accomplished by Augustus, and Roman Carthage became one of the most important cities of the empire. It was taken and destroyed by the Arabs in 638. The religion of the Carthaginians was that of their Phœnician ancestors. They worshipped Moloch or Baal, to whom they offered human sacrifices; Melkart, the patron deity of Tyro; Astarte, the Phœnician Venus, and other deities, which were mostly propitiated by cruel or lascivious rites.

Carthage, city and county-seat of Jasper county, Mo., on the St. Louis and San Francisco, and the Missouri Pacific railroads, 300 miles S. W. of St. Louis. It is the center of an extensive lead region, and has zinc mines, stone and lime works, flour mills, machine shops and foundries, churches, public library, parks, electric railways and lights, National banks, several daily and weekly newspapers, public schools, and an assessed property valuation of \$2,000. Carthage was the scene of a battle, fought July 5, 1861, between a Federal army under General Sigel, and Confederates under Generals Parsons and Rains, in which the former was defeated. Pop. (1900) 9,416; (1910) 9,483.

Carthage, Cape, a headland of North Africa, jutting out into the Mediterranean, in 36° 52' N. lat., 10° 22' E. lon., with

Carthage College

traces of the ancient city of Carthage to the N. of the Tunis lagoon.

Carthage College, a co-educational institution in Carthage, Ill., organized in 1870 under the auspices of the Lutheran Church; has grounds and buildings valued at over \$60,000; scientific apparatus, \$15,000; endowment funds, exceeding \$250,000; volumes in the library, over 8,000; ordinary income, about \$18,000; average number of faculty, 15; of students, 130; graduates, over 300.

Carthamine, or **Carthameine**, a dye obtained by a chemical process from *Carthamus tinctorius*, or Safflower in crystals which are insoluble in water, slightly soluble in ether, and which with alcohol readily form a purple-red solution. When newly precipitated, carthamine immediately and permanently attaches itself to cotton or silk (but not to wool), requiring no mordant. It dyes the fabric a fine red, which is changed to yellow on the addition of alkalies, and may be returned to red again on being treated with acids. The safflower contains about 5 per cent. of carthamine, and also about 25 per cent. of a yellow coloring matter called safflower-yellow, which, however, is of no value in dyeing.

Carthusians, a monastic order founded in 1084 by St. Bruno, and named from the place of its institution—the valley of Chartreuse in France. The Carthusians are remarkable for the austerity of their rule, which binds them to perpetual solitude, total abstinence from flesh, even at the risk of their lives, and absolute silence, except at certain stated times. They support themselves by manual labor. Their habit is white, except an outer plaited cloak, which is black. They were established in England in 1180. See CHARTREUSE, LA GRANDE.

Cartier, Sir George Etienne (kärt-ya'), a Canadian statesman, born in St. Antoine, Quebec, Sept. 6, 1814. He was admitted to the bar in 1835, took part in the rebellion of 1837, and had for a time to leave Canada. In 1848 he entered the Canadian Parliament, and in 1855 became provincial secretary. Next year he became attorney-general for Lower Canada, in which post he was active in behalf of legal reforms. In 1857 he was a member of the Macdonald ministry, and in 1858 he himself became premier, remaining in this post till 1862. He was active in bringing about the establishment of the Dominion of Canada in 1867, and held a post in the first Dominion cabinet. The following year he received a baronetcy. He died in England, May 20, 1873.

Cartier, Jacques, a French navigator, born in St. Malo, Dec. 31, 1494. He commanded an expedition to North America in

Cartouch

1534, entered the Straits of Belle Isle, and took possession of the mainland of Canada in the name of Francis I. Next year he sailed up the St. Lawrence as far as the present Montreal. He subsequently went to found a settlement in Canada, and built a fort near the site of Quebec. He died about 1554.

Cartilage, a texture or substance possessed of elasticity, flexibility, and considerable cohesive power. Temporary cartilage is present in place of bone in very early life, and as development goes on ossifies. Permanent cartilage, on the contrary, retains its character to the last, never ossifying. It is of two kinds: Articular cartilage, used in joints, and membraniform cartilage, employed in the walls of cavities.

Cartilaginous Fishes, a general designation for those fishes whose skeleton consists of cartilage instead of bone, and which comprise the sharks and skates or rays.

Carton, Florent. See DANCOURT.

Cartoon, in painting, a drawing on stout paper or other material, intended to be used as a model for a large picture in fresco, a process in which it is necessary to complete the picture portion by portion and in which a fault cannot afterward be easily corrected. The cartoon is made exactly the size of the picture intended, and the design is transferred to the surface to be ornamented by tracing or other processes. Cartoons executed in color, like paintings, are used for designs in tapestries, mosaics, etc. The most famous are those painted by Raphael for the Vatican tapestries, seven of which are still preserved in the South Kensington Museum, London. The subjects of the seven are: 1, "Paul Preaching at Athens"; 2, "The Death of Ananias"; 3, "Elymas the Sorcerer Struck with Blindness"; 4, "Christ's Charge to Peter"; 5, "The Sacrifice at Lystra"; 6, "Peter and John Healing the Cripple at the Beautiful Gate of the Temple"; 7, "The Miraculous Draught of Fishes." In modern times the term is also applied to a pictorial sketch relating to some notable character or events of the day.

Cartouch (kär-tösh'), a tablet intended to receive an inscription which resembles a scroll of paper rolled up at the ends. It is also applied to the modillion that supports the corona of a cornice used in interior decoration. In Egyptian architecture the expression denotes the oval or elliptical figures that are carved on columns and other parts of a temple to receive hieroglyphic inscriptions of different kinds.

In military language it is a canvas or leather cartridge-box; a case for holding musket-balls and powder; a wooden bomb; a ticket of leave, or dismissal, given to a soldier.

Cartouche, Louis Dominique, (kär-tōōsh') a famous French robber, who for years kept Paris in terror by the audacity of his depredations. He was at length captured and executed in 1721.

Cartridge, a case of paper, parchment, metal, or flannel suited to the bore of fire-arms, and holding the exact charge, including, in the case of small arms, both powder and bullet (or shot). In loading with the old style of cartridge for muzzle-loading rifles, the paper over the powder was bitten or twisted off and the powder poured in, the bullet being then inserted and rammed home. The cartridges used for breech-loading rifles contain the powder in a case of solid brass, and have the percussion-cap by which they are ignited fixed in the base. Such cases can be refilled and used a number of times in succession. Cartridges for shot-guns are similar to those for rifles, but are usually of less solid construction, being commonly of strong paper with a base of metal. Those for large guns are usually made of flannel and contain only the powder. Blank-cartridge is a cartridge without ball or shot. Cartridges for blasting are filled with dynamite or other explosive.

Cartridge-paper, a thick sort of paper originally manufactured for soldiers' cartridges, but extensively used in the arts, its rough surface giving it an advantage for drawing upon, as a wall paper, and for other purposes.

Cartwright, Edmund, an English inventor, born in Marnham, April 24, 1743. He was educated at Oxford, and took orders in the Church. In 1785 he brought his invention, the first power-loom, into action. Though much opposed both by manufacturers and workmen, it made its way, and in a developed and improved form is now in universal use. Cartwright spent much of his means in similar inventions, and fell into straitened circumstances, from which a parliamentary grant of £10,000 relieved him. He died in Hastings, Oct. 30, 1823.

Cartwright, John, the "Father of Reform," was born in Marnham, England, Sept. 17, 1740. At 18 he entered the navy, saw some service under Howe, and in 1776 was gazetted first-lieutenant of the "Guernsey" at the Newfoundland station. He returned in 1770, and was appointed in 1775 major to the Notts militia. He then began to think and write on political questions, and found himself unable to take service under Lord Howe in North America. From the beginning he advocated annual parliaments, vote by ballot, and manhood suffrage, and throughout his busy life he advocated with equal ardor causes so different as reform in farming, abolition of slavery, the foundation of a Valhalla for En-

glish seamen, the improvement of national defenses, and the liberties of Spain and Greece. Cartwright was fined £100 for sedition in 1820. He died in London, Sept. 23, 1824.

Cartwright, Peter, an American clergyman, born in Virginia, Sept. 1, 1785; ordained in Kentucky in 1806, and in 1823 removed to Illinois, where he labored for nearly half a century. He sat in the State Legislature there, and in 1846 was defeated by Abraham Lincoln in an election for Congressman. Admired for his eloquence and strong common sense, he was also loved for his quaint eccentricity of manner, and possessed great influence in his own denomination. He died near Pleasant Plains, Ill., Sept. 25, 1872.

Cartwright, Sir Richard John, a Canadian statesman, born in Kingston, Ont., Dec. 4, 1835. He was educated at Trinity College, Dublin, and entered Canadian politics as a Conservative, but on account of a disagreement with Sir John A. Macdonald joined the Liberal party. He has served in the Canadian Parliament almost continually since 1863. He was Minister of Finance from 1873 until 1878, when his opposition to the policy of protection caused his downfall. He is an able speaker and an authority on finance. In 1897 he was a member of a Canadian commercial commission to the United States.

Cartwright, Thomas, an English Puritan clergyman; born in Hertfordshire in 1535. He suffered imprisonment and exile more than once for his nonconformist opinions. He was a learned man, and at one time professor of divinity at Cambridge. He died in Warwick, Dec. 24, 1603.

Carucate, formerly as much land as one team could plough in the year. The size varied according to the nature of the soil and practice of husbandry in different districts.

Carum, (from Caria, a district of Asia Minor, of which it is a native), a genus of *Apiaceæ* or *Umbelliferæ*, with finely-cut leaves and compound umbels, which in the true Caraway have but few bracts surrounding them, or sometimes none at all; petals broad, with a point bent inwards; fruit oval, curved with five ribs, and one or more channels for volatile oil under each furrow. The Caraway, *C. carui*, is cultivated in Essex and elsewhere. *C. bulbocastanum* is called Pignut; its tubers are quite wholesome.

Carupano (kär-ō'pän-ō), a growing port of the Venezuelan State of Bermudez, on the N. coast of the peninsula of Paria, with a lighthouse and good roadstead. The surrounding district is fertile, and has mines of copper, sulphur, silver, lead, and lignite;

it also exports cocoa, coffee, and fish. Pop. 12,389.

Carus, Julius Victor, a German zoölogist, born in Leipsic, Aug. 25, 1823. He studied medicine and surgery at Leipsic, further at Würzburg and Freiburg, and in 1849 went to Oxford as keeper of the museum of comparative anatomy. In 1851 he returned to Leipsic, and in 1853 was placed in the chair of Comparative Anatomy there. In the summers of 1873-1874 Carus lectured at Edinburgh for Wyville Thomson during his absence on the "Challenger" expedition. His books are numerous and valuable. Most are elaborate and masterly monographs devoted to particular departments of zoölogy; the more general books are "System of Animal Morphology" (1853); "Handbook of Zoölogy" (1863 *et seq.*); "History of Zoölogy" (1872); "Classification of Mediterranean Fauna" (1884 *et seq.*). He died in 1903.

Carus, Karl Gustav, a German physiologist, born in Leipsic, Jan. 3, 1789. He became professor of midwifery at the Medical Academy, and then royal physician, being latterly a privy-councillor. He published a great number of writings covering a wide field of science, including medicine, physiology, anatomy, psychology, physics, painting, besides memoirs of his life. He died in Dresden, July 28, 1869.

Carus, Marcus Aurelius, a Roman emperor, born in 222, succeeded to the throne in 282 A. D., after the assassination of Probus, under whom he had been prætorian prefect. He was a good and able ruler, with much energy and simplicity of manners. He conquered the Sarmatians, wrested Mesopotamia, Seleucia, and Ctesiphon from the Persians, and was about to make an invasion beyond the Tigris, when he was killed, either by a stroke of lightning or by assassination, in 283.

Carus-Wilson, Charles Ashley, a Canadian scientist, born in Eastry, England. He was graduated at Cambridge (1887) and became a civil engineer. Since 1890 he has been Professor of Engineering Science at McGill University. He has written many monographs on his science.

Carvalho, Leon, a French opera manager, born in 1825. He was a singer of repute and became manager of the Opera Comique in 1875. The structure was burned down with great loss of life in 1887, whereupon he was imprisoned, but later freed and reinstated as manager. His wife was the celebrated singer, Caroline Miolan. He died in Paris, Dec. 20, 1897.

Carvel-built, a term applied to a ship or boat the planks of which are all flush and not overlapping, as in clincher-built boats.

Carver, John, a "Pilgrim Father," the first governor of the Plymouth colony, born in England about 1575. He joined the Leyden colony of English exiles about 1608, and as their agent assisted in securing a charter from the Virginia Company and in selecting and equipping the "Mayflower." He was elected governor probably Nov. 11, 1620, after the "Mayflower" reached Provincetown, showed great ability and judgment in governing the infant colony after the landing at Plymouth, and established by a treaty with the Indians peaceful relations that remained for many years undisturbed. He was reëlected in March, 1621, but died a few days afterward. His chair and sword are still preserved as Pilgrim relics.

Carving, as a branch of art, the process of cutting a hard body by means of a sharp instrument into some particular shape, and is a term generally employed in speaking of figures cut out in ivory or wood, in contradistinction to sculpture, or figures produced in stone or metal. The art of carving is of the highest antiquity. Even among the most uncivilized tribes, rudely-carved representations in wood are common. In the early and Middle Ages wood-carving became general for the decoration of Christian churches and altars. One of the latest developments of the art of carving is the modern invention of carving by machinery. A machine patented in 1845 by Jordan is capable of copying any carved design that can be produced, so far as that is possible, by revolving tools; the finish is afterward given by hand-labor.

Cary, Alice, an American poetess, born near Cincinnati, O., April 26, 1820. When quite young she began writing sketches and poems for the press. In 1852 she, with her sister Phœbe, removed to New York City, where they lived during the rest of their lives. In 1850 the sisters published a volume entitled "Poems by Alice and Phœbe Cary." Alice soon after published "Clovernook, or Recollections of Our Neighborhood in the West" (1851-1853), "Hagar, a Story of To-day" (1852), "Married not Mated" (1856), "The Lover's Diary" (1867), and "Snow Berries: A Book for Young Folks" (1869). She died in New York City, Feb. 12, 1871.

Cary, Annie Louise, an American singer; born in Wayne, Me., Oct. 22, 1842; studied in Milan, made her operatic début in Copenhagen in 1868, had a successful European career for three years, and returned in 1870 to the United States, where she won great popularity and remained, with the exception of one brilliant European tour, until 1882, when she married Charles M. Raymond, and retired from the stage while her voice was still unimpaired.

Cary

Since then she has appeared only in private or for charity.

Cary, Edward, an American journalist; born in Albany, N. Y., June 5, 1840. He has long been connected with the "New York Times." His principal published work is a "Life of George William Curtis."

Cary, George Lowell, an American theologian; born in Medway, Mass., May 10, 1830. He was graduated at Harvard College in 1852; and was a professor at Antioch College in 1856-1862, and Professor of New Testament Literature in Meadville Theological Seminary in 1862-1902 (also president part of the time).

Cary, Henry Francis, an English poet and translator of Dante; born in Gibraltar, Dec. 6, 1772. Though his fame rests upon his version of Dante's "Divine Comedy," he possessed an intimate knowledge of Latin, Greek and French, and translated masterpieces from those languages adequately and with grace. He died in London, Aug. 14, 1844.

Cary, Lott, a negro slave; born in Virginia in 1780. He educated himself, became a Baptist minister, purchased the freedom of himself and his two children for \$850, and joined the colony sent in 1822 to Liberia, where he performed inestimable services in behalf of the new republic. He was acting as agent with full power when he was accidentally killed while making cartridges for defense against the slave traders, in 1828.

Cary, Lucius. See FALKLAND.

Cary, Phœbe, an American poetess and prose-writer, sister of Alice; born in Cincinnati, O., Sept. 4, 1824; contributed numerous sketches to various periodicals; and with her sister published many books, among which are "Poems and Parodies" (1854), and "Poems of Faith, Hope, and Love." She died in Newport, R. I., July 31, 1871.

Cary, Sir Robert. See CAREY.

Cary, Samuel Fenton, an American politician; born in Cincinnati, O., Feb. 18, 1814; represented Ohio in Congress in 1867-1869; was the only Republican representative to vote against the impeachment of President Johnson; and was an unsuccessful candidate for Vice-President in 1876, on the Independent, or so-called "Greenback" ticket headed by Peter Cooper. He died in 1900.

Carya, a genus of North American plants, allied to the Walnut, and belonging to the order *Juglandaceæ*. *C. alba* is the common hickory (*q. v.*). The seeds of *C. amara*, with oil of chamomile, are useful in colic.

Caryopsis

Caryatides, or **Caryates** (ka-rê-at'i-dêz), a term used to signify the figures which are sometimes introduced to support a cornice instead of columns. According to the mythical account given by Vitruvius, they were so called to commemorate the disgrace of the people of Caryä, a city in Arcadia, which was attacked and taken by the confederate Greeks for joining the Persians, the men being killed and the women led into captivity. When the figures introduced to support a cornice are male, they are said to be Persians; this is purely a modern name founded upon the tale related to Vitruvius, and adopted by the architects of the Renaissance period.



A CARYATIDE.

Caryocar, a genus of plants, order *Rhizobolaceæ*. The species are large trees, natives of the hottest parts of South America. *C. butyrosom* is much esteemed for its timber, which is used in shipbuilding and for other purposes. The separated portions of the fruit constitute the Souari or Suwarrow nuts of commerce, the kernels of which are delicious.

Caryophyllaceæ (kar-ê-ô-fil-as'ê-î), a natural order of *thalamifloral dicotyledons*, classed by Lindley under his *Silenal* alliance. There are three sub-orders: (1) *Sileneæ*, the Pink tribe, with united sepals opposite the stamens, where the latter are of the same number; (2) *Alsineæ*, the Chickweed tribe, with separate sepals; (3) *Mollugineæ*, the Carpet-weed tribe, in which the petals are wanting, and the stamens are alternate with the sepals when of the same number. They are all natives of cold and temperate regions. The Clove-pink (*Dianthus Caryophyllus*) is the origin of all the cultivated varieties of carnations, picotees, bizarres, flakes, etc. There are about 60 genera and 1,100 species.

Caryophyllus, a genus of plants, order *Myrtaceæ*. The most important species is *C. aromaticus*, the Clove-tree, a native of the Moluccas, but now grown also in the Isle de France, India, and the West Indies. The cloves of commerce are the unexpanded flower-buds dried. They form a well-known spice, and are used in medicine on account of their aromatic, stimulant, and carminative properties.

Caryopsis, in botany, a small one-seeded, dry, indehiscent fruit in which the seed adheres to the thin pericarp throughout as in wheat and other grains.

Caryota

Caryota, a genus of palms, with doubly-pinnate leaves, the best-known species of which (*C. urens*) is a native of most of tropical Asia; it supplies an inferior kind of sago, and from its juice is made toddy or palm-wine.

Carysfort Reef, a coral reef near the S. extremity of Florida, on which is erected a lighthouse of the first order, 112 feet in height.

Casa, Giovanni della, an Italian poet, born in Mugello, June 28, 1503. His learning and brilliancy gained him the favor of Alexander Farnese, afterward Pope Paul III. He became Archbishop of Benevento, and only the licentious character of his early life and verse prevented his accession to the papacy. His poems are lyrical in style and mark a reaction against the imitation of Petrarch affected by Della Casa's contemporaries. In addition to his poetical works he wrote a prose treatise, "Il Galateo," on manners, and numerous translations. He died in Rome, Nov. 14, 1556.

Casabianca, Louis (käs-äb-yän'kä), a French naval officer, born in Bastia about 1755; sat in the National Convention of 1792; and in 1798 was captain of the flagship "L'Orient" in the expedition to Egypt. He was mortally wounded at the battle of the Nile, Aug. 1, 1798; the ship caught fire; his 10 year old son would not leave him, and both (contrary to Mrs. Hemans' version of the story) were floating on the wreck of the ship's mast when the final explosion took place.

Casamicciola (käs-ä-mēch-yō'lä), a favorite watering-place on the island of Ischia, beautifully situated in a valley on the N. side of Monte Epomeo, with hot springs (158° F.), baths, hotels, etc. The season extends from June to September. By the earthquake of July 28, 1883, the place was almost entirely destroyed.

Casanare, a river of the Republic of Colombia, which flows through a region called by the same name, and after an easterly course of 180 miles empties into the Meta.

Casanova de Seingalt, Giovanni Jacopo (ka'sa-no'vä de sin'gält), an Italian adventurer, born in Venice, April 2, 1725. Expelled from Venice for his scandalous irregularities, he returned there and was imprisoned; after some months he made his escape, and for 20 years traveled over Europe, imposing upon all classes of society with his pretensions to occult science and knowledge of all the secrets of alchemy, including rejuvenation of the old. Among his dupes were Mme. de Pompadour, Frederick the Great, and even that other prince of charlatans, Cagliostro. He wrote his "Memoirs," which were published (1828)

in 12 volumes. He died in Bohemia, June 4, 1798.

Casareep, or **Cassiripe**, a sauce or condiment made from the juice of the Bitter Cassava or Manioc root, which also furnishes tapioca. It is in the highest esteem in Guiana, where it is employed to flavor almost every dish; and it is the basis of the favorite West Indian dish called pepper-pot. It is a powerful antiseptic, and meat can by means of it be kept for a long time quite fresh, even in a tropical climate. It is made by evaporating and concentrating the juice, which is also mixed with various aromatics. The poisonous principle of the juice is dissipated in the evaporation.

Casas Grandes (käs-as grän'das), an old Indian town of Mexico, in the State of Chihuahua, 125 miles S. W. of El Paso, surrounded with ruins of Aztec buildings, which seem to indicate a former population of 20,000 to 30,000.

Casas, Las. See LAS CASAS.

Casati, Gaetano (käs-ä'tē), an Italian explorer, born in Monza in 1838. He studied at Pavia and entering the army attained the rank of major (1879). He then explored Bahr-el-Ghazel, joined Emin Pasha (1883), and, after long captivity among African tribesmen, was rescued by Stanley (1889). He wrote "Ten Years at the Equator" (1891). He died in Rome, Italy, March 7, 1902.

Casaubon, Isaac de (kas-ä'bon), a Swiss classical scholar, born in Geneva, Feb. 18, 1559, educated by his father, a clergyman. In his ninth year he spoke Latin fluently. In 1582 he became professor of the Greek language at Geneva. Henry IV. invited him to Paris and made him royal librarian. After the death of Henry IV. he followed Sir Henry Wotton, envoy extraordinary from James I., to England, where he was received with distinction, had two benefices and a pension conferred on him, and died in London, July 1, 1614. His son, Meric, born in Geneva, Aug. 14, 1599, likewise distinguished himself by his learning, publishing commentaries on Terence, Marcus Aurelius, etc. He died in Oxford, Eng., July 14, 1671.

Casca, Publius Servilius, a Roman conspirator, assisting in the assassination of Julius Caesar, 44 B. C. According to Plutarch, he struck the first blow, in the back of the neck, and left the finishing work to Brutus and the others. Casca died in 42 B. C.

Cascade Range, a chain of mountains in the States of Oregon and Washington. It takes its name from the cascades formed by the Columbia river breaking through the mountains. It is a continuation of the

Sierra Nevada of California, and is nearly parallel with the Pacific coast. Some of the highest peaks are Mt. Hood, 11,225 feet, Mt. Jefferson in Oregon, and Mt. Tacoma in Washington, 14,444 feet high.

Cascapediatic River, a river in Canada, province of Quebec, flows S. E. into Chaleur Bay; length, 150 miles.

Cascara, the bark of the *C. amarga*, a tree native to Mexico, much used as an alterative tonic in skin affections.

Cascarilla, the aromatic bitter bark of *Croton Eleutheria*, a small tree of the natural order *Euphorbiaceæ*. The name has recently been applied also to a subdivision of the genus *Cinchona*.

Casco Bay, a bay on the S. W. coast of Maine; is about 20 miles wide and so deep as to constitute one of the best harbors of the world, for all kinds of vessels. It contains many islands.

Case, in grammar, a modification or inflection of a noun, pronoun, or adjective, by which a different shade of meaning is communicated to the word. In nouns and pronouns case supplies the place of prepositions, indicating the relation of the word thus modified to other words in the phrase or sentence, as John (nominative) speaks; John's (possessive) dog barks. There is only one case in English for nouns, the possessive or genitive (John's). English pronouns have three cases—nominative, genitive, and accusative, as *he*, *his*, *him*. In Sanskrit there are eight cases. In French, Italian, Spanish, and Portuguese the nouns have no case-inflections. In German there are four cases, nominative, genitive, dative, accusative.

Case, (1) A word that in legal phraseology, though often used as synonymous with cause, has separate, though not always very definite, meanings. A formal written argument, prepared with a view to obtaining the opinion of a court of law, is called a Case. (2) In letter-press printing, a receptacle for types, generally made 34 inches long, 15 inches wide, and 1¼ inches deep, and divided into compartments or "boxes," each of which contains types of one class or letter. A pair of Cases consists of an upper and a lower Case; the upper one has 98 "boxes," and contains the capitals, small capitals, and some other signs that are only occasionally required in composition; the lower one has 54 "boxes," and holds the letters of the small characters, figures, spaces, and most of the points. The places assigned to the several letters of the alphabet in the boxes of the Case are not precisely the same in all printing-offices, but the differences are few. The different sizes of the boxes in the lower Case depend upon the comparative frequency with which

the several letters occur in the composition, and the position in the Case allotted to each letter is such as to afford the greatest facility in composing. The letter *e*, which is most run upon in the English language, has a box much larger than any of the other compartments, and is placed directly in front of the compositor. In the upper Case the boxes are of uniform size, and the letters are placed in nearly alphabetical order, the comparatively rare occurrence of capitals rendering it less important which letter is nearest the compositor's hand. Cases are mounted in a slanting position upon a frame of convenient height.

Case, **Augustus Ludlow**, an American naval officer, born in Newburg, N. Y., Feb. 3, 1813; entered the navy as a midshipman in 1828. In the Mexican War he took part in the capture of Vera Cruz and Tobasco, and during the Civil War served as fleet-captain of the North Atlantic blockading squadron. He took part in the capture of Forts Hatteras and Clark and cut out the blockade-runner "Kate," under the fire of the forts at New Inlet, N. C. He was a lighthouse inspector in 1867; chief of bureau of ordnance, 1869; and commander of the European squadron in 1873. He was retired in 1875, and died in Washington, D. C., Feb. 17, 1893.

Case-hardening, the process of converting the surface of certain kinds of malleable-iron goods into steel, thereby making them harder, less liable to rust, and capable of taking on a better polish. Fire-irons, gun-locks, keys, and other articles of limited size, are very commonly so treated, but the process is sometimes applied to large objects, such as iron railway-bars. The articles are first formed, and heated to redness with powdered charcoal or cast-iron, the malleable-iron taking carbon from either of these to form a skin of steel upon it; the heated objects are then cooled in cold water, or in oil when they are of a delicate nature. Yellow prussiate of potash or parings of leather have also been a good deal used for coating iron articles with steel by heating them together. Some chemists consider that in this case nitrogen combines with the iron and effects the hardening. The coating of steel is very thin, seldom exceeding one-sixteenth of an inch. A Swedish ironmaster has found that a very excellent case-hardening is obtained by treating iron or steel objects with a mixture of animal matter, such as rasped leather or horn, and arsenious acid dissolved in hydrochloric acid, and heating as usual.

Casein, or **Caseine**, an albuminoid substance found in milk, soluble in alkali. It is coagulated by animal membranes. It

dries into a yellow mass, and contains less nitrogen than albumin. A similar substance, called vegetable caseine, or legumin, occurs in peas, beans, etc. Vegetable caseine is a substance essentially the same as animal caseine, of which from 20 to 27 per cent. occurs in the pea and bean, while the seeds of leguminous plants in general contain a considerable proportion of it.

Case-mate, in fortifications, (1) a kind of bomb-proof vault or arch of stone-work, in that part of the flank of a bastion next the curtain, somewhat retired or drawn back toward the capital of the bastion, serving as a battery to defend the face of the opposite bastion, and the moat or ditch. (2) The well, with its several subterraneous branches, dug in the passage of the bastion, till the miner is heard at work, and air given to the mine.

Caserta, a town of Italy; on a plain 20½ miles N. N. E. of Naples by rail. It is remarkable for its magnificent palace, one of the finest in Europe, which was founded by Charles III. in 1752. Pop. (1901) 32,709.

Caserta, or **Terra di Lavoro**, a province of Italy, N. of Naples, along the Mediterranean Sea. Its chief industries are agriculture and cattle raising; there are also some flourishing manufactures. Area, 2,033 square miles. Pop. (1906) 806,310.

Case-shot, in artillery, is formed by putting a quantity of small iron balls into a cylindrical tin box called a canister, that just fits the bore of the gun. This kind of shot is very injurious to an enemy within a short distance. The shrapnel-shell is a modern variety of case-shot.

Casey, Silas, an American officer, born in East Greenwich, R. I., July 12, 1807; was graduated at the United States Military Academy in 1826; served in the Mexican War, being present at the battles of Contreras, Churubusco, Molino del Rey, and the siege of Chapultepec. When the Civil War broke out he was given charge of organizing the volunteers near Washington; later served in the Army of the Potomac, and won much distinction at Fair Oaks; was president of the board to examine candidates for officers of colored troops in 1863-1865; brevetted Major-General U. S. A., March 13, 1865; and retired in 1868. His publications include "System of Infantry Tactics" and "Infantry Tactics for Colored Troops." He died in Brooklyn, N. Y., Jan. 22, 1882.

Casey, Thomas Lincoln, an American military engineer, born in Madison Barracks, Sackett's Harbor, N. Y., May 10, 1831; the oldest son of Gen. Silas Casey. He graduated from West Point in 1852, and entered the Engineer Corps of the army.

During the Civil War he was superintending engineer of defenses on the coast of Maine, and on special duty with the North Atlantic squadron in the first expedition against Fort Fisher. In 1865 he was brevetted colonel for gallant services during the war. In 1868 he was put in charge of one of the departments in the chief engineer's office at Washington; in 1873 was sent abroad for professional service; and in 1877 was placed in charge of the construction of the State, War, and Navy Building and of the Washington Aqueduct, and also of the Department of Public Buildings and Grounds. Later he built the White House Conservatory and the Army Medical Museum, and completed the Washington Monument and the Congressional Library. He was president of the Board of Engineers for fortifications at New York in 1886-1888; was promoted to chief of engineers in 1888; was elected to the National Academy of Sciences in 1890. General Casey was an officer of the French Legion of Honor and a member of the American Society of Civil Engineers. He died in Washington, D. C., March 25, 1896.

Casgrain, Abbe Henry Raymond (kä-gran'), a Canadian historical writer, born in Rivière Quelle, Quebec, Dec. 16, 1831. On Oct. 5, 1856, he was ordained a priest. He was professor at St. Anne's College till 1859, and afterward vicar at Quebec Cathedral from 1860 till 1873. Among his most important works are: "History of the Hôtel Dieu de Quebec"; "My Canadian Parish in the Seventeenth Century." A collection of his entire works was published in 1886.

Cash Credit, or **Cash Account**, a mode of advancing funds originated by the Scotch banks, and since adopted by others. A cash credit is an account which the trader may overdraw to a certain amount as he may require, paying cash in and taking it out, according to his needs within that limit. Heritable property, two sureties, or some other form of security is usually demanded by the bank.

Cashel, a town in Tipperary county, Ireland, about 49 miles N. E. of Cork; noted as containing the most interesting ruins in Ireland. These consist of a cathedral, founded in 1169; a stone-roofed chapel, built in 1127; Hore Abbey, founded in 1260; the palace of the Munster kings; and a round tower, 90 feet in height and 56 feet in circumference. They are built on the summit of the slope which the town occupies, and called collectively "Rock of Cashel." Here was held the great synod, in 1172, when the Irish priests first acknowledged the authority of the English Church and state. Cashel is a Roman Catholic archdiocese. Pop. (1901) 2,938.

Cashew

Cashew (a corruption of *acajou*, the French form of the native Brazilian name *acajaiba*), the seed of the *Anacardium occidentale*, a tree of the family *Anacardiaceæ*. It is a large tree, somewhat like a walnut. The fruit or nut is kidney-shaped, of an ash color; the shell consists of three layers, the outer and inner of which are hard and dry, but the intermediate layer contains a quantity of black, extremely acrid, caustic oil, which is destroyed by roasting the nuts before eating them. The oil is applied to floors in India to protect them from the attacks of white ants.

Cashmere. See KASHMIR.

Casiguran Bay, a considerable inlet on the E. coast of Luzon, Philippine Islands, reached through Casiguran Sound. The sound is about 9 miles long from Cape Ildefonso to a narrow passage affording access to the bay. The bay itself is about $\frac{3}{4}$ miles long and $2\frac{1}{2}$ miles wide. Its depth is some 15 fathoms.

Casimir, properly **Kazimierz** ("founder of peace"), was the name of many Polish princes and kings. With the establishment of the power of Casimir I. in 1041, the predominance of Christianity was decided in Poland. But the most distinguished of this name was Casimir III., called Casimir the Great, who succeeded his father, Vladislav Loketek, as King of Poland in 1333. He added Little Russia and Red Russia to his dominions, and repelled the Tartars, who then threatened Poland. He founded the university of Cracow (1364), as well as several schools and hospitals, and showed great anxiety for the advancement of the arts and of learning in his kingdom, and for the improvement of the condition of the most oppressed classes, which won him the title of King of Peasants, while a Jewish mistress obtained from him special liberties for her race. He died Nov. 5, 1370.

Casimir-Perier, Jean Paul Pierre (käs-ē-mēr' per-yā'), a President of the French Republic, born in Paris, Nov. 8, 1847. He served in the Franco-Prussian War, and received the decoration of the Legion of Honor for bravery. In 1876, he was elected to the Chamber of Deputies; in 1890, Vice-President of the Chamber, and in 1893, President. He was Premier till the assassination of President Carnot, when he was chosen his successor on the first ballot (June, 1894). He resigned the office of President Jan. 16, 1895, and was succeeded by Felix Faure. He died March 11, 1907.

Casino, a name generally given to a kind of club-house or place of amusement, containing rooms for dancing, playing at billiards, etc.

Caskets, The, a group of rocks in the English Channel, 7 miles from Alderney.

Caspian Sea

They have often been fatal to vessels, and, in 1119, Prince William, son of Henry I., and his suite, perished here. In 1744, the "Victory" ship of war, of 110 guns, also was shipwrecked upon them. On the highest there is a lighthouse.

Caspari, Karl Paul, a German Church historian; born in Dessau, Feb. 8, 1814; became Professor of Theology at Christiania in 1857. His Arabic grammar (4th ed. Halle, 1875) is in high repute, and his contributions to the study of the Old Testament include works on Obadiah, Isaiah, Micah, and Daniel. Besides his "Anecdotes of Ecclesiastical History" (1883), he published at Christiania "The Origin of the Story of the Baptismal Symbol, and the Rule of Faith" (2 vols., 1866-1869), extensions of which appeared in 1875 and 1879. He died in Christiania, Norway, April 11, 1892.

Caspian Gates, a name given to the Russian fortress Dariel, situated in a narrow defile of the Caucasus, on the Terek, 80 miles N. of Tiflis.

Caspian Sea (ancient *Mare Hyrcanum*), a great salt lake of Western Asia, wholly enclosed, having no outlet whatever to the ocean, and surrounded by Tartary, Persia, the Caucasian countries, and the Russian governments of Orenburg and Astrakhan. Its greatest length from N. to S. is 760 miles; average breadth, 200; area, about 120,000 square miles. The waters of this inland sea are less salt than those of the ocean. The water has a bitter taste, ascribed by some to the great quantities of naphtha with which the surrounding soil abounds, but by others to the presence of Glauber salts, among the substances held in solution. The fish are principally salmon, sturgeons, and sterlets; a kind of herring is also found, and there are porpoises and seals. The Caspian Sea has no tides, but its navigation is dangerous because of violent storms, especially from the S. E., by which its waters are sometimes driven for many miles over the adjacent plains. The depth near the S. end is about 600 feet; and in some places near the center it attains a depth of nearly 3,000 feet; but near the coast it is very shallow, seldom reaching a depth of more than 3 feet at 100 yards from the shore, and in many places a depth of 12 feet is not reached within several miles of the beach. On the N. E. and E. it is especially shallow. It receives the waters of a number of large rivers, of which the greatest is the Volga. The Ural, the Tereh, and the Kur also fall into it. The trade of the sea is entirely in the hands of Russia. The *Kaspin Oálassa* (Herod. Clio, 203), is the oldest name for this water. It was derived from the Caspii, a people who inhabited its banks; as

the more modern term, Hyrcanian Sea, *Oálassa 'Yrkania* (Strabo, xi, 507), was similarly derived from the more important Hyrcanii, a principal branch of the great Persian family. At the present day it is called *More Gualenskoi*, by the Russians; *Kulsum*, by the Persians; *Bahr Kurzum*, by the Arabs; *Kulzum Denghis*, by the Turks; and *Akdinghis*, by the Tartars.

Cass, Lewis, an American statesman, diplomatist, and soldier, born in Exeter, N. H., Oct. 9, 1782; served in the War of 1812; was governor of Michigan Territory (1813-1831); Secretary of War (1831-1836); minister to France (1836-1842); United States Senator (1845-1848); Presidential candidate (1848); United States Senator (1849-1857); Secretary of State (1857-1860). He wrote: "History, Traditions, and Languages of the Indians" (1823); "France, Its King, Court, and Government"; etc. He died in Detroit, Mich., June 17, 1866.

Cassagnac, Adolphe Bernard Granier de (käs-än-yäk'), a French journalist and politician, born in 1806; began his career at Paris as contributor of literary criticisms to the "Journal des Débats," and soon made himself known, and latterly notorious, as editor of various papers, the "Globe," the "Pouvoir," the "Pays," etc., and as being involved in many controversies and duels. He published various books, chiefly historical. Among the principal are "Literary Portraits," "History of the Causes of the French Revolution," "History of the Girondists," "The Emperor and Modern Democracy." He died in 1880. His son, Paul de Cassagnac, born in 1842, had a career and a reputation not dissimilar to those of his father, and, like him, he was a devoted Bonapartist. He died in 1904.

Cassandra, the most W. of the three tongues of the Chalcidic peninsula, between the gulfs of Salonica and Cassandra. Its ancient name was Pallene. The Gulf of Cassandra was anciently Toronaicus Sinus.

Cassandra, according to Homeric legend, was daughter of Priam and Hecuba. She was passionately loved by Apollo, who promised to grant her whatever she might require, if she would look with favor on his suit. She demanded the power of prophecy, and as soon as she had received it, refused to perform her promise, and slighted Apollo. The god, thus disappointed, wet her lips with his tongue, and thus no belief was ever placed in her predictions. She endeavored to prevent the entrance into Troy of the wooden horse of the Greeks, but was unsuccessful, and when that city was taken she suffered violence at the hands of Ajax Oileus. In the division of the spoils of Troy she fell to the share of Agamemnon, who carried her to Greece. She repeatedly

foretold to him the calamities that awaited his return; but he gave no credit to her, and was assassinated by his wife Clytemnestra. Cassandra shared his fate, after seeing all her prophecies but too truly fulfilled.

Cassano (kas-ä'nō), a town of Southern Italy, 34 miles N. of Cosenza. Pop. 7,407. Cassano, on the Adda, 16 miles E. N. E. of Milan by rail, was the scene of two sanguinary battles—a defeat in 1705 of the Imperialists under Prince Eugene, by the French under Vendôme; and a defeat in 1799 of the French themselves under Moreau, by the Russians and Austrians under Suwaroff.

Cassation, a term used in the courts on the continent of Europe, signifying the annulling of any act or decision, if the forms prescribed by law have been neglected, or if anything is contained in it contrary to law.

Cassation, Court of (*Cour de Cassation*), one of the most important institutions of modern France, which gives to the whole jurisdiction of that country coherency and uniformity, without endangering the necessary independence of the courts. It was established by the first National Assembly, and has been preserved, in every essential respect, under all the changes of the revolution and restoration. It has been maintained even in those districts which, by their union with France, became subjected to French laws, but by the peace of Paris again became part of the Prussian monarchy. In France as early as the reign of Louis IX. (1226-1270), petitions were presented to the king by appellants from the decisions of the courts. In later times appeals to the parliaments, as the highest courts of the kingdom, came into use, and their decisions were not liable to be set aside by the ordinary forms of law. Yet the parties were allowed to dispute even these decisions if they were founded on errors of fact, or violated undisputed principles of law; and by an ordinance of 1302 it was provided that the parties should be allowed royal letters for the defense of their rights against the decisions of the supreme courts (*lettres de grâce de dire contre les arrêts*), which should be issued from the chancery (by the chancellor of France). The case was then sent back to the Parliament for further investigation, but was examined and decided in the presence of the king himself, or of a special commissioner.

An abuse, however, crept in of transferring these cases to the royal council, where they were decided by officers called *maîtres des requêtes*. These letters received the name of *lettres de proposition d'erreur*, and during the civil commotions at the end of the 14th century began to be more fre-

quently presented to the council, which, as soon as one party complained of the partiality of the Parliaments, transferred the case to its own bar, and obstructed the course of justice by *lettres d'état* (suspensions of the process, on the pretext of the absence of one of the parties in the service of the king). Under Chancellor Poyet (1538-1542), this abuse reached its highest pitch; but Chancellors Olivier (1545-1551) and Hôpital (1560-1568), the two great reformers of French jurisprudence, limited the use of these *lettres*, till, by the ordinance of Blois (1576), all the provisions against the decisions of the Parliaments were reduced to these three: the *proposition d'erruer*, for an error of fact; *requête civile*, to restore the parties to their former condition on account of the fraud of one of the parties, or the mistakes of the attorney; and *cassation* (petition for abrogation), for violation of forms or settled principles of law. By the famous order of procedure of 1667 the first of these provisions was abolished, but the province of the *requête civile* and *cassation* was enlarged and more precisely defined. The former was always brought before the court itself and decided there, the latter before the council.

For this purpose, in the *conseil privé*, or *cons. des parties*, a particular committee was formed, consisting of the chancellor, the four secretaries of State (ministers of the departments), the council of State, and all the *maîtres des requêtes* (in 1789, 78 in number). The decisions of this committee were too much influenced by the will of the king and the ministers, and by various other circumstances, so that they did not enjoy great respect, though they often exposed acts of great injustice on the part of the Parliament and other high courts. It was therefore abolished in the first National Assembly, and its place supplied by an independent court—the *tribunal of cassation* (decrees of Nov. 27 and Dec. 1, 1790), which was retained in all the constitutions and received under the imperial government (1804) the name court of cassation, which it still retains. It consisted, according to the organization of 1800, of 48 members, chosen from the senate, on the nomination of the consuls, who elected their own president from among themselves. The appointment of president was afterward vested in the emperor. In the Charte Constitutionnelle of 1814 the number of members of the court of cassation was fixed at 49, at which it still remains. The members are appointed for life by the president of the republic, and consists of a first president, three presidents of sections, and 45 councillors, besides certain honorary members. The minister of justice, or keeper of the seals (*garde des sceaux*) has the right of presiding on certain occasions.

This court never decides on the main question at issue, but on the competency of the other courts, and on the petitions to have their decisions reviewed or annulled, and assigns the question to another court, if a decision is to be set aside for an evident violation of the forms or the principles of the law. For this purpose it is divided into three sections or chambers—the *chambre des requêtes*, which decides on the admissibility of the petitions in civil cases; the *chambre de cassation civile*; and the *chambre de cassation criminelle*. After a decision has been reversed, if a second court decides the same case in the same way, and an appeal is entered again, the court of cassation must either request an authentic explanation of the law from the government, or at least all the three sections must unite, to pronounce a second reversal or cassation; and if a third decision is the same as the preceding, the court before which the case is again brought must submit to the doctrine of the court of cassation on the point of law in dispute.

This system, which dates from April 2, 1837, gives great authority to this court in matters of jurisprudence. According to the law in force before 1837, the court before which a case was brought for decision a third time was not required to adopt the views of the court of cassation, but after the third decision there was no further appeal. The government, however, in that case gave an authentic interpretation of the law if there was any occasion for so doing. Until the end of 1852 there was a similar court of cassation for the Prussian province of the Rhine, but in 1853 its jurisdiction was transferred to the supreme Prussian tribunal sitting at Berlin. The sentences of the court of cassation are not only recorded in the journals of the courts, the decisions of which are reversed, but published likewise in an official bulletin, by which consistency and uniformity are preserved. The tribunal of cassation has enjoyed from its commencement the respect and confidence of France, and numbered among its members several of the most distinguished lawyers; as the president Henrion de Pansey, the councillors Chabot, Merlin, and Carnot.

Cassatt, Mary, an American figure-painter, born in Pittsburg, Pa.; studied art in Europe; and lived some time in Spain and France. One of the first to adopt impressionistic methods, she exhibited some excellent work in the Paris Exposition of 1878; became a member of the Society of American Artists in 1880. As an etcher she ranks among the best. Her studio is at Paris.

Cassava (*Manihot utilisima*), a South American shrub, about 8 feet in height, with broad, shining, and somewhat nana-

Cassava

shaped leaves, and beautiful white and rose-colored flowers, belonging to the natural order *Euphorbiaceæ*, sub-order *Crotoneæ*. A nutritious starch is obtained from the white soft root of the plant, and is called by the same name. It is prepared in the West Indies, tropical America, and in Africa in the following manner: The roots are washed, stripped of their rind, and grated down to a pulp, which is put into coarse, strong canvas bags, and submitted to powerful pressure to express the juice, which is highly poisonous in its natural state. The flour that remains after pressing is formed into cakes, and baked on a hot iron plate. In this state it forms a valuable article of food, upon which many of the inhabitants of Southern America live almost entirely. From Cassava the tapioca of commerce is prepared. Another species (*M. Aipi*), the sweet Cassava, has roots the juice of which is not poisonous, and which are an agreeable and nutritive food. The Cassava is also called Manioc, or Mandioc.

Cassegranian Telescope, a form of the reflecting-telescope in which the great speculum is perforated like the Gregorian, but the rays converging from the surface of the mirror are reflected back by a small convex mirror in the axis of the telescope, and come to a focus at a point near the aperture in the speculum, where they form an inverted image, which is viewed by the eyepiece screwed into the tube behind the speculum.

Cassel, or Kassel, formerly the residence of the Elector of Hesse-Cassel, is now the chief town in the province of Hessen-Nassau, Prussia, on the Fulda, 91 miles N. N. E. of Frankfort-on-the-Main. The Old and New Town are connected by a bridge over the Fulda. There are several fine squares, in the principal of which, the Friedrichsplatz, the largest in any town in Germany, stands the palace of the ex-elect- or, an indifferent structure. There is a museum and library (160,000 vols.), and a valuable picture-gallery. The city has manufactories of machinery, mathematical instruments, gold and silver wares, chemicals, knives, gloves, leather, and porcelain. There are many fine walks and public gardens in the vicinity; amongst the latter are the gardens of Wilhelmshöhe, in which is situated the ex-elect- or's summer palace, the residence of the late Emperor Napoleon III., after his being taken prisoner at Sedan, from Sept. 5, 1870, to March 19, 1871. Pop. (1905) 120,467.

Cassel (ancient *Castellum Menapiorum*), a town of France, in the department of Nord, on an isolated hill in the center of a large and fertile plain, dating from the time of Julius Cæsar.

Cassicus

Cassia, a genus of plants, order *Leguminosæ*, sub-order *Cæsalpinieæ*, and tribe *Cassieæ*. It has five unequal sepals, five petals all yellow, unequal in size but not papilionaceous, ten stamina distinct from each other, the three lowest the longest, the four intermediate ones shorter and straight, and the remaining three sterile or abortive; ovary stalked, usually curved, leaves simply and abruptly pinnated with opposite leaflets, generally with glands on the peduncles. Between 200 and 300 species are known. They are trees, shrubs, or herbs. They are found in India, Africa and the warmer parts of this country. Several furnish Senna. The seeds of *C. Absus*, which are very bitter, are brought to Cairo from the interior of Africa; they are called *Chicin* or *Cismatan*, and are regarded as the best of remedies for Egyptian ophthalmia. The bark of *C. aurata* is used in India medicinally, and also for dyeing and tanning leather. The roasted seeds of *C. occidentalis*, which, notwithstanding its specific name, is found in the East as well as in the West Indies, are used in the Mauritius for coffee, and as a remedy in asthma.

Cassianus, Joannes Eremita, or Joannes Massiliensis, an early monk and theologian, born about 360. He spent some years among the ascetics of the Egyptian deserts, was ordained by Chrysostom at Constantinople in 403, and afterward instituted monastic life in Provence, France. Shortly before 415 he founded at Massilia two monasteries according to the rules laid down in his "Rules of the Cœnobites." One of these monasteries was for nuns; the other was the famous Abbey of St. Victor, which under its founder is said to have possessed not less than 5,000 inmates, and which served as a model to a multitude of monastic institutions in Gaul and Spain. He died about 448, and was afterward canonized, his festival falling on July 25. In his writings Cassianus appears as the opponent of the extreme dogmas of St. Augustine respecting grace and free-will. His "Colloquies of the Sketic Fathers" is a work in 24 chapters, each of which gives a "spiritual colloquy between monks in the desert of Sketis," regarding the monastic life and the vexed questions of theology. Cassianus was one of the first of the "semi-Pelagians" rejecting the extreme view taught by St. Augustine of man's worthlessness and natural incapacity for good; his views being substantially identical with what was long afterward known as Arminianism. There is an edition of his works by Gazæus (3 vols. Douai, 1616).

Cassicus, an American genus of insectorial birds, the Cassicans, family *Icteridæ* (American orioles), allied to the starlings, remarkable for the ingenuity with which

Cassidaria

they weave their nests. *C. cristatus*, sometimes called the crested oriole, a South American bird, constructs a pouch-shaped nest of the length of 30 inches.

Cassidaria, a genus of molluscs — class *Gasteropoda*, order *Prosobranchiata*, family *Cassidæ*. The shell is roughly oval, with a wide mouth, a fairly long siphon canal, and without a closing lid. There are six modern Mediterranean species, and five times as many extinct in the Upper Chalk and Tertiary strata.

Cassin, John, an American ornithologist, born near Chester, Pa., Sept. 6. 1813. Among his more important works may be named: "Mammalogy and Ornithology of the Wilkes Exploring Expedition;" "Ornithology of Perry's Expedition to Japan;" etc. He died in Philadelphia, Jan. 10, 1869.

Cassini, Count, a Russian diplomatist, born in St. Petersburg. He was educated at the Imperial Alexander Lyceum, and became secretary of legation in Denmark, minister resident in Hamburg, minister to China, and the first Russian ambassador to the United States.

Cassini (kas-ē-nē), a name famous in astronomy and physics for several generations: (1) Giovanni Domenico, born near Nice, France, in 1625, became professor of astronomy at the University of Bologna, but afterward settled in France. He discovered four new satellites of Saturn and the zodiacal light, proved that the axis of the moon is not perpendicular to the plane of the ecliptic, and showed the causes of her libration. He died in 1712. (2) Jacques, his son, born in Paris in 1677. After several essays on subjects in natural philosophy, etc., he completed his great work on Saturn's satellites and ring. His labors to determine the figure of the earth are well known. He died in 1756. (3) Cassini de Thury, César François, son of the preceding, born in 1714, member of the Academy from his 22d year, undertook a geometrical survey of the whole of France, which was completed by his son. He died in 1784. (4) Cassini, Jean Dominique, Count de Thury, son of the preceding, born in Paris in 1748, was a statesman of ability as well as a mathematician. In 1787 he completed the topographical work which was begun by his father, and which in its complete state consists of 180 sheets. He died in 1845.

Cassino, a game at cards usually played by four persons (although more can enter the game), two on each side. In it the ten of diamonds, technically called big cassino, or big cass., counts two; and little cassino, or little cass., the two of spades, counts one. The points possible to be scored in one deal (exclusive of sweeps) number 9. They are: Big cassino, 2; lit-

Cassis

tle cassino, 1; cards, 1; spades, 1; each ace, 1=4. A sweep is counted when a player takes up all the cards on the table. The object sought in the game (besides the points already enumerated) is to arrange the cards on the board in combination so that the sum of the spots on the cards thus combined may equal those on one card in the hand of the player, who has the right to take as many cards from the board as he can thus combine; or he may capture any card from the board the counterpart of which he has in hand.

Cassiodorus, or **Cassiodorius**, **Magnus Aurelius**, a Latin writer, born at Scylaceum, in Calabria, about 468 A. D. He was appointed by Theodoric, King of the Goths, governor of Sicily, filled afterward some of the highest offices in Rome, and finally retired to a monastery in Calabria. He is celebrated as grammarian, chronologist, and historian. Died about 577.

Cassiopeia, or **Cassiepeia**, (1) the wife of Cepheus, King of Æthiopia, and mother of Andromeda. Besides the account that makes Cassiopeia boast of her daughter's beauty as exceeding that of the Nereids, another says that she boasted that she herself was more beautiful than they, and for this reason, when placed among the stars, she was represented as turning backward round the pole. (2) "The Lady in her Chair," one of the northern circumpolar constellations included in Ptolemy's original 48. The figure is that of a woman seated in a chair and turning backward round the pole of the heavens. Its brightest star, Alpha, varies between the 2.2 and the 2.8 magnitudes in an irregular period. The constellation is bounded by Cepheus, Camelopardalis, Perseus, Andromeda, and Lacerta. It is in this constellation that the *Nova* (Lat "new") of 1572, or Tycho Brahé's wonderful star, burst forth in November of that year. The star is also called *B. Cassiopeia*, as Bayer placed that letter beside the enormous star which he drew upon the map of Cassiopeia to represent this *Nova* of Tycho, though at this time (1603) it had long since disappeared from naked-eye vision. Whether he intended the letter to refer to Brahé or not does not appear.

Cassiquiari, or **Cassiquiare** (ka-sik-ē-ä'rē), a large river of South America, in Venezuela, which branches off from the Orinoco and joins the Rio Negro, a tributary of the Amazon. By means of this river water communication is established for canoes over an immense tract of South America, it being practicable to sail from the interior of Brazil to the mouth of the Orinoco.

Cassis, in zoölogy, (1) the Helmet-stone, an echinite, a section of the class of *Catacysti*; (2) a genus of gasteropodous mollusks, family *Buccinidæ*. Their En-

glish name is helmet shells. They are ventricose univalves; the aperture is longitudinal and sub-dentated, and terminating in a short reflected canal. This genus of shells is found both recent and fossil.

Cassius, full name, **Caius Cassius Longinus**, one of the assassins of Julius Cæsar. In the civil war that broke out between Pompey and Cæsar he espoused the cause of the former, and, as commander of his naval forces, rendered him important services. After the battle of Pharsalia he was apparently reconciled with Cæsar, but later was among the more active of the conspirators who assassinated him, 44 B. C. He then, together with Brutus, raised an army, but they were met by Octavianus and Antony at Philippi. The wing which Cassius commanded being defeated, he imagined that all was lost, and killed himself 42 B. C.

Cassivelaunus, a British chief who, when Cæsar invaded Britain, held sway over the tribes living to the N. of the Thames, and who on account of his valor was appointed leader of the British forces which opposed Cæsar. He had at first some slight successes, but Cæsar ultimately forced a passage across the Thames and put the enemy to flight. In the end Cassivelaunus sued for peace, which was granted on condition that he should pay a yearly tribute and give hostages.

Cassock, a close garment resembling a long frock coat, worn by clergymen under the surplice or gown. In the Church of Rome they vary in color with the dignity of the wearer; those of priests being black, bishops purple, cardinals scarlet, and Popes white.

Cassowary (*Casuaridæ*), a family of birds placed by modern systematic writers among the *Brevipennes*, *Cursores*, or *Ratitæ* (Huxley), their affinities being greatest to the ostrich, rhea, etc., among living, the moa and others among extinct birds. The shortness of their wings totally unfits them for flying, and it would seem impossible for nature to have furnished muscular power sufficient to move wings large enough to sustain their great weight in the air. As in others of this group, the pectoral or wing muscles are comparatively slight and weak—the breast-bone having no keel by which, as in other birds, the surface for the attachment of muscles is increased—while those of their posterior limbs are very robust and powerful. The wings of the ostrich are of some assistance to it in running, but those of the cassowary are too short even to be of service in this way. Indeed its whole plumage is so poorly supplied with feathers as to resemble, at a little distance, a coat of coarse or hanging hair. The cassowaries have three toes, all provided with nails.

The cassowaries are commonly divided into two genera—*Casuaris* and *Dromæus*, the former, or cassowaries proper, having a long compressed bill, a bony crest or helmet on the head, and stiff featherless quills on the wings; the latter having a broader and shorter bill, feathers on the head, and no rudiment of the wing visible externally. Several species of both genera are known, and of these one of the most familiar is the galeated or helmeted cassowary of Ceram (*C. galeatus*), which has a laterally compressed beak, the head surmounted by an osseous prominence, covered with a sort of horny helmet; the skin of the head and superior part of the neck is naked, of a deep-blue and fiery-red tint, with pendent caruncles or wattles. There are some naked rigid quills on the wings, which are used as weapons of defense. The inner toe nail is the largest of all. The ostrich is the only bird which surpasses the cassowary in size and strength. From the form of its head and bright eyes the cassowary is of a fierce and threatening aspect. This, however, is not a true indication of its character, which is rather timorous and shy. It is about 5½ feet long from the tip of the bill to the extremity of the longest claw. The head and neck together measure 18 inches, and the largest toe, including the claw, is 5 inches long. The claw of the inner toe is 3½ inches long.

All the feathers of the cassowary are of the same kind, being entirely designed for covering, and externally are all of one color. They generally grow double, having two long shafts growing out of a short one attached to the skin. In this genus the second or aftershaft is as long as the first. The double feathers are all of unequal length, some on the rump being 12 or 14 inches long, while others are only 3. The stem or shaft is flat, shining, black, and knotted below, having a beard arising from each knot. The beards at the ends of the large feathers are perfectly black, and toward the root of a tawny gray. The feathers on the head and neck are so short and scattered that the skin appears naked, except toward the hind part of the head, where they are somewhat longer. The wings without the feathers are not more than 3 inches long. The rigid quills or prickles already mentioned are five; the longest is 11 inches in length, and a quarter of an inch thick at the base. The helmet is black in front and yellow behind. The eye is of a bright yellow, and more than 1 inch in diameter. The anatomy of the cassowary differs very materially from that of the ostrich, which it resembles so much in general appearance. The intestines are short and the cæcum small; there is no stomach intermediate to the crop and gizzard, and the cloaca is not larger in proportion than that of other birds. It feeds

on fruits, eggs of birds, etc., and inhabits the forest districts.

As might be inferred from its structure, the cassowary is a swift runner, and its mode of progression, being unaided by wings, is as peculiar as it is efficient. In running, the cassowary appears to strike out powerfully with one leg, so as to project its body violently forward with a bounding motion, far surpassing the speed of a horse. It also kicks violently when, in a state of captivity, it is provoked to anger, and can inflict a very severe blow. The eggs of the galeated cassowary are green, and are neither so round nor so large as those of the ostrich. The shell is marked by numerous little deep-green tubercles. The largest of their eggs measure about 15 inches in length and 12 round. Other species of this genus are *C. australis*, the Australian cassowary, inhabiting Northern Australia, and resembling the bird above described; *C. beccarii* and *C. bicarunculatus* of the Aru Islands, *C. uniapendiculatus* of New Guinea and Salwatti, *C. papuanus* of Northern New Guinea, *C. Bennetti* of New Britain. (See Pl. V., figs. 4, 5, 6, at ORNITHOLOGY.)

The emu, or New Holland cassowary (*Dromæus novæ Hollandiæ*, Gray), differs from the helmeted cassowary by being much larger, and standing higher on its legs, being 7 feet 2 inches in length. The head is destitute of the helmet, and feathered throughout, except around the ear. The plumage is thicker, and the webs of the feathers more perfect. It has neither caruncles to the neck nor prickles on the wings. The nails of the toes are nearly equal. The legs are stout, similar to those of the galeated species, but jagged or dentated along the whole of their back part. The emu is swifter in running than the fleetest grayhound. It has not yet been found anywhere but in Australia. The flesh has a considerable resemblance to beef. The young of the New Holland cassowary are striped with white and brown.

Cast, in the fine arts, an impression taken by means of wax or plaster of Paris from a statue, bust, bas-relief or any other model, animate or inanimate. In taking a cast from a living person's face, it is necessary, first, to anoint the eyebrows and eyelashes, and any hairs about the cheeks and temples, with a little sweet oil; then to insert two tubes (oiled also) of pasteboard into the nostrils, so that breathing may be performed through them; a handkerchief is then to be tied loosely over the face, and the head is sloped backward in an elbow chair or sofa. Powdered and calcined plaster of Paris is then mixed with spring water to the consistence of cream, and poured in between the face and handkerchief to the depth of half an inch. On be-

coming fixed or hard, it is removed and left to dry. When dried thoroughly it is well soaked with linseed oil, and an impression may then be taken from it, in plaster of Paris or soft clay; the hollow cast being first split longitudinally down the nose, so that the object cast may be more easily removed.

It ought to be observed that all models should be divided into several pieces or joints; thus, in that covering any round body, one side must be covered first with the plaster, and the sides pared with a knife, and smeared with clay and water; then the remaining part of the object covered with plaster, and a joint will thus be formed between the two parts; for, wherever the mixture of clay and water has been applied with a hair brush, the cast will not adhere, and therefore will be easily separated with the blunt edge of a knife. It is usual also to make small pits or depressions of the size of small buttons, on the edges of the joints of molds, so that they may lock together well when added, and thus fit closely.

Plaster casts are varnished by a mixture of soap and white wax in boiling water. A quarter of an ounce of soap is dissolved in a pint of water, and an equal quantity of wax afterward incorporated. The cast is dipped in this liquid, and after drying a week is polished by rubbing with soft linen. The surface produced in this manner approaches to the polish of marble. When plaster casts are to be exposed to the weather, their durability is greatly increased by saturating them with linseed oil, with which wax or resin may be combined. When intended to resemble bronze, a soap is used made of linseed oil and soda, colored by the sulphates of copper and iron. Walls and ceilings are rendered water-proof in the same way.

Castalia, a fountain on the slope of Parnassus, a little above Delphi, in Phocis, sacred to Apollo and the Muses. All who visited the Delphian temple were wont to bathe their hair *rore puro Castaliæ* ("in the pure dew of Castalia"), but those who needed to be purified from murder bathed their whole body. Its waters, moreover, gave poetic inspiration to those who drank. The name was due to Castalia, daughter of Achelous, who threw herself into the fountain to escape the pursuit of Apollo.

Castalides, the Muses, so called from the fountain Castalia, at the foot of Parnassus.

Castanea, a genus of trees, order *Corylaceæ* (Mastworts). The barren flowers are in a long, cylindrical, interrupted spike; the fertile ones within a four-leaved involucre; the nuts 1-2 together within the enlarged prickly involucre. *Castanea vulgaris* is the Spanish chestnut.

Castanet, a small, slightly concave, spoon-shaped instrument of ivory or hard wood, of which a pair are fastened to the thumb and beaten together with the middle finger. Castanets were used by the virgins as an accompaniment to hymns sung in honor of Diana. They are used by the Spaniards and Moors as an accompaniment to their dances and guitars. They are known also in India and Java.

Castanheda, Fernao Lopez de (käs-tãñ ã'dä), a Portuguese historian; born in Santarem, about 1500. His father having been appointed to an important post in India, he was taken thither in youth, and was thus led to make the careful and unremitting researches embodied in the "History of the Discovery and Conquest of India by the Portuguese" (1551-1561), work upon which Camoens drew largely in the course of his epic activity. He died in Coimbra, March 23, 1559.

Castaños, Don Francisco Xavier de (käs-tän-yōs'), Duke of Baylen, a Spanish military officer; born in Madrid, April 22, 1756, and studied military tactics in Germany. On the invasion of the country by Napoleon, he received the command of a division of the Spanish army, and in July, 1808, compelled 18,000 French, under General Dupont de l'Etang, to surrender at Baylen, but was in turn defeated by Lannes in November of the same year at Tudela. Under Wellington he served as general of the 4th Spanish *corps d'armée*, and took part in the battles of Albuera, Salamanca, and Vittoria. In 1815 he was placed at the head of the Spanish army for the invasion of France, which was rendered unnecessary by the victory at Waterloo. In 1825 he was called to the State Council, where he became a decided opponent of the Carlist party. He died in Madrid, Sept. 24, 1852.

Caste, an hereditary class of society in India, the members of which are theoretically equal in rank, and, as a rule, follow the same profession or occupation. Formerly it was customary to add "and in Egypt"; but Dr. Birch, the most distinguished Egyptologist of his time, says that the Egyptians, strictly speaking, had not castes, though the son often succeeded to the office of the father. Caste must therefore be viewed in connection with India chiefly, if not exclusively. There it sprung primarily from the distinction of ethnological race and from conquest.

The aborigines of India seem to have been Turanians. In pre-historic times a second influx of Turanians appears to have taken place, the newcomers conquering the old inhabitants or driving them to the hills and jungles. Thus were produced two classes, what may be called Turanian caste

people and Turanian outcasts. Next, but still at a remote period of antiquity, say 1700 B. C., or even earlier, an Aryan people from Central Asia invaded the land, and after a struggle, continued for many centuries, became dominant nearly everywhere. Long before this conquest was effected, three occupations among them had hardened into castes, the Brahmans or Priests, the Kshatriyas or Warriors, and the Vaisyas or Merchants.

The fourth Hindu caste, that of the Sudras, or Artisans and Laborers, was constituted mainly of the Turanian caste-people, while the Pariahs and other outcasts and the wild tribes of the hills and the jungles are the older Turanian aborigines. When the real origin of the four leading castes and the outcasts beyond the pale had been forgotten, the Brahmans attempted to base the structure of society on what was alleged to be divine revelation. It was gravely asserted that the Brahmans came out of the mouth of the Supreme God, to instruct men; the Kshetriyas from his arms, to defend them; the Vaisyas from his stomach, to feed them, and the Sudras from his feet to serve them.

Buddhism did its best to destroy caste, but after a struggle of about 1,250 years (say from 500 B. C. to A. D. 750, during 1,000 years of which (from 250 B. C. to A. D. 750) it was victorious, it had to quit the field. For the next 300 years caste was dominant and tyrannical in a high degree. Then the Mussulman conquest began to break its power. Now Anglo-Indian influences, political, religious, and social, are sapping its authority, especially at the Presidency seats.

Through the long ages during which Indian caste has existed, the original four castes have split into an immense multitude, and at present in almost any locality from 100 to 200 may be met with. Different castes refuse to eat together or to intermarry, and as a rule they follow hereditary occupations, but nature is often too powerful for artificial and arbitrary restrictions.

Castelar, Emilio (käs-tel-är'), a Spanish statesman; born in Cadiz, Sept. 8, 1832. He studied at Madrid, and in 1856 became Professor of History and Philosophy in the university there. He began early to write on letters and politics in the newspapers and magazines, and in 1864 started "*La Democracia*" (The Democrat), in the pages of which he inveighed fiercely against the government. After the abortive rising of 1866 he was condemned to death, but contrived to escape to Paris, returning when the revolution of 1868 began. All his ardor and eloquence could not hinder the crowning of King Amadeus, though it helped to bring about his down-

fall in 1873. In September of that year the Cortes made Castelár dictator, but the orator proved somewhat ineffectual in action, and found himself unable to crush either the "red demagogy of Socialism on the one hand, or the white demagogy of Carlism" on the other. In the beginning of 1874 a hostile vote in the Cortes obliged him to resign, and soon after the *pronunciamiento* in favor of Alfonso XII. drove him across the frontier. He returned to Spain in 1876, and was returned to the Cortes, where, till his retirement in 1893, he often spoke with all his old eloquence. His chief writings are: "Civilization" (2d ed. 1865); "Questions, Political and Social" (3 vols. 1870); "Parliamentary Discussion" (3 vols. 1871); "History of the Republican Movement in Europe" (2 vols. 1874); "The Oriental Question" (1876). He died in Murcia, May 25, 1899.

Castellammare, (käs-tel-ä-mär'e), a fortified Italian sea-port in the province of Naples; on the site of the ancient Stabiae where Pliny was killed. It has a royal dockyard and hospital, and manufactures sail-cloth, leather, linen, and silk. Its castle was built in the 13th century by Emperor Frederick II. It contains a convent founded by Gonsalvo de Cordova, which possesses a celebrated image of the Madonna. In the 15th century it was sacked by Pope Pius II., and in the 17th century by the Duke of Guise. Pop. (1901) 32,841.

Castellan, or **Chatelain**, properly the owner or commander of a castle. In Flanders and France the title went with the possession of certain districts, and in Normandy and Burgundy châtelains ranked next after bailiffs, with both civil and military authority. In Germany the châtelains were imperial officers with military and civil jurisdiction in fortified places.

Castellane, **Esprit Victor Elizabeth Boniface** (käs-tel-än'), **Comte de**, a French marshal, born in Lyons in 1788. He entered the army in 1804, and took part in most of Napoleon's campaigns. After the restoration he became colonel of the Hussars of the Royal Guard. He fought in Spain (1823), and at the siege of Antwerp (1832), and as Lieutenant-General commanded the Army of the Pyrenees. In the February revolution (1848), he lost his command, and in consequence went over to Louis Napoleon. In 1850 he became commander at Lyons, and in 1852 marshal and senator. His "Memoirs," published in 1896, though crude in style, are valuable for their mass of minute detail. He died in 1862.

Castelein, **Matthijs de** (käs-tel-än'), a Dutch poet, born in Pamele (Oudenarde), in 1485. He was the acknowledged law-

giver and pattern of all the Dutch rhetoricians of his time, in his "Art of Rhetoric." He composed many plays, but only two of them were published: one of these is the "Story of Pyramus and Thisbe." He wrote also "Ballads" and a volume of "Various Lays," in melodious verse. He died in 1550.

Castello-Branco, **Camillo** (kas-těl'-lō brank'ō), a Portuguese novelist and poet, born in Lisbon, March 16, 1826. He is the most popular of the modern romancists of Portugal, and at the same time the most national in tone, spirit, and form. Realism characterizes his numerous novels (over 100), the best known being: "Love of Perdition" (1862), "The Marquis of Torres Novas," "Brilliant from Brazil." All of them are genuine pictures of Portuguese life. Among his poetic compositions, the collection published under the title, "A Book" (1854), holds the first place. He died at San Miguel de Seide, June 6, 1890.

Castellon, **Francisco**, a Nicaraguan revolutionist, born about 1815. He was the leader in a revolt at Leon in 1853, which was unsuccessful, and fled to Honduras, whence he returned in June of the next year. It was by his invitation that the filibustering expedition under William Walker went from the United States in 1854. He died Sept. 2, 1855.

Castelnaudary (käs-tel-nō-dä-rē), a town in the French department of Aude, situated on a declivity, skirted at the base by the Canal du Midi, 34 miles S. E. of Toulouse by rail. It has manufactures of woolen and silk fabrics, and earthenware. The canal at this point expands into a large basin. Pop. (1891), 8,598. The *Sostomagus* of the Romans, and *Castrum Novum Arianorum* (hence the modern name) of the Visigoths, Castelnaudary suffered dreadfully in the crusade against the Albigenses, and in 1355 it was captured by the Black Prince. Under its walls, in 1632, the royalists defeated the Duke of Orleans.

Casti, **Giambattista** (käs'tē), an Italian poet, born in 1721. He entered the service of the Emperor Joseph II.; accompanied embassies to St. Petersburg, etc. He won fame by his "Gay Stories in Ottava Rima," and added to it by his witty satiric "Talking Animals" (1802). The latter work was immediately translated into most of the languages of Europe. The English translation, with numerous additions, was made by W. S. Rose, and published as "The Court and Parliament of Beasts" (1819). Casti wrote also two very successful comic operas, and a poetic satire on court life in the reign of Catharine II. of Russia. He died in 1803.

Castiglione

Castiglione, Baldassare, Count (käs-tēl-yō'nē), an Italian poet and statesman,



BALDASSARE CASTIGLIONE.

born in the district of Mantua in 1478. He wrote a volume of "Poems, Vernacular and Latin." But the work to which he owes his literary fame is "The Book of the Courtier," a masterpiece of elegant and ornate prose. It lays down the laws of courtesy and of courtly manners, and incidentally gives a view of life in the highest society in the author's time. He died in 1529.

Castiglione, Carlo Ottavio, Count, an Italian scholar, born in Milan in 1784. His *magnum opus*, published in 1826, is a work in which he seeks to ascertain the origin and the history of the towns in Barbary, whose names are found on Arabic coins. Out of Italy, however, he is best known by his edition of some fragments of the Mæso-Gothic translation of the Bible by Ulfilas, which had been discovered in 1817 by Cardinal Mai among the palimpsests of the Ambrosian Library. He died in Genoa, April 10, 1849.

Castile (kas-tēl'), an ancient kingdom of Spain, the nucleus of the Spanish monarchy, extends over a large part of the peninsula from the Bay of Biscay southward. It is divided into New Castile and Old Castile. The former (*Castilla la Nueva*) occupies nearly the center of the peninsula; area, 28,010 square miles. It is traversed from E. to W. by three lofty mountain chains nearly parallel to each other—the Sierra Guadarrama, the mountains of Toledo, and Sierra Molina, and the Sierra Morena. Between these chains, which form the great watersheds of the province, lie two extensive plains or plateaux, almost without wood, and arid and barren in appearance. Dryness, indeed, is the curse of the whole country, and there is a great deficiency of method alike in agriculture and industries. The inhabitants are of a grave, manly character, with much of the old Spanish pride and probity, but devoid of enterprise, and content to live on from day to day as their fathers did before them. This ancient province now forms the five provinces of

Castillon

Madrid, Ciudad-Real, Cuenca, Guadalajara, and Toledo. Pop. 1,923,310.

Old Castile (*Castilla la Vieja*) stretches from the Bay of Biscay to New Castile; area, 25,405 square miles. It is traversed by three mountain chains—the Sierra de Guadarrama, the Sierra de Deza, and the Cantabrian Mountains. It is less dry than New Castile, and grain, particularly wheat, is raised in great abundance. The pastures both of the mountains and the plains are excellent, and much merino wool is produced. Old Castile now forms the provinces of Burgos, Logroño, Santander, Soria, Segovia, Avila, Palencia, and Valladolid. Pop. 1,785,403.

Castilho, Antonio, Feliciano (käs-tēl'ō), a Portuguese poet; born in Lisbon, Jan. 26, 1800. Though almost blind, he studied jurisprudence at Coimbra. His first poetical composition, "Letters of Echo and Narcissus," published while he was a student, won him great celebrity. He excelled in pastorals; and to this class belong his "Spring," and "Love and Melancholy, or the Latest Heloise." He died in Lisbon, June 18, 1875. He had a deep sympathy with nature, and was a master of elegiac verse.

Castilla, Ramon, a Peruvian statesman; born in Tarapaca, Aug. 30, 1796. Early in life he served in the Spanish army, then operating against the Chilian patriots; but in 1821 he joined the insurrectionists in Peru and distinguished himself in the successful struggle of that country for independence. In 1845 he was elected President of Peru, and succeeded in composing the factional quarrels which threatened to disrupt the republic. On the expiration of his term he retired to private life; but as the new President proved tyrannical, Castilla led a revolt against him, drove him into exile, and in 1855 was himself re-elected President. He served till 1862. He died in Tarapaca, May 30, 1867.

Castillejo, Christoval de (käs-tēl-yā'hō), the last representative of the ancient Spanish poetry, born at Ciudad Rodrigo in 1490. He opposed the introduction of Italian styles into the poetry of Spain, and justified his opposition by demonstrating in his own work the competence of the traditional styles of Spain for the expression of all moods and all sentiments. His satiric vein, especially in the "Dialogue on the Condition of Women" and the "Sermon on Loves," offended both clergy and laity. He died in 1556.

Castillon (käs-tē-yôn'), a town in the French department of Gironde, on the right bank of the Dordogne, 33 miles E. of Bordeaux by rail. Beneath its walls, on June 13, 1453, the English met with a signal

defeat, their leader, Earl Talbot of Shrewsbury, and his son, being slain. Part of the battle is described in the fourth act of Shakespeare's "King Henry VI., Part I."

Castillo-Solorzano, Alonso del (kas-tēl'-yō-sō-lōr'tha'nō), a Spanish romancer and poet of the 17th century. His stories, "The Garrulous Humbug," "The Allurement of Money," and others, are still popular and are still reprinted. Of his comedies the most notable is "The Marquis of Cigarral." His fables after the manner of Ovid would not be deemed unworthy of the Roman poet.

Castine, Vincent, Baron de (käs-tēn'), a French soldier, born at Oleron, France, in 1650. He went to Canada in 1665, established a mercantile house at Penobscot (now the town and port of entry of Castine, Me.), in 1687, and married the daughter of the Penobscot chief. In 1696 he captured Pemaquid, at the head of 200 Indians. He assisted in the defense of Fort Royal, in 1706, and was there wounded the following year. He died in France, about 1722. His son, who succeeded him in command of the Penobscots, was made prisoner and taken to Boston in 1721.

Casting, the running of melted metal into a mold prepared for the purpose, so as to produce an article of a certain shape. Iron-casting (or iron-founding) is the most important branch. In general an exact pattern, usually of wood, is employed by the iron-founder. The floor of every foundry is composed, for several feet deep, of a loamy sand, in which deep pits may be sunk to bury large molds. The wooden pattern is pressed firmly down into this, the sand being shoveled up all around, level with the top of the pattern, and well rammed down. The pattern is then lifted out of the sand, all small pieces of sand which may have fallen into the mold carefully blown away, and some finely-powdered charcoal sifted over the surface. The molten metal is then poured into the mold until it is full. The whole is then covered with sand to keep the air from it while it cools. An open horizontal bed of sand is sufficient for casting many articles, but with articles of a more complex form and not too large, a frame or box, called a flask, is generally employed to hold together the sand used in casting, the number of flasks varying according to the form and parts of the mold. In ordinary operations the pattern is laid on a board known as the turn-over board, and the flask placed over it, the sand being carefully rammed into the flask till it is full. Another board, known as the bottom-board, is then laid upon it. The flask is then turned over, the first or turn-over board taken off, the one side of the pattern un-

covered, a fine facing of sand spread upon the surface to prevent adhesion, after which a second flask, called the cope, sometimes made with crossbars to strengthen it and help to hold the sand, is placed upon it and sand carefully rammed in. The cope or second flask is then lifted off, the sand which it contains carrying the impression of the upper side of the pattern; the pattern in the lower part of the flask, or drag, is then carefully drawn out, and any injuries which the mold receives during the operation repaired. Holes or passages are then cut into the sand for pouring in the metal, all loose sand carefully removed, the cope replaced and secured to the drag by clamps. The mold is now ready for the molten metal. In pouring, the metal is generally run through two or three different passages at the same time to prevent it losing fluidity by cooling. It is only in lighter castings that sand, of the proper degree of dryness, porosity, and adhesiveness, is used. In heavy castings the mold is usually made of loam, which is more adhesive, and in complicated articles the making of the mold is often a difficult process. Small articles of simple form and of easily fusible alloys, such as bullets, printing types, etc., are often cast in metal molds. Articles of sculpture are usually cast in plaster of paris; which, when mixed with water, runs into the finest lines of a mold and takes a most exact impression. The variety of articles made by casting is very great: boilers, cisterns, cylinders, pumps, railings, grates, cannon, cooking utensils, and many objects of decorative art.

Cast-iron, the name given to the iron obtained from the blast-furnace by running the fused metal into molds prepared for the purpose. The molds are in the form of long narrow channels, from which the iron, when it has cooled and solidified, is taken in bars called pigs, between 3 and 4 feet long and 3 or 4 inches broad.

Castle, a building constructed for the purpose of repelling attack. The *castella* left by the Romans in Great Britain and elsewhere were constructed on the general model of their stationary encampments (*castra stativa*), and though they may have suggested the castles of the Middle Ages, they differed from them in being designed for military purposes only, and not also as places of permanent residence. Even Burgh Castle, in Suffolk, the ancient Garamonium, and Richborough Castle, in Kent, the ancient Rutupiaë, were encampments or fortresses rather than castles. The absence of strongholds is said to have been a reason why William the Conqueror so easily became master of England; and it was as a protection against the treatment which the conquest occasioned that most of the great

Castle

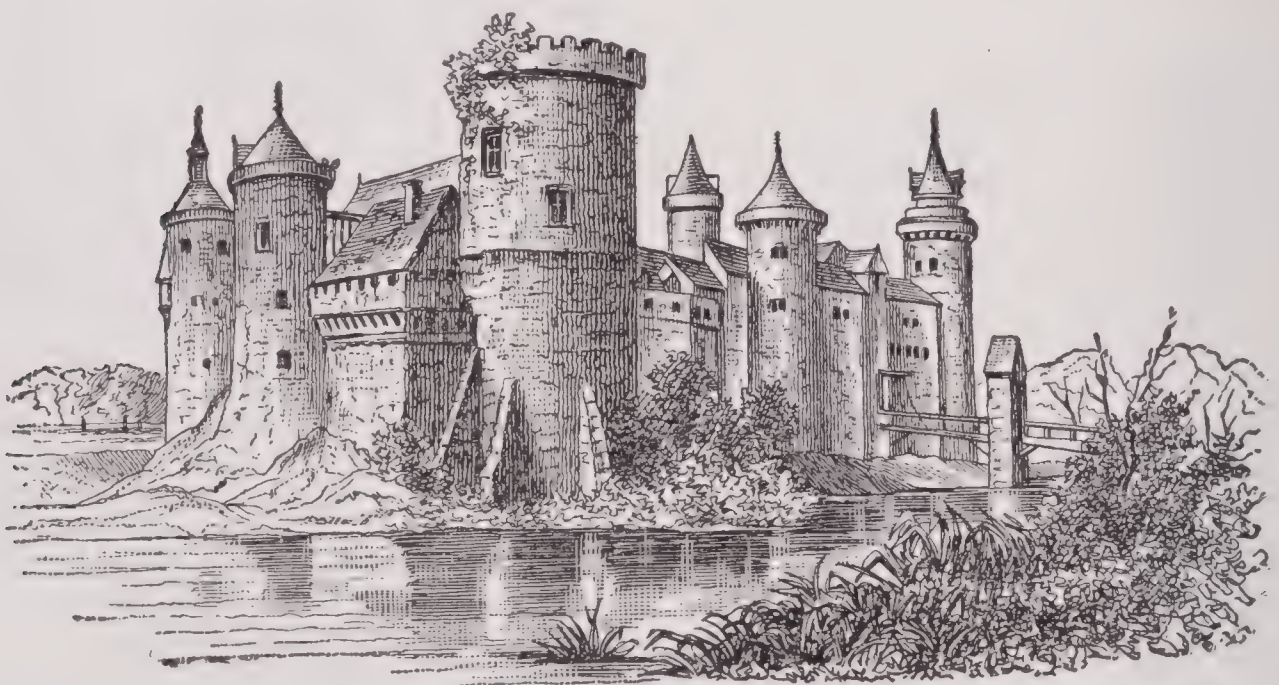
Norman castles of England were built. The Norman castles were generally surrounded by a moat or ditch; and in order that the ditch might be readily filled with water the site chosen was usually either on the banks of a river or on a peninsula running into a lake; on the inner side of the ditch mounds were constructed, which were surmounted with walls and towers, both of which, but particularly the latter, were supplied with battlements and bastions. The entrance gates were also protected by towers, which were usually of great strength. The communication was by a bridge, sometimes of stone, but usually of wood, which was made to draw up and down; and the entrance, in addition to thick folding doors, was protected by a portcullis, which was dropped down through grooves in the masonry at the sides. The gateway in the castles of the larger sort, was further defended by a barbican. On passing the external wall one entered the bailey, which sometimes consisted of several courts, and contained the barracks, magazines, well, a chapel, and sometimes even a monastery. The keep

architects trusting more to the outline of their masses than to the lesser decorations. Of this the round tower of Windsor Castle is a well-known example.

Castle, Egerton, an English author, born March 12, 1858. He was educated at Glasgow University and Cambridge. After a brief military career he turned to literature and journalism, and has written "Consequences," "Saviola," "The Light of Scarthey," "The Pride of Jennico," and "Young April."

Castlebar, the capital town of County Mayo, Ireland. It is on the Castlebar river, 10 miles N. E. of Westport; has infantry and cavalry barracks, and some linen manufactures. In 1641 occurred here the massacre of the English Parliamentary army in the Irish rebellion; in 1789 Castlebar was held for a fortnight by the French general, Humbert; and in 1846-1847 it suffered greatly from famine.

Castle Garden, the former immigrant depot in New York, at the point of Manhattan Island, in Battery Park. In the early



A FEUDAL CASTLE AT ROUEN, FRANCE.

was a species of internal castle, more strongly defended than any other portion of the fortress, and placed in the most advantageous position, so as to afford a last chance to the garrison when driven from the external works. As the keep had the same design as the castle itself, it contained most of its appliances even to a chapel when large and complete. The keep was also called the dungeon or donjon.

The castles erected during the reign of Edward III. and some of the succeeding kings of England, exhibit a remarkable union of beauty with solidity. The masonry is of the most finished description, the

days of the city the place was a small, fortified island a few feet from the main-land: later it became a public hall for assemblies and concerts. Here Jenny Lind made her American début. Many years ago the island was incorporated with the general area of the Battery by filling the intervening space with earth and rock; new buildings were erected, and the place was devoted to the purpose of landing steerage immigrants. In 1890 it ceased to be used as an immigrant depot, and was turned over to the Park Commissioners of the city of New York. The old fort is now used as a public aquarium.

Castlemon, Harry. See FOSDICK, CHARLES AUSTIN.

Castlereagh, Robert Stewart, Viscount (kas-el-rā'), an English statesman, born June 18, 1769; was educated at Armagh, and at St. John's College, Cambridge. He turned Tory in 1795, and next year became Keeper of the Privy Seal; but he continued a steadfast supporter of Catholic emancipation. Still, he believed that emancipation with an independent Irish Parliament would mean simply a transference of tyranny from the Protestant oligarchy to a Catholic democracy; hence, as Chief Secretary from 1797, he bent his whole energies to forwarding Pitt's measure of union. Transferred by the union from Dublin to Westminster, he accepted office in the Addington ministry (1802) as President of the Board of Control; but the true second era in his career was as War Minister under Pitt from July, 1805, to January, 1806, and again under Portland from April, 1807, to September, 1809. His real greatness begins with March, 1812, when, as Foreign Secretary under Lord Liverpool, he became the soul of the coalition against Napoleon, which, during the momentous campaigns of 1813-1814, was kept together by him, and by him alone. He represented England at the congresses of Chatillon and Vienna in 1814-1815, at the Treaty of Paris in 1815, at the Congress of Aix-la-Chapelle in 1818; and he was preparing to start for a congress at Verona, when, on Aug. 12, 1822, in a fit of insanity, he committed suicide with a pen-knife at Fooks Cray, his Kentish seat.

Castletown (Manx *Balley Cashtal*), a seaport and former capital of the Isle of Man, on Castletown Bay, 11 miles S. W. of Douglas. Castle Rushen, now a prison, occupies the site of a Danish fortress of the 10th century, which was almost wholly demolished by Robert Bruce in 1313. The grounds of Rushen Abbey (11th century), near the station, are now market gardens. Near by is the small building where the House of Keys assembled for about 170 years. Brewing, tanning, and lime-burning are carried on. Near Castletown is King William's College (1833), an Elizabethan pile, rebuilt after the fire of 1844, and enlarged in 1862.

Castor, or Castoreum, a reddish-brown substance, of a strong, penetrating smell, secreted by two glandular sacs connected with the organs of reproduction of the beaver, and used by perfumers.

Castor and Pollux, two demi-gods known by the ancients under the joint name of Dioscuri, that is, sons of Zeus or Jupiter. Castor was celebrated as a horse tamer; Pollux for his prowess as a boxer. Homer describes them as sons of Leda and Tyndareus, King of Lacedæmon, and, therefore,

brothers of Helen. Hence, too, their patronymic of Tyndaridæ (sons of Tyndareus). Another fable ascribes their birth to an amour of Jupiter with Leda; whilst a third account makes Pollux and Helen only the fruit of this intercourse, and Castor the lawful son of Tyndareus, whence it was supposed that the latter was mortal, and Pollux immortal. The brothers are described as having first distinguished themselves by the rescue of their sister Helen, who had been carried off by Theseus. They were engaged in the celebrated hunt of the Calydonian boar; were sharers in the renowned expedition of the Argonauts; and, finally, in a war against Messene, undertaken for the purpose of chastising Idas and Lynceus, sons of the king of that country. Castor was slain by Idas, who was immediately struck dead by a thunderbolt from Jove, and Lynceus fell by the hand of Pollux. The latter, devotedly attached to his brother, besought Jupiter either to restore Castor to life or to deprive him himself of his immortality. On this, according to one story, Jupiter granted them alternate life, so that each lived or died daily—a term extended by some writers to six months of alternate life and death of each. Another version makes Jupiter reward their affection by translating the two brothers into constellations, under the name of Gemini—stars which never appear together, but when one rises the other sets, and so on alternately. These demi-gods were chiefly worshipped as protectors of seamen, though they were supposed to be helpers of the brave generally. They are usually represented on medals, bas-reliefs, and gems, as youthful horsemen, with egg-shaped helmets crowned with stars, and spear in hand. The ancients very commonly swore "by Castor" (*Æcastor*) and "by Pollux" (*Ædepol*), as the English did by St. George, and the French by St. Denis.

In meteorology, the name given to an electrical meteor, which sometimes appears at sea, attached to the extremities of the masts of ships, under the form of balls of fire. When one light only is seen, it is called *Helena*. The meteor is generally supposed to indicate the cessation of a storm or a future calm; but *Helena*, or one ball only, to portend bad weather.

In mineralogy, the names of two minerals which are found together in granite in the island of Elba. Castor is a silicate of aluminium and lithium, pollux is a silicate of aluminium and the rare element cæsium.

Castoridæ, in zoölogy, a family of rodents, of which the Castor or Beaver is the typical genus. They are of stout make, possess distinct clavicles, and have five toes, those of the hind feet being connected by a

Castor Oil

web or membrane. Genera, *Castor* and *Myopotamus*. No Castoridæ have as yet been found earlier than the Miocene. Among the genera two contain animals of large size, *Trogonotherium* and *Castoroides*; the former is Pliocene and Post-Pliocene, the latter Post-Pliocene only.

Castor Oil, a fixed oil obtained from the seeds of the castor oil plant. In extracting the oil the seeds are first bruised between heavy rollers and then pressed in hempen bags under a hydraulic or screw press. The best variety of oil is thus obtained by pressure in the cold, and is known as cold-drawn castor oil, but if the bruised and pressed seeds be afterward steamed or heated and again pressed, a second quality of oil is obtained, which is apt to become partially solid or frozen in cold weather. In either case the crude oil is heated with water to 212°, which coagulates and separates the albumen and other impurities. Exposure to the sun's light bleaches the oil, and this process is resorted to on a large scale. When pure and cold-drawn, castor oil is of a light-yellowish color; but when of inferior quality it has a greenish and occasionally a brownish tinge. It is somewhat thick and viscid. Its sp. gr. is high for an oil, being about 960 (water being taken as 1,000). It is mixable with alcohol, or spirits of wine, and ether. It has a nauseous smell and an acrid, disagreeable, sickening taste, which may be overcome by the addition of a little magnesia. The principal acid in it is ricinolic acid. Castor oil is one of the most convenient and mildest of purgative medicines. Given in doses of one or two teaspoonfuls, with a little peppermint water, it forms a gentle laxative for habits easily acted on by medicine; while a dose of a tablespoonful, or a little more, will almost always succeed. The sickness often produced by the disagreeable flavor of castor oil is by some obviated by floating the oil in hot coffee, which in a measure removes its nauseous qualities.

Castramentation, the art of laying out camps, whether the troops to occupy them are to be hutted, under canvas, or bivouacked.

Castration, the method by which animals, both male and female, are deprived of parts of their generative organs (testicles and ovaries). They are in consequence rendered more valuable for working purposes, and also tend to grow and fatten much more quickly for the butcher. A castrated horse is called a gelding; a castrated bull, a bullock or steer (Scotch, "stot"); a castrated boar, a pig; and a castrated ram, a wether. These are the ordinary male animals operated on in this country, but occasionally cocks are castrated, and

Castro

are then called capons. Castration of females is called "spaying," and is frequently performed upon sows, which are then called gelts. The act of emasculating a man upon any other plea than that of a surgical necessity is a felony at the common law, and in some of the States the penalty is very severe—especially if the act be accompanied by force or is accomplished by stratagem. It is a mayhem in all of the States, even though it be done with the consent of the victim, under any other than conditions of necessity. The penalty therefor varies in the different States.

Castren, Matthias Alexander (k a s - tren'), a Finnish philologist, born in Tervola, Dec. 2, 1813. Educated at the University of Helsingfors, his attention was turned to the language of his native country. He traveled much among the nations of the Arctic regions, both in Europe and Asia, including the Norwegian and Russian Lapps, and the Samoyedes of Siberia and the coasts of the White Sea. He was appointed in 1851 Professor of the Finnish and Old Scandinavian languages in the University of Helsingfors. Among his works are a Swedish translation of the great Finnish epic, the "Kalevala," besides grammars, travels, and other works. He died May 7, 1852.

Castro, Agustin, a Mexican poet, born in Cordova, Vera Cruz, Jan. 24, 1728. A Jesuit priest, an unpedantic scholar, he taught philosophy, and also translated masterpieces with almost unfailing sureness of touch. His original verse, always warm and pure, includes "Hernán Cortés," and "Charts" to guide the budding poetic genius; while the versions he made of Seneca, Horace, Sappho, Milton, Fénelon, and Euripides, receive merited praise. He died in Bologna, Italy, in 1790.

Castro, Guillen de, a Spanish dramatist, born in Valencia in 1569; was at one time commander of a Neapolitan fortress. In his later years he lived in Madrid, and was on intimate terms with Lope de Vega. Castro's memory has been chiefly preserved by his authorship of "Las Mocedades del Cid," to the first part of which Corneille was indebted for the plot and many of the beauties of his celebrated tragedy. The second part of the "Mocedades" has few passages that rise above mediocrity; and his other plays are badly constructed, and chiefly distinguished for their intensely national spirit. He died in Madrid, July 28, 1631.

Castro, Inez de, a lady of noble birth, secretly married to Pedro, son of Alphonso IV., King of Portugal, after the death of his wife Constantia (1345). The old King Alphonso, fearful that this marriage would injure the interests of his grandson Ferdi-

nand (the son of Pedro by his deceased wife), resolved to put Inez to death. Three noblemen, Diego Lopez Pacheco, Pedro Coelho, and Alvarez Gonsalvez, were his counsellors in this scheme, and carried it out themselves by stabbing Inez within the convent where she lived (1355). Two years after King Alphonso died, and Pedro, inducing the King of Castile to give up to him two of the murderers, who had taken refuge there (the third, Diego Lopez, managed to escape), put them to death with cruel tortures. The king then made public declaration of the marriage that had taken place between him and the deceased Inez; and had her corpse disinterred and placed on a throne, adorned with the diadem and royal robes, to receive the homage of the nobility. The body was then conveyed to Alcobaça and buried with great honors. The history of the unhappy Inez has furnished many poets of different nations with materials for tragedies, and her story is one of the finest episodes in the "Lusiads" of Camoens.

Castro, Joao de, a Portuguese navigator, born in Lisbon, Feb. 7, 1500. In 1538 he accompanied the viceroy, Garcia de Neronha, his uncle, to India, as commander of a vessel, and in 1540 was in the expedition that explored the Red Sea, of which he made charts and scientific descriptions. His profound knowledge of mathematics and languages made these works of great value. They were published under the title "The Log-book of Don John de Castro, on the Voyage which the Portuguese made to the Red Sea." After his return, he was made commander of a fleet to rid the European seas of pirates; was appointed governor of India in 1545, in which office he defeated the great army of the Moors, under Adhel Khan, and completely subjugated Malacca, and in 1547 was made viceroy of India. He died in Persia, June 6, 1548.

Castro, Jose Maria, a Costa Rican statesman, born in San José, Sept. 1, 1818; educated at the University of Leon, Nicaragua, and held positions under the government of Costa Rica. In 1846 he was Vice-President; in 1847 elected President. After Costa Rica withdrew from the Central American States, he resigned the presidency, but held diplomatic positions. From 1866 to the rise of the Jimenez government (1868), he was again President.

Castrogiovanni (käs''trō-jē-ō-vä''nē), a town in the middle of Sicily, 56 miles E. of Catania by rail, on a remarkable fertile plateau, which rises precipitously to a height of 3,270 feet above sea-level. Castrogiovanni occupies the site of the ancient Enna, of which Ceres was the presiding goddess, and here was her most famous temple. The neighborhood was the fabled scene

of the rape of Proserpine. In connection with the Punic and Servile wars, Enna played a conspicuous part in early history. A castle and other buildings of Saracenic origin are still standing. Pop. (1901) 26,081.

Cast Steel, blister steel which has been broken up, fused in a crucible, cast into ingots, and rolled. The blocks of steel are melted in crucibles of refractory clay, and the molten metal is poured into ingot-molds of cast iron. These are opened to let out the red-hot ingot, which is then passed to the rolls. The process of making cast-steel was invented by Benjamin Huntsman, of Attercliff, near Sheffield, in 1770.

Casuarinaceæ, an order of abnormal exogens, alliance Amentales. Only one genus is known, *Casuarina*. They have a one-celled ovary, one or two ascending ovules, and a superior radicle. There are no leaves, but in place of them short, toothed, ribbed sheaths. They are trees like Giant *Equiseta* (Horse-tails). They have closer affinities, however, with *Myricaceæ* or with *Coniferæ*. They occur in Australia, New Caledonia, and the Indian Archipelago. They are generally called Beefwoods, their timber being of the color of raw beef. In Australia they are often termed oaks. In Graham's "Flora of Bombay" one species is called the Cassarina or Tinian Pine. The heavy war-clubs of the native Australians are of *Casuarina*. The bark of *C. equisetifolia* is slightly astringent; that of *C. muricata* is used as infusion in India as a tonic. The young cones of *C. quadrivalvis*, when chewed, yield a pleasant acid, and are useful to those who cannot obtain water. Cattle also are exceedingly fond of them. About 32 species are known.

Casuistry, that branch of ethical science which professes to deal with cases of conscience. It lays down rules or canons directing us how to act in all matters of moral doubt; whether and how far an obligation is binding upon us, or may be relaxed or dissolved, on account of concomitant circumstances. Its rules are drawn from revelation, reason, the canon-law, authority of the Fathers, etc. This science was much studied in the 15th and 16th centuries, especially by the Jesuits. It has however, been cultivated in the Protestant as well as the Roman Catholic Church.

Caswell, Richard, an American lawyer, born in Maryland, Aug. 3, 1729; removed to North Carolina in 1746; was president of the Provincial Congress which framed the State Constitution (1776), and first governor of the State, three times reëlected; was also a delegate to the convention which framed the Federal Constitution in 1787. He died in Fayetteville, N. C., Nov. 20, 1789.

Cat, the *Felis catus ferus*, a species of the genus *Felis*. The cat is originally from

Cat

the European forests. In its wild state it differs from the domestic animal in having a shorter tail, a flatter and larger head, and stronger limbs. Its color is grayish-brown, with darker, transverse undulations. Its manners resemble those of the lynx, living in woods, and preying on young hares, birds, and a variety of other animals, which it seizes by surprise. It is the fiercest and most destructive beast to be found in France, Germany, and England. At what period cats became inmates of human habitations, it is scarcely possible, at this period, to determine, but there is good reason to believe that they were at first domesticated in Egypt. The cat belongs to a genus better armed for the destruction of animal life than all other quadrupeds. The short and powerful jaws moved by vigorous muscles are supplied with most formidable trenchant teeth; a cunning disposition, combined with nocturnal habits and much patience in pursuit, gives them great advantages over their prey; and their keen, lacerating claws enable them to inflict a certain death blow. All animals considerably weaker than themselves prove objects of pursuit; but the mouse is their favorite game; for which they will patiently wait for a whole day till the victim comes within reach, when they seize it with a bound and after playing with it, put it to death. The pupil of the eye in most animals is capable of but a small degree of contraction and dilatation; it enlarges a little in the dark and contracts when the light pours upon it too profusely; but in the eyes of cats, this contraction and dilatation is so considerable that the pupil, which by day appears narrow and small, by night expands over the whole surface of the eyeball and gives the eyes a luminous appearance. By means of this peculiar structure, their eyes are better adapted for vision at night than in the daytime; and they are thus fitted for discovering and surprising their prey. Cats are extremely fond of strong-smelling plants and will roll in valerian till they seem almost mad with excitement. Personally, the cat is a very cleanly animal, avoiding stepping in any sort of filth, concealing its excrement in the earth with great care, and preserving its fur in a very neat condition; which being generally clean and dry readily yields electric sparks when rubbed. The cat goes with young for 63 days and brings forth from three to six at a litter, which remain blind for nine days. The varieties of this animal in a domestic state are very numerous; it is either entirely black, black and white; black, fulvous, and white (called the tortoise-shell or Spanish cat); entirely white; fulvous and white; dun color or tawny, either plain or striped; tabby boldly striped; slate colored or blue-gray (called the Chartreuse cat);

Catacombs

with very long fur, especially on the neck and tail (the Persian cat); long hair of silvery whiteness and silky texture (called the Angora cat); and lastly, with penciled or tufted ears like a lynx, which sometimes, though rarely takes place. Of all the above varieties the Persian, the Angora, and the new, tall and gray Malta variety are the most remarkable.

Catachresis, the abuse of a trope, when the words are too far wrested from their native signification; or when one word is abusively put for another, for want of the proper word, as a voice beautiful to the ear.

Catacombs, caverns, grottoes, subterraneous caves, destined for the sepulture of the dead. The respect felt for the dead by all nations naturally led them to some outward manifestation of regard, such as the pomp of funeral solemnities, or the consecration of a particular spot for sepulture, or the erection of monuments, to transmit to posterity the remembrance of the services or virtues of the deceased. Some nations, as the Egyptians, constructed pyramids and labyrinths to contain their mortal remains. Others, as the Phœnicians, and, after them, the Greeks, hollowed out the rocks for tombs, surrounding their towns with vast magazines, containing the bones of their fathers. Asia Minor, the coast of Africa, and Cyrenais, afford instances of these singular and gigantic works. The discovery of these monuments has always excited the curiosity of travelers and the attention of artists. The latter have applied themselves to learn from them the character of architecture and painting at different epochs; and though they have often found only coarse representations, the productions of art in its infancy or decline, they have occasionally met with types of perfection. Many monuments of this description have been preserved to our days, and still contain traces of the painting and architecture with which they were decorated. There are catacombs existing in Syria, Persia, and among the most ancient Oriental nations. But the revolutions in these countries, and the changes which they have occasioned, have deprived us of the documents which would have given us exact information regarding them.

The description of the catacombs in Upper Egypt gives us an idea of those whose existence is still unknown to us. They contain the history of the country, and the customs and manners of the people, painted or sculptured in many monuments of the most admirable preservation. The subterranean caves of these countries, like almost all of the kind, have their origin in quarries. From the depths of the mountains which contain them, stone was taken, which

Catacombs

served for the building of the neighboring towns, and also of the great edifices and pyramids which ornament the land. They are dug in a mountain situated in the neighborhood of the Nile, and furnished the Romans with materials for the construction of buildings in their colonial establishments. The excavations in these mountains are found throughout a space of 15 to 20 leagues, and form subterranean caverns which appear to be the work of art; but there is neither order nor symmetry in them. They contain vast and obscure apartments, low and irregular vaults, supported in different parts with piles left purposely by the workmen. Some holes, of about 6 feet in length and 2 feet in width, give rise to the conjecture that they were destined for sepulchers. Cells of very small dimensions, formed in the hollows of these obscure caverns, prove them to have been the abode of recluses.

In Sicily and Asia Minor a prodigious number of grottoes and excavations have been discovered containing sepulchers. Some appear to have served as retreats to the victims of despotism. The greater part are the work of the waters which traverse the mountains of these regions, as for instance the great cave of Noto, which passes for one of the wonders of Sicily. This cave, the height, length, and breadth of which are equal, has been formed by the Cassibili river, which runs at the bottom, and traverses it for the length of 100 fathoms. In the interior of this cave are a number of houses and tombs.

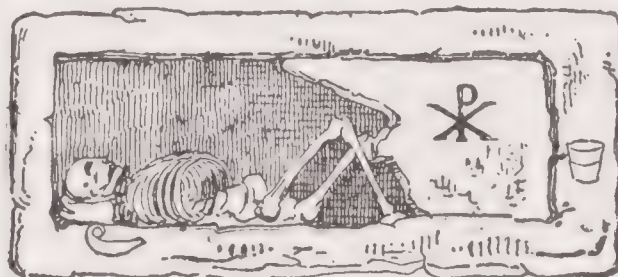
At Gela, on the S. coasts, there are abodes for the living and sepulchers for the dead, cut in the rocks; at Agrigentum subterranean caves, labyrinths, and tombs, arranged with great order and symmetry. There are also caverns in the environs of Syracuse which may be ranked with the principal monuments of this description, from their extent and depth, their architectural ornaments, and from some historical recollections attached to them.

The catacombs in the tufa mountains of Capo di Monte, near Naples, consist of subterranean galleries, halls, rooms, basilicas, and rotundas, which extend to the distance of 2 Italian miles. Throughout there are seen niches for coffins (*loculi*) and bones. A description of them was given by Celano in 1643. They probably owe their origin to the quarries which afforded tufa for the walls of the cities Palæopolis and Neapolis, and afterward served as sepulchers for the Christian congregations. The most numerous and most extensive catacombs are those in the immediate neighborhood of Rome, at San Sebastiano, San Lorenzo, etc., the earliest of which of certain date belongs to the year A. D. 111. They are composed of interminable subterranean galleries, extending underneath the town itself as well

Catacombs

as the neighboring country, and are said to contain not less than 6,000,000 tombs.

The name of catacombs, according to St. Gregory, was at first applied to designate exclusively the cave in which the bodies of St. Peter and St. Paul were buried, and it was only at a later period that it came to be given to all the subterranean passages which were used as public burying-places. It is now regarded as certain that in times of persecution the early Christians frequently took refuge in the catacombs, in order to celebrate there in secret the ceremonies of their religion; but it is not less certain nowadays, thanks to the labors of Marchi and De Rossi, that the catacombs served also as places of burial to the early Christians, and that in spite of the contrary opinion which prevailed for two centuries, and even down to our day, the catacombs were not for the most part abandoned quarries, but were excavated by the Christians themselves. We find that originally the cemeteries of Rome were made up of separate tombs, which rich Christians constructed for them-



A CATACOMB GRAVE.

selves and their brethren, and which they held as private property under the protection of the law. But in course of time this was changed. At the end of the 2d century we find that there exist certain cemeteries that are not the property of particular individuals but of the Church. Such was the one which Pope Zephyrinus (202-219) intrusted to the superintendence of Calixtus, and which took its name from that bishop. Some years later, under Pope Fabian (236-251), there were already several such common burying-places belonging to the Christian congregations, and their number went on increasing till the time of Constantine, when the catacombs ceased to be used as burying-places. From the time of Constantine down to the 8th century they continued to be used as places of worship by the Christians, but during the siege of Rome by the Lombards (Longobardi) they were in part destroyed, and soon became entirely inaccessible, so that they were forgotten. The first excavations in them were made by Antonio Bosio between 1560 and 1600. The results of these excavations were published in his "Roma Sotterranea" (Rome, 1632), which was translated into Latin by P. Aringhi (Rome, 1657). Among

Catacombs

the more modern works on the subject may be mentioned: Rochette's "Tableau des Catacombes de Rome" (Paris, 1837); Perret's "Les Catacombes de Rome" (Paris, 1851-1856, 5 vols.); and above all, "La Roma Sotterranea Cristiana" by De Rossi (Rome, 1864-1877, 3 vols.), containing the results of very careful investigations made by the author himself.

The catacombs of Paris, situated on the left bank of the Seine river, are almost equally celebrated. The name itself, which has been given to this labyrinth of caverns and galleries from its resemblance to the asylums and places of refuge of the persecuted Christians under Naples and Rome, informs us of the purpose to which it has been applied since 1786. These galleries were originally the quarries from which materials were excavated for constructing the edifices of the capital. The weight of the superincumbent houses rendered it necessary to prop them; and when the cemeteries of the demolished churches and the burying-grounds were cleared in 1786, the government resolved to deposit the bones in these quarries, which were consecrated for that purpose.

The first cemetery that was suppressed was the Cimetière des Innocents, and the bones from it were deposited beneath what is now Petit-Montrouge. The ossuary now extends much farther. The relics of 10 or more generations were here united in the repose of the grave. Many times as great as the living tide that rolls over this spot is its subterranean population. By the light of wax tapers, a person may descend about 70 feet to a world of silence, over which the Parisian police keeps watch as strictly as over the world of noise and confusion above. He will then enter a gallery where only two can go abreast. A black streak on the stones of the walls points out the way, which, from the great number of by-passages, it would be difficult for the visitor to retrace without this aid or without guides.

Among the curiosities here is a plan of the harbor of Mahon, which an ingenious soldier faithfully copied from memory, in the material of the quarries. Entering the hall, one is ushered into the realms of death by the inscription which once stood over the entrance to the churchyard of St. Sulpice: "*Has ultra metas requiescunt beatam spem expectantes*"—"Beyond these bounds rest those awaiting the hope of bliss fulfilled." Narrow passages between walls of skeletons; chambers in which monuments, altars, candelabra, constructed of human bones, with festoons of skulls and thigh-bones, interspersed occasionally with inscriptions, not always the most happily selected, from ancient and modern authors, excite the gloomy impression which is always produced, even in the most light-mind-

Catalan

ed, by the sight of the dissolution of the human frame. Wearied of these horrible embellishments, the visitor enters a simple chapel, without bones, and containing an altar of granite. The inscription "D. M. II et III Septembr. MDCCXCII." recalls to memory the victims of the September massacres, whose remains are here united. On leaving these rooms, consecrated to death, where, however, the air is always preserved pure by means of air-holes, the visitor may pass to a geological cabinet, formed by Héricart de Thury, the director of the Carrières sous Paris. Specimens of the minerals furnished by the regions traversed, and a collection of diseased bones, in a contiguous hall, scientifically arranged, are the last curiosities which these excavations offer. More than 600 yards to the E. of the road to Orleans the visitor finally returns to the light of day. Strangers may visit the catacombs in company with the government officials at their periodical visits. An account of these subterranean passages is that which was published by M. Dunkel in 1885.

The Etruscan tombs were not, strictly speaking, catacombs, yet as subterranean places of sepulture they may appropriately be referred to. They were usually hewn out of cliffs on the sides of a hill and were variously arranged, sometimes tier above tier and sometimes on a level. There was a central chamber with smaller ones opening from it. In the latter there were stone benches to receive the bodies of the dead.

Catacoustics, the science of reflected sounds, or that part of acoustics which considers the properties of echoes.

Catafalque, a temporary and ornamental structure, placed over the coffin of a distinguished person or over a grave.

Catalan, a blast furnace for reducing ores, extensively used in the N. of Spain, particularly in the province of Catalonia. It consists of a four-sided cavity or hearth, which is always placed within a building and separated from the main wall thereof by a thinner interior wall, which in part constitutes one side of the furnace. The blast-pipe comes through the wall, and enters the fire through a tuyere which slants downward. The bottom is formed of a refractory stone, which is renewable. The furnace has no chimneys. The blast is produced by means of a fall of water, usually from 22 to 27 feet high, through a rectangular tube, into a rectangular cistern below, to whose upper part the blast-pipe is connected, the water escaping through a pipe below. This apparatus is exterior to the building, and is said to afford a continuous blast of great regularity; the air, when it passes into the furnace, is, however, impregnated with moisture.

Catalani, Alfredo (kät-ä-lä'nē), an Italian composer, born in Lucca, July 19, 1854. He was graduated at the Paris Conservatory and settled in Milan, where he achieved fame with brilliant operas, especially "Dejanice," "Loreley," and "La Wally." He died in Milan, Aug. 7, 1893.

Catalani, Angelica (kät-ä-lä'nē), an Italian singer, born in Sinigaglia, near Ancona, in October, 1779; was educated in the convent of Sta Lucia, near Rome, where, in her seventh year, she displayed such wonderful vocal powers that strangers flocked from all quarters to hear her. She made her début at Venice in 1797 and experienced a succession of triumphs in every country in Europe for upwards of 30 years, making vast sums of money — *e. g.*, nearly £10,000 during a four months' engagement in London. The Italian Opera in Paris was twice under her direction; but her husband's interference and extravagance brought her into much trouble. Her large, queenly person and fine countenance, the immense volume, range, and flexibility of her voice, her power of sustaining her notes, in contrast with the lightness and facility of her unerring execution, everywhere took her audience by storm. Her expression, though fine, and her whole style, surprised rather than touched the heart. She retired from the stage in 1827, and three years later purchased a villa near Florence, where she gave free instruction to girls who had a talent for singing. She died in Paris, June 13, 1849.

Catalaunian Plain, the ancient name of the plain surrounding Chalons-sur-Marne, France, scene of the great battle in 451 A. D., between the Goths and the Huns.

Catalepsy, a form of mental disorder, akin to hysteria, which is characterized by the person affected falling down suddenly in a state of real or apparent unconsciousness, and, save for some occasional muscular twitchings of the face and body, remaining rigid and statue-like for a period of time which varies from one minute to some hours or even days, and then all at once recovering consciousness as if aroused from sleep — as a rule with no bad consequences to follow. Catalepsy almost invariably affects hysterical people only, and it is the prolongation of the unconscious condition to some days in certain extreme cases which has given rise to the fear which some people have of being buried alive under such circumstances.

Catilina, Lucius Sergius, the conspirator, whose attempt to overturn the constitution and State of Rome in the year 63 B. C. was defeated by the vigilance and spirit of Cicero. He was defeated and killed by the consul Antonius in the following year.

Catalonia (ancient *Hispania Tarraconensis*), an old province of Spain, bounded N. by France, E. and S. E. by the Mediterranean, S. by Valencia, and W. by Arragon. The country in general is mountainous, but intersected with fertile valleys, while the mountains themselves are covered with valuable woods and fruit-trees, the slopes being cut in terraces and plentifully supplied with water by an artificial system of irrigation. Wheat, wine, oil, flax, hemp, vegetables, and almost every kind of fruit are abundant. There are mines of lead, iron, alum, etc. On the coast is a coral-fishery. Catalonia, though less fertile than most of Spain, stands preëminent for the industry of its inhabitants, who speak the Catalan dialect. It comprises the modern provinces of Tarragona, Gerona, Lerida, and Barcelona; area, 12,483 square miles. Pop. (1900) 1,966,382.

Catalpa (from the native Indian name in Carolina, where it was discovered by Catesby in 1726), a genus of *bignoniaceæ*, comprising four or five species of trees, natives of North America, the West Indies, Japan, and China. They have been introduced in Europe, and are cultivated in France, Germany, and the S. of England. The wood is remarkably light, of a grayish-white color, and fine in texture. It is capable of receiving a brilliant polish, and when properly seasoned is very durable. The bark is reputed tonic, stimulant, and antiseptic, and the honey from its flowers poisonous. A decoction of the pods of *catalpa syringifolia* is used in Italy as a remedy for catarrhal dyspnoea and coughs.

Catalysis, a term applied in chemical physics to a force supposed to be exerted by one substance upon a second, whereby the latter is subjected to change or decomposition, while the former, or acting substance, remains comparatively unaltered, and does not combine with it. The force indeed, has been ascribed to the mere "action of contact." Fermentation is an example of this force, when one part of yeast acting upon the sugar of the sweet worts, without entering into combination with it, compels 100 parts of sugar to pass into alcohol and carbonic acid. So also, when platinum or gold are brought in contact with peroxide of hydrogen, the latter is decomposed, while the metal remains unchanged. No plausible theory has been brought forward to account for these changes, or to define what the force of catalysis is.

Catamaran, a kind of boat, vessel, or, more accurately, raft or float used by the Hindoos of Madras, the island of Ceylon, and the parts adjacent. It is formed of three logs of timber, secured together by means of three spreaders and cross lashings

Catamarca

through small holes. The central log is much the largest, with a curved surface at the fore-end, which terminates upward in a point. The side logs are very similar in form, but smaller, and with their sides straight; these are fitted to the central log. The length of the whole is from 20 to 25 feet. The crew consists of two men. In the monsoons, where a catamaran is able to bear a sail, a small outrigger is placed at the end of two poles as a balance, with a bamboo mast and yard, and a mat or cotton sail. Frail as such a structure may appear, it can pierce through the surf on the beach at Madras and reach a vessel in the bay when a boat of ordinary construction would be sure to founder.

Catamarca, a W. province of the Argentine Republic, sinking S. E. from the Andes to the Salt Marshes, which separate it from Cordoba. Almost two-thirds of its surface is mountain or waterless desert, where the rivers are lost in the sands; but the remainder is very fertile, and yields much wine and corn, besides supporting large herds of cattle. Only copper has been much mined. Area, 42,018 square miles; pop. (1890), 130,000. Catamarca, the capital, lies 82 miles N. E. of Rioja.

Catamount, the North American tiger, *Felis* (or *Puma*) *Concolor*, the cougar or puma.

Catanduanes, a small island in the Philippine archipelago, E. of Luzon, about 90 miles long and 50 miles wide. It is mountainous and said to have rich gold deposits. There are no large towns, the island forming, with Samar, Leyte, and part of Luzon, a military governorship created in 1900, as the Department of Southern Luzon, with Gen. John C. Bates in command. Pop. (1903) 39,288, all civilized.

Catania (ancient *Catāna*), a city on the E. coast of Sicily, in the province of Catania, at the foot of Mount Etna. It has been repeatedly visited by tremendous earthquakes, one of the worst of which was in 1693, when 18,000 people were destroyed, and has been partially laid in ruins by lava from eruptions of Mount Etna; but it has always revived, and has much more the features of a metropolis than Palermo. Most of the edifices have an air of magnificence unknown in other parts of the island, and the town has a title to rank among the elegant cities of Europe. The cathedral, founded by Count Roger in 1094, is a fine building. The manufacture of silk, linen, and articles in lava, amber, etc., constitutes the chief industry. The ruins of the amphitheatre, which was more extensive than the Colosseum at Rome, are still to be seen, as also the remains of the theater, baths, aqueducts, sepulchral chambers, hippodrome, and several temples. The harbor

Cataract

was choked up by the eruption of 1669, so that for the larger vessels there is nothing but a roadstead. In spite of this Catania has a considerable trade, and exports wheat, barley, wine, oil, etc. Pop. (1901) 149,694.

Catapult, a machine of the ancients for projecting missiles, chiefly arrows. They may be described as a kind of gigantic cross-bows.

Cataract, in medicine, an opacity of the crystalline lens of the eye, or of its capsule, or both. It is quite different from amaurosis, which is a disease of the retina, by which it is rendered unsusceptible of the action of light. In cataract the lens becomes opaque, loses its transparency, and is no longer capable of transmitting the light. The causes of cataract are numerous. Inflammation or injury to the lens may produce it. Sometimes it is ascribed to a state of the vessels of the part which prevents a proper nourishment of the lens or its capsule. It is produced by various diseases, such as gout, rheumatism, diabetes, scrofula, and often accompanies old age. Sometimes children are born with cataract. Its earliest approach is marked by a loss of the natural color of the pupil; this becoming turbid or slightly gray. *Muscæ volitantes* accompany this period. The opacity is not at first over the whole lens, but most frequently first attacks the center portion; this being turbid, and of a grayish color, while the surrounding portions remain transparent, and of the usual black color. While it exists in this degree only, the person can see in an oblique direction. The color of the pupil is various; mostly grayish-white or pearl-colored; sometimes milk-white, or of a yellowish-gray now and then of a grayish-brown, and even of a dark brown or dark gray. The consistence of the lens differs in different cases, being either hard, and even horny; or very soft, as if dissolved.

The treatment of cataract is by a surgical operation on the eye, and different operations have been tried and recommended. They all consist in removing the diseased lens from its situation opposite the transparent cornea. By one of these operations the cataract is depressed, removed downwards, and kept from rising by the vitreous humor. This is called couching. Another operation is extraction, and consists in making an incision of the cornea, and of the capsule of the lens, by which the lens may be brought forward, and through the cut in the cornea. The third operation is by absorption. This consists in wounding the capsule, breaking down the crystalline, and bringing the fragments into the anterior chamber of the eye, where they are exposed to the action of the aqueous humor, and are at length absorbed. This last operation has the name *keratonyxis* applied to it, and

is chiefly employed in the case of children, because the lenses of their eyes are soft. The choice of the operation is determined by the character of the cataract. After the operation the patient is to be kept from the light, and from all means of irritation.

Cataract, in geography, a waterfall. The English language has more words than most European languages to express different degrees of rapid and sudden descent in streams of water. The most general term is fall or falls. A considerable declivity in the bed of a river produces rapids; when it shoots over a precipice it forms a cataract; and if it falls from steep to steep, in successive cataracts, it is often called a cascade. In rocky countries rivers abound in falls and rapids. In alluvial districts, falls, of course, are very rare. Rapids and cataracts are often a blessing to rugged countries, since they furnish the cheapest means of driving machines in manufactories, etc. In recent times waterfalls have been utilized in the furnishing of electric power in addition to ordinary water-power, as at Niagara (see NIAGARA FALLS).

Many cataracts are remarkable for their sublimity, the grandest being the Falls of Niagara, on the Niagara river, between Lakes Erie and Ontario, in North America. The river, more than a mile above the falls, is divided by Grand and Navy islands, and has a gradual descent of 57 feet from this place. The banks preserve the level of the country, and in some parts rise 100 feet from the water. At the falls the river is $\frac{3}{4}$ of a mile broad, and the precipice which breaks its course curves irregularly so as to form nearly a semicircle on the Canadian side, but is straighter on the American side. An island, called Goat island, divides the cataract into two principal portions—the American fall on the E. and the Horseshoe on the W., or Canada side. The American fall descends almost perpendicularly from a height of 162 feet, and is about 1,000 feet in width. The Horseshoe fall is 4 feet less in height, but is wider and surpasses the other much in grandeur. The water rushes over the precipice with such force that it forms a curled sheet, which strikes the water below 50 feet from the base of the precipice, and visitors can pass behind the falling sheet of water.

The following is an account of the principal known waterfalls after Niagara, with their respective heights, as given by the best authorities:

The Mortmorency river, which joins the St. Lawrence a few miles below Quebec, forms a magnificent cataract, 250 feet in height. The Missouri, in the upper part of its course, descends 357 feet in 16½ miles. There are four cataracts, one of 87, one of 19, one of 47, and one of 26 feet in height. The Yosemite river, in California, forms a series of magnificent falls, with

a total descent of 2,600 feet. The first of them is a plunge of 1,500 feet, and is followed, after a series of beautiful cascades, by a final plunge of about 400 feet. Fully 200 miles from the mouth of the Hamilton river in Labrador there is a magnificent series of cataracts known as the Grand Falls, the largest cataract having a height of over 300 feet. In the republic of Colombia, South America, a magnificent cataract, called that of Tequendama, is formed by the Bogotá river. The river precipitates itself through a narrow chasm, about 36 feet broad, to the depth of over 600 feet. On the Potaro river in British Guiana, is a grand fall known as the Kaieteur Fall, 740 feet high, and about 370 broad, a second fall of 88 feet occurring immediately below the principal.

The most remarkable waterfall of Africa is one with which Dr. Livingston's missionary travels first made us acquainted. This is a cataract on the Zambesi, called by the natives Mosioatunya ("Smoke sounds here"), named by him Victoria Falls. The stream, about 1,860 yards broad, flowing over a bed of basaltic rock, is suddenly precipitated into a tremendous fissure, extending across the bed of the river from the right to the left bank, to the depth of about 370 feet. The breadth of this fissure or crack is only from 80 to 90 yards, and the pent-up waters, from which immense columns of vapor are continually ascending, are then hurried through a prolongation of the chasm to the left with furious violence. The so-called Cataracts of the Nile are not, properly speaking, cataracts. A more correct designation for them would be "rapids." The Stanley Falls on the Kongo comprise seven cataracts. On the Tugela river, in Natal, there are the Tugela Falls. On the Umgeni river, in the same country, are the falls of the Great Umgeni (364 feet) and the Kar Kloof Falls (350). There seem to be no waterfalls of more note in Asia than those of the Cavery river of India.

One of the grandest falls in Europe is that of the Ruikanfoss ("smoking fall"), on the Maan river, in Norway. The height of the cataract is 805 feet. In Sweden, on the Gotha river, a few miles below its outlet from Lake Wener, are the celebrated falls of Trollhätta, which have a height of over 100 feet. The cascade of Gavarnie, in the Pyrenees, is reputed the loftiest in Europe, being over 1,300 feet in height. Its volume of water, however, is so small that it is converted into spray before reaching the bottom of the fall. Another water fall in the Pyrenees is that of Seculéjo, in the neighborhood of Bagnères-de-Luchon. It ascends from the Lac d'Espingo, into the Lac de Seculéjo, or d'Oo, a singularly romantic mountain reservoir, from a height of 820 feet, and is the

Catarrh

most copious of the Pyrenean waterfalls. The Swiss Alps likewise contain some falls of great sublimity. At Lauterbrunnen, in addition to numerous other cascades, is the renowned fall of the Staubbach, about the renowned fall of the Staubbach, about 870 feet in height, which however, from its small volume of water, has none of the terrific adjuncts of a cataract, and resembles, in front, a beautiful lace veil suspended from the summit of the precipice. Near Martigny is the picturesque waterfall of the Sellesche or Pissevache, the final leap of the cascade being 128 feet. The falls of the Rhine at Schaffhausen are renowned over Europe. They are 300 feet broad, and nearly 100 feet in height. In Italy, the falls of Terni, or the Cascade del Marmore on the Velino, have been immortalized by Lord Byron, and though artificial, are justly regarded as among the finest and most picturesque in Europe. They consist of three falls, the aggregate height of which may be estimated at 550 feet. The falls of the Anio or Teverone, at Tivoli, are likewise very beautiful. They too are artificial, and have a fall of about 80 feet.

Catarrh, a running or discharge which takes place, under certain circumstances, from the various outlets of the body. When it occurs in the eyes and nose it usually receives the name of "a cold in the head"; in the back part of the mouth and throat it is called post-nasal and pharyngeal catarrh; in the windpipe and bronchial tubes it is called laryngeal and bronchial catarrh; in the stomach and alimentary canal it is known as gastric and intestinal catarrh; and, lastly, in the bladder, as vesical catarrh.

Catawba, a light sparkling wine, of rich Muscatine flavor, produced in the neighborhood of Cincinnati, O. It is made from the Catawba grape, first found growing on the banks of the Catawba river in the Carolinas. This wine is now in extensive use in the United States, where it is gradually superseding the importation of the Rhenish and French sparkling wines, to which, in general character, it bears a resemblance.

Cat Bird (*Turdus felivox* or *Galeoscoptes carolinensis*), a well-known species of American thrush, which during the summer is found throughout the Middle and New England States, frequenting thickets and shrubberies. Its note is strikingly similar to the plaint of a kitten in distress. The plumage is a deep slate-color above and lighter below, and it is about 9 inches in length. In habit it is lively, familiar, and unsuspicious; the song is largely imitative of that of other birds. During the winter it inhabits the extreme S. of the United States, and is found also in Mexico and Central America. The cat bird frequently attacks the common black snake, which, in the absence of the bird, rifles its nest.

Catechu

Cateau, Le, or Cateau-Cambresis, (kat-ō), a town in the French department of Nord, on the Selle, 14 miles E. S. E. of Cambrai. Pop. (1901) 10,451. Here in 1559 the treaty of Cateau-Cambresis was concluded between Henry II. of France and Philip II. of Spain.

Catechetical Schools, institutions for the education of Christian teachers, of which there were many in the Eastern Church from the 2d to the 5th century. The first and most renowned were those formed at Alexandria (A. D. 160-400) on the model of the famous schools of Grecian learning in that place, Pantænus, Clement, and Origen being their most famous teachers. The schools at Antioch were also in high repute from about 290 till the 5th century. The Arian controversy broke up the Alexandrian, and the Nestorian and Eutychian controversies the Antioch schools. They were succeeded at a later date by the cathedral and monastic schools.

Catechism, any compendious system of teaching drawn up in the form of question and answer. It is derived, through low Latin, from a Greek word *katēcheō*, which means to resound, or sound into one's ears; to instruct by word of mouth. Persons undergoing instruction in the principles of Christianity were hence called *Catechumens*. The first germ whence the idea of a Christian "catechism," formally so called, grew, was furnished by St. Paul, when, in I Cor. xiv: 19, he said "*hina kai allous katēchēsō*." (Authorized Version), "that by my voice I might teach others also" (literally, might catechise others also). The first Christian catechisms are said to have been composed in the 8th or 9th century. Luther published a short catechism in 1520, and his larger and smaller ones in 1529. The Geneva Catechism was sent forth in 1536. The Church of England Catechism was first published in 1549 or 1551, but in a shorter form than now; the additions which enlarged it to its present dimensions being made by James I.'s bishops by his order in 1604, and the work issued in its complete form in 1612. The catechism of the "orthodox" Greek Church was published in 1542. In 1566 the Council of Trent produced a catechism, of course Roman Catholic in its teaching; the Rakovian Catechism, which is Socinian, was put forth in 1574, and the shorter and larger catechisms of the Westminster Assembly of Divines, now used in the Church of Scotland and other Presbyterian churches, appeared the former in 1647, and the latter in 1648. Catechisms of other sects have been published, some of great literary merit, among others, a notable specimen being that of the Methodist Episcopal Church.

Catechu, a gum furnished by the *Acacia catechu*. It is called also *Terra Ja-*

ponica. In the W. of India it obtains the name of *Kutt*, and is collected by a tribe of people called Kuttoorees.

The *Catechu pallidum*, or Pale Catechu, is an extract from the leaves and young shoots of *Uncaria gambir*; it is prepared at Singapore. It occurs in cubical, yellowish brown, porous pieces, with a dull, earthy fracture and a bitter, astringent taste; sp. gr., 1.4. It is soluble in alcohol. It consists chiefly of catechin, a white powder melting at 217° , formula $C_{20}H_{18}O_8$; and of catechu-tannic acid, a yellow porous substance, $C_{18}H_{18}O_3$. It is soluble in water; on exposure to the air the solution turns red. Catechu has been used to prevent the formation of boiler incrustations. Catechu is a very powerful astringent; it is used in diarrhœa and in cases of hæmorrhage and mucous discharge, especially in diseases of the urinary or procreative tract. It is chewed, and the juice gradually swallowed in relaxed conditions of the uvula and palate.

Catechumen (kat-ē-kū'-men), he who learns the elements of any science; one who is undergoing a course of religious instruction with a view to his admission into the Church. The Christian society in the early ages was divided into two classes, *Fideles* and *Catechumeni*; the former being those who had been admitted by baptism into the entire privileges of the Church, the latter such as were preparing for that admission.

Category, or Predicament, in logic, an assemblage of all the beings contained under any genus or kind ranged in order. The ancients, following Aristotle, held that all beings or objects of thought may be referred to ten categories, viz., quantity, quality, relation, action, passion, time, place, situation, and habit. Plato admits only five: substance, identity, diversity, motion, and rest; the Stoics four: subjects, qualities, independent circumstances, relative circumstances. Descartes suggested seven divisions: spirit, matter, quantity, substance, figure, motion, and rest. Others make but two categories, substance and attribute, or subject and accident; or three, accident being divided into the inherent and circumstantial. In the philosophy of Kant the term categories is applied to the primitive conceptions originating in the understanding independently of all experience (hence called pure conceptions) though incapable of being realized in thought except in their application to experience. These he divides into four classes, quantity, quality, relation, and modality, placing under the first class the conceptions of unity, plurality, and totality; under the second, reality, negation, and limitation; under the third, inherence and subsistence, causality and dependence, and community (mutual action);

and under the fourth, possibility and impossibility, existence and non-existence, necessity and contingency. John Stuart Mill applies the term categories to the most general heads under which everything that may be asserted of any subject may be arranged. Of these he makes five, existence, co-existence, sequence, causation, and resemblance, or, considering causation as a peculiar case of sequence, four.

Catenarian Curve, a curve formed by a chain or rope of uniform density, hanging freely from any two points, not in the same vertical line. It is of two kinds, the common, which is formed by a chain equally thick or equally heavy in all its points; or uncommon, formed by a thread unequally thick, that is, which in all its points is unequally heavy and in some ratio of the ordinates of a given curve. The catenarian curve, or catenary, was first observed by Galileo, who proposed it as the proper figure for an arch of equilibrium. He imagined it to be the same as the parabola. Its properties were first investigated by John Bernovilli, Huygens, and Leibnitz. It is now universally adopted in suspension-bridges. Each wire assumes its own catenary curve, and the cable is formed of bunches of aggregated strands.

Caterpillar, the larvæ of *lepidopterous* insects—butterflies, moths, and hawk-moths. Caterpillars exhibit as great differences as subsist among the perfect insects into which they change, and the family, genus, and species may be determined by the characters of the Caterpillar, as well as of the perfect insect. Their body is generally long, nearly cylindrical, soft, and consisting of twelve rings or segments besides the head, with nine spiracles or small openings for respiration on each side. The head is much harder than the rest of the body, of a sort of almost horny substance, and has six small shining points on each side, which are regarded as simple or stemmatic eyes, and is also furnished with two very short rudimentary antennæ. The mouth is adapted for tearing, cutting, and masticating the substances on which the Caterpillar is destined to feed, which are various in the different species, though in all extremely different from the food of the perfect insect; it is provided with two strong mandibles, or upper jaws; two maxillæ, or lower jaws; a labium, or lower lip; and four palpi, or feelers. In the mouth also is situated the spinneret of those species which, when they change into the chrysalis or pupa state, envelop themselves in silken cocoons. The first three segments of the body are each furnished with a pair of feet, which are hard and scaly, and represent the six feet of the perfect insect; some of the remaining seg-

Caterpillar

ments are also furnished with feet, varying in all from 4 to 10 in number, the last pair situated at the posterior extremity of the body; but these feet are soft and membranous, or fleshy, and armed at their extremity with a sort of circlet of minute hooks. All the feet or legs are very short. Those Caterpillars in which the pro-legs, as they are sometimes called, or supplementary soft feet, are pretty equally distributed along the body, move by a sort of regular crawling motion; but those which have only four such feet situated near the posterior extremity, move by alternately taking hold by what may be called their fore-feet and their hind-feet, now stretching the body out to its full length, and now bending it into an arch while the hinder part is brought forward almost into contact with the fore-part. Caterpillars which move in this way are called Geometers or Loopers. Some Caterpillars have the power of fixing themselves by the two hind-feet to a twig, and stretching themselves out as straight as a rod, so that being in color very like a twig of the tree on the leaves of which they feed, they are not readily observed. The muscular power required for this recumbent position is very great, and Lyonnet found the number of muscles in a Caterpillar to be more than 4,000. The skin of some Caterpillars is naked, that of others is covered with hair, spines, or tubercles. Some make for themselves nests or tents of silk, under which they dwell in societies, protected from the inclemency of the weather. Many construct cases or sheaths by agglutinating various substances together, as the Caterpillar of the common clothes-moth. Some roll leaves together, and fix them by threads, thus forming a dwelling for themselves; and a few burrow and excavate galleries in the substance of the leaves. Numbers feed on leaves; many being limited to a particular kind of plant, or to a few nearly allied plants. Some feed on flowers, some on seeds, some on roots, and some even on the woody portions of stems; some on wool, hides, furs, and other animal substances; a few on lard and other kinds of fat.

Catesby, Mark, an English naturalist, born about 1679, probably in London, traveled in North America in 1710-1719 and 1722-1726, and published "Natural History of Carolina, Florida, and the Bahama Islands" (2 vols. 1731-1743), "British-American Flowers," and a work on the fishes, reptiles and insects of the Isle of Providence. German translations of the first and last appeared at Nuremberg. He died in London, Dec. 23, 1749.

Cat-fish, the sea-wolf (*Anarrhicas lupus*), a native of the West Indian seas, so called from its round head and large, glar-

Catharine

ing eyes; also a fresh-water fish of different species of the genus *Pimpeodus*, *P. catus*, the common cat-fish, called also horned pout, and bull-head. In the W. waters of North America it often attains a very large size.

Cat-gut, the name given to the material of which the strings of many musical instruments are formed. It is made from the intestines of the sheep, and sometimes from those of the horse, but never from those of the cat.

Catha, a genus of plants belonging to the order *Celastraceæ*. The species are mostly natives of Africa, forming small shrubs, sometimes with spiny branches. *Catha edulis* is a native of Arabia, and from the leaves the Arabs make a beverage possessing properties analogous to those of tea or coffee. Under the name of *kât* or *cafta*, the leaves form a considerable article of commerce among the natives. Chewed, they produce wakefulness and hilarity of spirits.

Cathari, a name akin to "Puritans," applied at different times to various sects of Christians. It became a common appellation of several sects which first appeared in the 11th century in Lombardy and afterward in other countries of the W., and which were violently persecuted for their alleged Manichean tenets and usages. They had many other local names. Thus from their relation to the Bulgarian Paulicians they were sometimes termed Bulgarians. In Southern France, where they were mostly prosperous, they were confounded with the Albigenses, and were exterminated with them. The Cathari proper were dualists, of a type closely related to the older Gnostics, held a community of goods, abstained from war, marriage, and the killing of animals, and rejected water-baptism. They professed to strive after a higher life than that embodied in the ordinary religious ideals.

Catharine, the name of several Christian saints: (1) St. Catharine proper, a virgin of royal descent in Alexandria, who publicly confessed the Gospel at a sacrificial feast appointed by the Emperor Maximinus, and was therefore put to death, after they had vainly attempted to torture her on toothed wheels, 307 A. D. Hence the name of Catharine wheel (*q. v.*): No less than 50 heathen philosophers sent by the emperor to convert her in prison were themselves converted by her winning eloquence; whence she is the patroness of philosophers and learned schools. Having steadily rejected all offers of earthly marriage, she was taken in vision to heaven, when the Virgin presented her to her son, and Christ plighted his troth to her with a ring. This subject has been a favorite one with many artists (as signifying the union of the re-

Catharine I.

deemed soul with Christ); the Christ being usually represented as an infant. It has been suggested that the attributes of the unhistorical St. Catharine seem to have been derived from those of the actual Hypatia, a heathen who suffered death at the hands of Christian fanatics. St. Catharine's festival falls on Nov. 25. (2) St. Catharine of Sienna, one of the most famous saints of Italy, was the daughter of a dyer in Sienna, and was born there in 1347. While yet a child she practiced extraordinary mortifications, and devoted herself to perpetual virginity. She became a Dominican, and therefore afterward a patron saint of the Dominicans. Her enthusiasm converted the most hardened sinners, and she was able to prevail upon Pope Gregory XI. for the sake of the Church to return from Avignon to Rome. She was given, it was said, extraordinary tokens of favor by Christ, whose Stigmata were imprinted upon her body. She wrote devotional pieces, letters, and poems, an edition of which is Tomaseo's (Florence, 1860). Her festival falls on April 30. St. Catharine of Bologna (1413-1463), festival March 9, and St. Catharine of Sweden (died, 1381; a festival March 22), are of less note.

Catharine I., Empress of Russia. The early history of this remarkable woman is uncertain. According to some accounts she was the daughter of a Swedish officer named Rabe, who died shortly after she was born; according to others her father was a Catholic peasant in Lithuania, by name Samuel,



CATHARINE I. OF RUSSIA.

for he had (as is frequently the case there) no family name. It is said that she was born in 1686, named Martha, and placed by her poor parents in the service of a Lutheran clergyman named Daut at Roop, in the circle of Riga. She then removed to Marienburg, a small village in the circle of Wenden, and entered the service of a clergy-

man named Glück, who caused her to be instructed in the Lutheran religion. Here she was married to a Swedish dragoon. But a few days after he was obliged to repair to the field, and the Russians, within a short period, took Marienburg in 1702. Martha fell into the hands of General Tcheremetieff, who relinquished her to Prince Menzikoff. While in his possession she was seen by Peter the Great, who made her his mistress. She became a proselyte to the Greek Church, and assumed the name of Catharine Alexiewna. In 1708 and 1709 she bore the emperor the Princesses Anna and Elizabeth, the first of whom became the Duchess of Holstein by marriage, and mother of Peter III. The second became Empress of Russia. In 1712 the emperor publicly acknowledged Catharine as his wife. She was subsequently proclaimed empress, and crowned in Moscow in 1724.

When Peter, with his army, seemed irreparably lost on the Pruth in 1711 Catharine endeavored to win over the grand vizier; and having succeeded, by bribing his confidant with her jewels, she disclosed her plan to the emperor, who gave it his approbation, and was soon relieved. She afterward received many proofs of the gratitude of her husband. Peter even deemed her worthy of being his successor. But in the latter part of 1724 she fell under his displeasure. Her chamberlain Moens, with whom she was suspected of being on too intimate terms, was beheaded on pretence that he had been bribed by the enemies of Russia. Menzikoff, who had always manifested much attachment to her, had now been in disgrace for some time, and Peter had very frequent attacks of bodily pain, with intervals only marked by dreadful explosions of rage. These circumstances made Catharine's situation critical, and her anticipations of the future must have been the more melancholy, as the emperor had uttered some threats of a change in the succession to her disadvantage. To prevent such an event she applied to Menzikoff; and by the prudence of Jaguschinski, who then enjoyed the favor of Peter, and whom she gained over, a reconciliation was effected with the emperor. The empress and the favorite were laboring to confirm their improving prospects when Peter the Great died, Jan. 28, 1725. Catharine, Menzikoff, and Jaguschinski considered it necessary to keep the death of the emperor a secret until, by judicious arrangements, they had secured the succession of the throne to the empress. Theophanes, archbishop of Plescow, swore before the people and troops that Peter on his death-bed had declared Catharine alone worthy to succeed him in the government. She was then proclaimed empress and autocrat of all the Russias, and the oath of allegiance to her was taken anew. At first the cabinet pursued the plans of Peter, and,

Catharine II.

under Menzikoff's management, the administration was conducted with considerable ability. But the pernicious influence of favorites was soon felt, and great errors crept into the administration. Catharine died suddenly on May 17, 1727, in the 42d year of her age. Her death was probably hastened by excess in the use of ardent spirits.

Catharine II., Empress of Russia; born in Stettin, May 2, 1729, where her father, Christian Augustus, Prince of Anhalt-Zerbst, and Prussian field-marshal, was governor. Her name was originally Sophia Augusta. The Empress Elizabeth, at the instigation of Frederick II., chose her for the



CATHARINE II.

wife of Peter, her nephew, whom she appointed her successor. The young princess accompanied her mother to Russia, where she joined the Greek Church, and adopted the name of Catharine Alexiwna, given to her by the empress. The marriage was celebrated Sept. 1, 1745. It was not a happy one, but Catharine found relief in the improvement of her mind. She was endowed with uncommon strength of character; but the ardor of her temperament and the ill-treatment of her husband led her into errors which had the most injurious influence on her whole political life. Among the friends of her husband Count Soltikoff was distinguished for talent and the graces of his person. He attracted the attention of Catharine, and an intimate connection between them was the consequence. When Soltikoff, who was employed in foreign embassies, grew indifferent to Catharine, a young Pole, Stanislaus Augustus Poniatowski, celebrated both for his good and ill fortune, gained the affections of the grand princess. Their intimacy was known to the empress, but did not appear to displease her; and it was at her recommendation that Augustus III. appointed Poniatowski his ambassador at the court of St. Petersburg.

This connection created alarm at Paris.

France, at that time at war with Great Britain, had formed a secret treaty with Austria, and drawn Russia into the same. Poniatowski was known to be a warm adherent of Great Britain, and it was feared that through his influence with the princess he might prejudice Elizabeth against France; and Louis XV. endeavored to induce the King of Poland to recall him. In January, 1762, Elizabeth died, and Peter III. ascended the throne. The emperor now became still more alienated from his wife. Peter lived in the greatest dissipation, and on such intimate terms with a lady of the court, named Elizabeth Woronzoff, that it was generally thought that he would repudiate Catharine and marry his mistress. The empress, therefore, was obliged to take measures for her personal security. At the same time Peter grew continually more and more unpopular with his subjects, owing to his blind predilection for the Prussian military discipline, his politics, and the faults of his character. This led to a conspiracy, at the head of which were the hetman Count Rasumowski, Count Panin, the enterprising Princess Daschkoff, and a young officer of the guards, Gregory, Orloff, who, since Poniatowski's departure, had taken his place in Catharine's affections. All those who were dissatisfied, or who expected to gain by a change, joined this conspiracy. Panin and the greater part of the conspirators were actuated only by the desire to place the youthful Paul on the throne, under guardianship of the empress and a council. But this plan was changed through the influence of the Orloffs.

The guards were the first to swear allegiance to the empress on her presenting herself to them at Peterhoff on the morning of July 9, 1762; and Alexei Orloff prevailed on Teplov, who was afterward appointed senator, to read at the Kazan Church, instead of the proclamation of the conspirators in favor of the young prince, one announcing the elevation of Catharine to the throne. Peter died a few days after in prison. The accusation against Catharine of having contributed to hasten this event is without foundation. The young, ambitious princess, neglected by her husband, whom she did not respect, remained passive on the occasion, yielded to circumstances, which were, it is true, propitious to her, and consoled herself for an event which she could not remedy. She knew how to gain the affections of the people by flattering their vanity; showed great respect for their religion; caused herself to be crowned at Moscow with great pomp; devoted herself to the promotion of agriculture and commerce, and the creation of a naval force; improved the laws; and showed the greatest activity in the administration of the internal as well as the external affairs of Russia. A year after her ascension to the throne she

forced the Courlanders to displace their new duke, Charles of Saxony, and to recall Biren, who was extremely odious to the nobles. After the death of Augustus III., King of Poland, she was the means of Stanislaus Poniatowski's being crowned at Warsaw. But while she was forcing this king on the Poles, the number of the malcontents in her own empire increased, and several attempts against her life were made at St. Petersburg and Moscow. The young Ivan was the person to whom the hopes of the conspirators were directed; but his sudden death at the fortress of Schlüsselburg overthrew the plans of the disaffected.

After this the court of the empress was only disturbed from time to time by intrigues, in which gallantry and politics went hand in hand, and which had no other object than to replace one favorite by another. In the midst of pleasure and dissipation Catharine did not neglect the improvement of the laws. Deputies from all the provinces met at Moscow. The empress had herself prepared instructions for their conduct, which were read at the first session; but it was impossible for so many different nations to understand each other, or to be subject to the same laws. In the first sessions the emancipation of the peasants was proposed. This alone would have been sufficient to cause a bloody revolution. Catharine, who presided at the debates, and received from the assembly the title of "mother of the country," soon dismissed the discordant legislators. About this time France formed a party in Poland against Russia; but these attempts only served to accelerate Catharine's plans. The war to which the Porte was instigated had the same result. The Turks were beaten. The Russian flag was victorious on the Greek seas; and on the banks of the Neva the plan was formed of reëstablishing the republics of Sparta and Athens as a check to the Ottoman power. The advancement of Austrian troops into Poland inspired Catharine with the desire to aggrandize herself in this quarter. She therefore entered into an agreement for the division of the country with the courts of Berlin and Vienna in 1772, by which the governments of Polotzk and Mohilev fell to her share, and she insured to herself exclusive influence in Poland by undertaking to guarantee the Polish constitution. At the same time she abandoned all her conquests, with the exception of Azoph, Taganrog, and Kinburn, in the peace with the Porte concluded at Kainardschi in 1774, but secured to herself the free navigation of the Black Sea, and stipulated for the independence of the Crimea.

By this apparent independence the Crimea became, in fact, dependent on Catharine. This peace was as opportune as it was advantageous to Russia; for in the third

year of the war Moscow and several other cities were desolated by the plague; and about the same time an adventurer named Pugatscheff, assuming the name of Peter III., had excited a revolt in several provinces of Eastern Russia, which was soon suppressed. At this time Potemkin exercised an unlimited influence over the empress. In 1784 he succeeded in conquering the Crimea, to which he gave its ancient name of Tauris, and extended the confines of Russia to the Caucasus. Catharine upon this traversed the provinces which had revolted under Pugatscheff, and navigated the Volga and Dnieper, taking greater interest in the expedition, as it was attended with some danger. She was desirous, likewise, of seeing Tauris. Potemkin turned this journey, which took place in 1787, into a triumphal march. Throughout a distance of nearly 1,000 leagues nothing but feasts and spectacles of various kinds were to be seen. Palaces were raised on barren heaths, to be inhabited for a day. Villages and towns were built in the wildernesses, where a short time before the Tartars had fed their herds. An immense population appeared at every step—the picture of affluence and prosperity. A hundred different nations paid homage to their sovereign. Catharine saw, at a distance, towns and villages, of which only the outward walls existed. She was surrounded by a multitude of people who were conveyed on during the night to afford her the same spectacle the following day. Two sovereigns visited her on her journey—the King of Poland, Stanislaus Augustus, and the Emperor Joseph II. The latter renewed his promise, given at St. Petersburg, to assist her in her projects against the Turks. The result was a new Turkish war, which by the peace of Jassy (1792), ended not less favorably for Russia than the first. The power of Russia was also increased by the war with Sweden which terminated in 1790, and by the two last partitions of Poland and the incorporation of Courland. Catharine took no part in the war against France, though she broke off all connection with the French republic, actively assisted the emigrants, and entered into an alliance with England against France. She likewise made war against Persia, and, as some historians assure us, entertained the project of destroying the power of the English in Bengal, when a fit of apoplexy put an end to her life, Nov. 17, 1796.

Catharine II. has been equally censured and praised. With all the weakness of her sex, and with a love of pleasure carried to licentiousness, she combined the firmness and talent of a powerful sovereign. Two passions were predominant with her till her death, love and ambition. She favored distinguished authors, and was particularly partial to the French. At Paris she had a

literary agent (Baron Grimm). She several times invited Voltaire to her court, proposed to D'Alembert to finish the "Encyclopædia" at St. Petersburg, and to undertake the education of the grand duke. Diderot visited her at her request, and she often allowed him the privilege of familiar conversation with her. By these means she gained the favor of the literati of Europe, who called her the greatest of rulers; and in fact, she was not without claims to this title. She protected commerce, improved the laws, dug canals, founded towns, hospitals, and colleges. Pal-las and others traveled at her expense. She endeavored to put a stop to the abuses which had crept into the administration of the different departments of government; but she began without being able to finish. Civilization advanced but slowly in Russia under her reign; and her anxiety to enlighten her subjects ceased when she began to entertain the idea that the French Revolution had been brought about by the progress of civilization. Laws, colonies, schools, manufactures, hospitals, canals, towns, fortifications, everything was commenced, but frequently left unfinished for want of means.

Catharine de' Medici, wife of Henry II., King of France; born in Florence in 1519, the only daughter of Lorenzo de' Medici, Duke of Urbino, and the niece of Pope Clement VII. Francis I. consented that his son Henry should marry her only because he did not believe she ever would ascend the throne, and because he was in great want of money, with which Lorenzo could furnish him. The marriage was celebrated at Marseilles in 1533. Catharine was equally gifted with beauty and talents, and had cultivated her taste for the fine arts in Florence; but at the same time imbibed the perverted principles of politics then prevailing in Italy. These, consisting in a constant practice of cabal, intrigues, and treachery, are particularly injurious in the government of large empires. Catharine's ambition was unbounded. She sacrificed France and her children to the passion for ruling; but she never aimed steadily at one great end, and had no profound views of policy. The situation in which she was placed, on her arrival at the French court, gave her great opportunity to perfect herself in the art of dissimulation. She flattered alike the Duchess d'Etampes, the mistress of the king, and Diana de Poitiers, the mistress of her own husband, though these two ladies hated each other. From her apparent indifference she might have been supposed inclined to shun the tumult of public affairs; but when the death of Henry II. in 1559 made her mistress of herself, she plunged her children in a whirl of pleasures, partly to enervate them by dissipation, partly from

a natural inclination toward prodigality; and in the midst of these extravagances cruel and bloody measures were executed, the memory of which still makes men shudder. Her authority was limited under the reign of Francis II., her eldest son, who, in consequence of his marriage with the unfortunate Mary Stuart, was entirely devoted to the party of the Guises. Jealous of a power she did not exercise, Catharine then decided to favor the Protestants. If it had not been for her patronage, by which the ambition of the chiefs of the Huguenots was stimulated, the conflicting religious opinions in France never would have caused such lasting civil wars. Catharine felt herself embarrassed by this indulgence toward the innovators, when the death of Francis II. placed the reins of government, during the minority of Charles IX., in her hands. Wavering between the Guises on one side, who had put themselves at the head of the Catholics, and Condé and Coligny on the other, who had become very powerful by the aid of the Protestants, she was constantly obliged to resort to intrigues, which failed to procure her as much power as she might easily have gained by openness of conduct. Despised by all parties, but consoled if she could deceive them; taking arms only to treat, and never treating without preparing the materials for a new civil war, she brought Charles IX., when he became of age, into a situation in which he must either make the royal authority subordinate to a powerful party, or cause part of his subjects to be massacred, in the hope, at best a doubtful one, of subduing faction. The massacre of St. Bartholomew was her work. She induced the king to practise a dissimulation foreign to his character; and as often as he evinced a disposition to free himself from a dependence of which he was ashamed, she knew how to prevent him, by the fear and jealousy which she excited in him by favoring his brother Henry. After the death of Charles IX. Catharine became again regent of the kingdom, till the return of Henry III., then King of Poland. She contributed to the many misfortunes of his reign, by the measures which she had adopted previously to its commencement, and by the intrigues in which she was uninterruptedly engaged. At her death in 1589 France was in a state of complete dismemberment. The religious contests were in reality very indifferent to her. The consequences she was not able to conceive. She was ready to risk life for the gratification of her ambition. She was equally artful in uniting her adherents and in promoting dissension among her adversaries. To those who directed her attention to the prodigal expenditure of the public treasure, she used to say. "One must live." Her example contributed greatly to promote the corruption of morals which prevailed in her time. Her

manners, however, were elegant, and she took a lively interest in the sciences and arts. She procured valuable manuscripts from Greece and Italy, and caused the Tuileries and the Hotel de Soissons to be built. In the provinces, also, several castles were erected by her order, distinguished for the beauty of their architecture, in an age when the principles of the art were still unknown in France. She had two daughters, Elizabeth, married to Philip II. of Spain in 1559, and Margaret of Valois, married to Henry of Navarre, afterward Henry IV.

Catharine Howard, Queen of England. See HOWARD.

Catharine of Aragon, Queen of England, the youngest daughter of Ferdinand of Aragon and Isabella of Castile; born in 1483 or 1485. In 1501 she was married to Arthur, Prince of Wales, son of Henry VII. Her husband dying about five months after, the king, unwilling to return her dowry, caused her to be contracted to his remaining son, Henry, and a dispensation was procured from the Pope for that purpose. In his 15th year the prince made a public protest against the marriage; but at length yielding to the representations of his council, he consented to ratify the contract, and on his accession to the throne in 1509 was crowned with her. The inequality of their ages and the capricious disposition of Henry were circumstances very adverse to the durability of their union, and it seems surprising that Catharine should have acquired and retained an ascendancy over the affections of the king for nearly 20 years. The want of male issue, however, proved a source of disquietude to him, and scruples, real or pretended, at length arose in his mind concerning the legality of their union, which were greatly enforced by a growing passion for Anne Boleyn, one of the queen's maids of honor. He made application to Rome for a divorce from Catharine. An encouraging answer was returned, and a dispensation promised, it being the interest of the Pope to favor the English king. Overawed, however, by the power of the Emperor Charles V., Catharine's nephew, the conduct of the pontiff became embarrassed and hesitating. Catharine, meanwhile, conducted herself with gentleness and firmness, and could not in any way be induced to consent to an act which would render her daughter illegitimate, and stain her with the imputation of incest. Being cited before the papal legates, Cardinals Wolsey and Campeggio, in 1529, she declared that she would not submit her cause to their judgment, but appealed to the court of Rome; which declaration was declared contumacious. The subterfuges of the Pope at length induced the king to decide the affair for himself; and the resentment expressed on this occasion by the court of Rome provoked him to throw off his submis-

sion to it, and declare himself head of the English Church—an act of royal caprice more important than most in history. In 1532 he married Anne Boleyn; upon which Catharine, no longer considered Queen of England, retired to Ampthill in Bedfordshire. Cranmer, now raised to the primacy, pronounced the sentence of divorce, notwithstanding which, Catharine still persisted in maintaining her claims. She died in January, 1536. Shortly before her death she wrote a letter to the king, recommending their daughter (afterward Queen Mary) to his protection, praying for the salvation of his soul, and assuring him of her forgiveness and unabated affection. The pathos of this epistle is said to have drawn tears from Henry. He had never presumed to call the virtues of his injured wife in question, and she certainly acted throughout with eminent dignity and consistency. This subject has been exhaustively treated by Froude.

Catharine of Braganza, wife of Charles II., King of England, and daughter of John IV., King of Portugal, was born in 1638. In 1662 she married Charles II., but her husband's infidelities and neglect, and her childlessness were a source of mortification to her. In 1693 she returned to Portugal, where, in 1704, she was made regent, and in the conduct of affairs during the war with Spain showed marked ability. She died in 1705.

Catharine Parr. See PARR.

Catharine, St., Orders of. The Knights of St. Catharine on Mount Sinai are an ancient military order, instituted for the protection of the pilgrims who came to visit the tomb of St. Catharine on this mountain. In Russia the order of St. Catharine is a distinction for ladies, instituted by Catharine, wife of Peter the Great, in memory of his signal escape from the Turks in 1711.

Catharine-wheel, in mediæval buildings, a window or compartment of a window of circular form, with radiating divisions or spokes. Also called a Rose, or Marigold-window. Memorial of St. Catharine's martyrdom. The term is also applied to a kind of firework in the shape of a wheel, and made to revolve automatically when lighted; a pin-wheel.

Cathartic, having the property or power of cleansing the bowels by promoting the evacuations of excrements, etc., purgative. Cathartics cause increased action of the bowels, that is, an unloading of the large and small intestines, with more or less alteration in the character of the evacuations. They are employed (1) to unload the bowels; (2) to remove irritating matters; (3) to cause an increased elimination of secretions from the liver, and from the glands of the mucous membrane of the alimentary canal; (4) to unload the veins of

Cathay

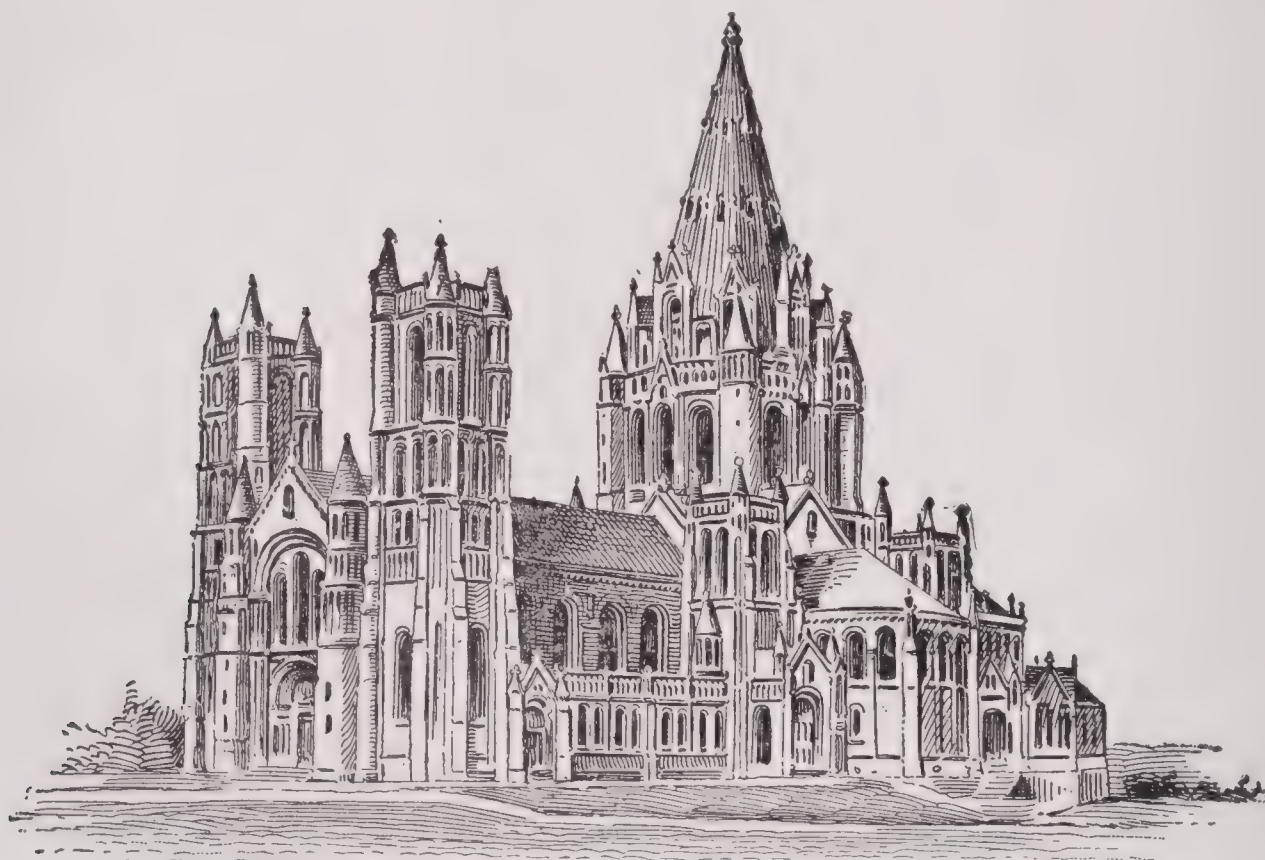
the canal, by causing an increased watery secretion from the membrane in cases of congestion of the kidneys; (5) to produce counter-irritation, and an increased secretion from a large mucous surface, to relieve distant parts, as the head, etc. Cathartics are divided by Garrod into laxatives, simple purgatives, drastic purgatives, hydragogue purgatives, saline purgatives, and cholagogue or hepatic purgatives.

Cathay, an old name of China.

Cathcart, Sir George, son of the following; born in London, May 12, 1794; entered the Life Guards in 1810, accompanied his father as attaché to Russia, and subsequently acted as aide-de-camp to the Duke of Wellington at Waterloo. He served in Nova Scotia and the West Indies, quelled the rebellion in Canada in 1837, and was appointed in 1852 governor at the Cape of Good Hope, where he showed ability in subduing the Kaffir insurrection. On the out-

near Glasgow, June 16, 1843. His son, Charles Murray, Earl of Cathcart, born in 1783, served under Wellington in the Peninsula and at Waterloo, was in 1830 created a Major-General, and in 1851 Commander-in-Chief in Canada; died in 1859.

Cathedral (Gr. *cathedra*, a "seat." Thus, "to speak *ex cathedrâ*," is to speak as from a seat of authority); the Cathedral city is the seat of the bishop of the diocese, and his throne is placed in the Cathedral church, which is the parish church of the whole diocese. The distinction between Cathedral and collegiate churches consists principally in the see of the bishop being at the former. The governing body of a Cathedral is called the dean and chapter. St. Peter's, at Rome, is unequaled in magnitude and splendor by any other Christian fane in the world. The length of the interior is 613½ feet, of transept 446½ feet, height of nave 152½ feet, and the diameter



CATHEDRAL OF ST. JOHN THE DIVINE, NEW YORK CITY.

break of the Crimean War great things were expected of him, but he fell as divisional commander at Inkerman, Nov. 5, 1854.

Cathcart, William Shaw, Earl of, British General, son of Baron Cathcart of Cathcart, Renfrew, born in Petersham, Sept. 17, 1775. He served in the American war and against the French Republic in Flanders and Germany, and in 1807 commanded the land forces in the expedition against Copenhagen, being then created viscount. In 1812 he went to Russia as minister-plenipotentiary, and in 1814 was created an earl. Subsequently he was for several years ambassador to the Russian court. He died

of the cupola 193 feet. The height of the dome from the pavement to the base of the lantern is 405 feet, and to the top of the cross 448 feet. A stairway leads to the roof, broad enough and easy enough for a loaded horse to ascend. St. Peter's was begun in 1503, and was consecrated in 1626. Milan Cathedral was commenced in 1387, but is still unfinished. Its height is 486 feet, width 252 feet, between the walls of the transept 288 feet, of the crown of the vaulting of nave 153 feet, and height from pavement to top of statue of Madonna 355 feet. The Duomo, Florence, was begun in 1298, and was finished in 1444. Its length is 500

feet, transept 306 feet, height of nave 153 feet, cupola, octagonal, 138½ feet in diameter, height to the eave of the dome 388 feet. The Cathedral at Cologne was begun in the middle of the 13th century, and only partly finished in 1509, after which work was not resumed on it till 1830. In 1863 the interior was thrown open to the public. In 1880 it was finished. The structure is 511 feet long and 231 feet wide. The towers are 501 feet high. The Cathedral of Dantzic was commenced in 1343 and finished in 1503. Its length is 358 feet and its height 230 feet. Notre Dame, Antwerp, was begun toward the close of the 14th century; its length is 390 feet and its width 250 feet. The Cathedral at Rheims was begun in 1211 and finished in 1430. It is 466 feet long. The Cathedral at Amiens dates from 1220, and is 469 feet long, with a central spire 422 feet high. The Cathedral at Strasburg was completed in 1601, and is one of the grandest Gothic structures in Europe. Its spire is 466 feet high. Notre Dame, Paris, was begun about 1163. Its length is 390 feet, width of transept 144 feet, height of vaulting 105 feet, of western towers 224 feet, width of front 128 feet, and length of nave to transept 186 feet. Salisbury Cathedral, England, founded 1220, finished in 1258, is a fine specimen. Its plan is a double cross, in extreme length 474 feet, width of greater transept 230 feet. Canterbury Cathedral, founded shortly after the Conquest, is 545 feet long and the greater transept 170 feet. It has three towers, the central one being 230 feet high. The crypts, which extend under the whole structure, are the finest in England. Ely Cathedral is 516 feet long and 190 feet wide. It is in the Norman and early English style. Lincoln Cathedral, in the early English style, is a fine edifice. It is 524 feet long outside and 482 inside. The chief tower is 300 feet high. The Cathedral at York is 524 feet long, 250 feet wide, and has a superb central tower. The nave from door to choir is 264 feet long, 106 feet wide, and 93 feet high. St. Paul's, London (the present edifice, the first having been destroyed in the great fire of 1666), was begun in 1675, and was finished in 1710. It is built in the form of a Latin cross, and is 514 feet in length. The transept is 286 feet long, and the W. front 180 feet wide. The campanile towers on the W. side are each 222 feet in height. The dome is 365 feet from the ground, 356 feet from the floor of the building, 145 feet in diameter, and 404 feet from ground to top of cross. The Cathedral of St. Peter and St. Paul, Philadelphia, has a dome 210 feet high. At Baltimore the Roman Catholic Cathedral is 190 feet long, 177 feet wide, and 127 feet high to the top of cross. St. Patrick's Cathedral, New York, is 332 feet long and 132

feet in general width, with an extreme width at the transept of 174 feet with spires. The Cathedral of Notre Dame, Montreal, Canada, is 255 feet long, 135 feet wide, and has two towers, each 220 feet high. The Cathedral of Mexico was begun in 1573, and was finished in 1667. It is 500 feet long and 420 feet wide. The Cathedral of Lima is 320 feet long and 180 feet wide. The Cathedral of St. John the Divine (P. E.), in New York, will, when completed, be the most ambitious structure of the kind on this continent.

Cathedral Peak, a peak of the Sierra Nevada Range, situated in Mariposa county, Cal. It is of granite formation and contains the source of the Merced river. Height, 11,000 feet.

Cathelineau, Jacques (kät-āl-ē-nō'), leader of the Vendéans in their resistance to the French Republic, born in Pin-en-Mauge, Lower Anjou, Jan. 5, 1759. At the outbreak of the revolution in 1793, he put himself at the head of a handful of stubborn recruits, and became famous for the courage and success of his exploits, the greatest of which was the storming of Cholet. The supreme command was given him after the victory of Saumur. He immediately determined to make an attack upon Nantes, and managed to penetrate into the town, but was mortally wounded by a musket-ball, and his troops immediately dispersed. He was carried to St. Florent, where he died 12 days later, July 11, 1793.

Catherine. See CATHARINE.

Catherine Harbor, a Russian port in the far N. on the Murman coast of the Kola peninsula. It was formally opened in 1900, the city having been built by imperial command. It is primarily a naval station, the harbor being a mile and a half long, 1,600 feet wide and 70 to 160 feet deep. The port is ice-free.

Catherwood, Mary Hartwell, an American writer, born in Luray, O., Dec. 16, 1847. She was author of "Craque-o'-Doom" (1881), "The Romance of Dollard" (1889), "The Story of Tonty" (1890), "A Woman in Armor," "The Lady of Fort St. John," "The Chase of St. Castin, and Other Tales," "The Spirit of an Illinois Town," "The White Islander," and other novels. She died Dec. 26, 1902.

Catheter, a term applied in surgery to a tube, usually of silver or india-rubber, which is introduced into the bladder through the urethra, for the purpose of drawing off the urine when it cannot be discharged in the natural way.

Cathode, that part of a galvanic battery by which the electric current leaves substances through which it has passed, or

Cathode Rays

the surface at which the current passes out of the electrolyte; the negative pole.

Cathode Rays, rays that proceed from the cathode in a discharge tube. See ELECTRICITY.

Catholic Apostolic Church. See IRVING, EDWARD.

Catholic Benevolent Legion, an organization of Roman Catholics in the United States, founded in 1881 as a fraternal and protective order. In 1909 it reported 6 state councils, 718 subordinate councils, and 17,479 members; president, R. B. Tippet, Baltimore, Md. This order had disbursed \$19,962,530 in benefits.

Catholic Christianity and Religious Unity. There is not now that absolute unity of the Christian multitudes that once existed and is yet the necessary, indispensable, ideal condition of the Christian religion. But we may believe that among the five hundred millions of Christians there are rough, imperfect, unfinished unities of tradition, practice and spirit; that they all look up to the Son of Mary as the Redeemer of Humanity; that He marks for them the true line of delimitation between the Old and the New; that in and through Him is the firm bond of union that holds us all to a common Father, a Giver of all good things, and a purifying, inflaming Spirit that acts in a manifold but mystic manner on all who have in any way confessed that Jesus Christ is true God and true Man.

Were this unity perfect among Christians, there can be no doubt that long since the whole world would have been won over to the Gospel of Jesus, that its sweet influences would have transmuted all the hardness and imperfections of our common humanity, by lifting us all into that higher spiritual sphere of brotherhood with the Redeemer of our souls, and sonship with the Head of our race. It is this lack of unity among Christians that makes it even possible for any other religion, old or new, to set up a comparison with it, to challenge its immortal titles to admiration and acceptance. For lack of unity, the impact of the missionary labors is broken, and the incredible sacrifices of Christian men and women must be repeated, often in vain, from generation to generation. This defect of our Christianity it is which enables the savage man, as well as the man of a foreign culture, to escape the arguments and appeals of the Christian apostle. It also renders almost nugatory the efforts of Christianity, on its original soil, to dominate even the most tangible forces of the world and the devil.

The life and teaching of Jesus Christ Himself have nothing but victories to chronicle since His appearance among men. His

Catholic Christianity

benign and gracious figure dominates forever all life and society. What is the secret of this constant and cosmopolitan devotion to Jesus? From what deep springs of history and human nature do the forces flow that keep it forever alive, in spite of the multitudinous accidents of time and space and change that affect so thoroughly all other phenomena of life? It can be no slight bond that holds forever such elastic and elusive forces as the minds and hearts of men, in varying epochs and lands, periods, forms and degrees of culture. To all Catholics, it is as simple as the sun that shines in the heavens, or as the air we breathe.

To them, the religion of Jesus Christ is no vague resultant of world-forces that found their proper time and suitable expression in the Son of Mary. Indeed, the first great domestic struggle of the new religion was against just those loose, nuclear forces of Gnosticism and Eclecticism that desired to fasten their dying causes to the vigorous young body of Christian Faith, but which she repelled with clear consciousness of their desire and of her repugnance. Christianity is the most intensely personal of all religions. It presumes, as no other, the unwavering belief in and concern for an immortal and responsible individual soul, the confession of an Omniscient and All-Just Judge, a known and possible code of conduct, and a clearly apprehended sanction that waits upon the violation or neglect of that code. The ideal of the individual Christian is the Imitation of Jesus Christ.

But how shall the individual follower of Jesus know His will, and, knowing it, follow it perfectly? For this purpose, Jesus formed a visible society, destined to embrace all who would accept Him as God and Master. He gave it the power to reproduce and continue itself, and conveyed to it the custody of His teaching and the example of His life, with vicarious authority to interpret both in time of need, and to decide with finality. To its court of appeal, He indicated not only the letter but the spirit of its procedure. He assured this society of His helpful presence forever, and also of the direction and guidance of the Holy Spirit. He foretold for it a career of great trial and sorrow, but also foreshadowed for it periods of triumph and glory. But, above all, He imposed on it the absolute condition of Unity. This is evident, not only from all His devices of constitution and description throughout the Gospels, but, in a very particular manner, from the great lyrical, almost dithyrambic, monologue in which, on the eve of His Atonement, He pours forth the very soul of prayer to the Heavenly Father. Here the underlying *motif* is Unity, that shadow

of the Divine Life, the condition of the new sanctity, the mark and proof of genuine Christianity.

Elsewhere, He insists that there shall be one fold and one shepherd, that whoever gathers not with Him scattereth, that whoever receives His disciples "receives me and Him who sent me." There can be no doubt, then, as to an effective will of Jesus that this society should be one to the end of time, and among all kinds and conditions of men. It was also to be holy and stainless, imperishable and all-glorious, self-identical and self-witnessing; but the note of unity predominates throughout. His prophetic soul forecasts and denounces every attempt to rend this unity, as the chief obstacle to the success of His life and teaching among men, as the great stumbling-block, the creators of which He will hold eminently responsible in the last great accounting.

Now, when we enter upon the last century of the mystic cycle of two thousand years during which the gospel of Jesus has been preached, principally by and through this society which is His Holy Church, we seize with a terrible earnestness and directness the meaning of Christ's language about unity. Just as that note dominates all others in the Gospels, so does its infringement or diminution dominate the history of His Church, the public propagation of His saving and consoling teachings. The avowedly anti-Christian forces of the past two centuries could never have scored their triumphs were it not for the mighty cleft that divided Protestant from Catholic Christendom. While conflict ran high as to the points on which they differed, the enemy was pillaging such parts of the original estate as they yet held in common. The Christian Church was, truly, the mother of all modern happiness and liberty; yet a minority of rebels or apostates was allowed to set aside her claims, to contaminate all the sources of public and private education, to enlist against her the literature and the arts that she had saved and cherished in a night of storm and disaster. And all this, because centuries of unhappy division had accustomed both Catholics and Protestants to look to one another only for suspicion and coldness and uncharity. Truly, the divine eye of Jesus saw well through the ages, and what He saw could only have intensified His will to base His Church upon a rock of unity that could not be overthrown. Could we restore to-day the former unity of all Christian peoples, with what ease we could look forth to the lifting of China to the highest plane of Christian welfare and culture! Could we be once more as in the fifteenth century, with what ease could the gospel of the Prince of Peace be preached throughout Africa from the lips of united

brethren, and not amid the horrors of injustice and war that are leaving their ominous, red tracks across every newly opened land! So, too, if there were again the old-time unity of east and west, what a quickening there could be of the slumbering forces of the Greek Church, and what a useful race the Coptic Christians would be for the evangelization of Darkest Africa! Whatever way we look, the functions of Unity seem so great and valuable that all the reasons which in the past operated to destroy it are pushed into the background, as no longer worthy of consideration. Indeed, as time wears on, and men take a broader and more philosophic view of things, it will be seen that each individual schism or heresy was less necessary or justifiable, in the light of the magnificent horizon of possible efforts and enterprises that is now dawning upon us, but to which we are unable to reach by reason of our lack of thorough and durable unity. Can any genuine Christian contemplate with equanimity the sad results that the Monophysitism of the fifth and sixth centuries has entailed upon the churches of the Orient by its substantial contribution to the success of Islam, and thereby upon all Christian society, mediæval and modern? There is in all such cases an encysting of the general Christian spirit and strength, a gradual hardening and crystallizing of all those currents of enthusiasm and daring that once poured in from the great main flow of Christian grace, a steady uplifting of walls of separation that can only render more narrow, if in some cases more deep and intense, the tides of Christian life, thought, endeavor.

To the Catholic, the Unity of the Church, that especial desire of Jesus Christ, is based upon the Rock of Peter. He finds the reasons for his belief in the Petrine headship of the Apostolic College, in the special promises and privileges accorded to Peter by Our Lord, in the peculiar activity of Peter and the pre-eminence that he obtains in the inspired records of primitive Christian life. No other see than that of Peter ever laid claim to a hegemony over Christianity, while, from the earliest days, that see claimed this supreme ascendancy. The last chapters of St. Clement's epistle to the Corinthians (*circa* A. D. 96), the almost contemporary epistle of St. Ignatius of Antioch to the Romans, the famous description by St. Irenæus of the Roman Church as the oldest, greatest, most glorious and most authoritative of all the apostolic churches, are only a few among many indications of the right of supreme leadership that archaic Christian society adjudged to the See of Rome.

Doubtless, in the infancy of Christendom, this supremacy was chiefly visible in the mystic pomp of martyrdom and the or-

ganized services of charity. But it was an organic and native right, and could therefore adapt itself, as it did, to all the actual needs of Christian society, as they developed from internal growth or under pressure from without. We need not rehearse the functions of Rome at a later period, in repressing the most disruptive, anti-Christian heresies, in the conversion and instruction of the barbarians, in the formation of their rulers and their laws, in the uplifting and idealizing of the incipient national lives of France, Germany, England and Spain. Writing in 1808, Tobler could say that, without the Papacy, there would not have remained in the world any universal religion, faith would have entirely disappeared. And the contemporary Swiss historian, the great Johann von Müller, could write that their paternal hands held up bravely the whole hierarchy, and at the same time preserved the liberty of all the states of Europe. "It was the Pope who restrained and governed, by means of the principles of religion and the fear of God, the bold, unbridled youth of our modern States." The Gregories, Alexanders and Innocents of the Middle Ages were, indeed, as a wall against the torrent of absolutism that then threatened to invade the whole earth. If, in the weakness of mediæval popular organization, the insidious despotism of the Orient failed to prevail in the courts of the West, it was because the violent and lascivious nobles were forever held in check by the fear or the respect of him who sat in the Chair of Peter. And when the awful cataclysm of the Reformation took place, it was still the insight, genius and energy of Rome that kept intact a solid phalanx of Catholicism, through all the defections and apostasies of a century.

The average non-Catholic does not easily seize the point of view from which the Roman Catholic looks on the Pope. To Catholics he is the divinely appointed High Court of Appeals of Christendom, the "*Dominus Apostolicus*" or living embodiment of the supreme, vicarious authority of the Apostolic College. Hence, they measure the progress or decay of the Christian cause and interest, very largely, by the condition of the Roman see. It is for them the working heart of Christendom. And the words of affection and veneration that they use when speaking of it they believe to be justified by its eminently paternal character and spirit, its origin, its age, its manifold experience, its countless services to the virtuous and the oppressed, its supranational functions. For its sake, they have imitated the Gueux of Holland, and converted a title of reproach into a title of distinction. Every Catholic bishop knows, by history and by instinct, that his strength

and dignity are dependent on the strength and dignity of the Pope. And the latter knows, in turn, that his first duty is the confirmation of the bishops in faith and enthusiasm.

The last great storm through which Catholic Christianity has gone was the French Revolution. The brunt of this was born by the see of Rome. Two Popes Pius VI. and Pius VII., learned in their own persons what the agony and the glory of martyrdom are like. To their personal courage and independence is very largely owing the recrudescence of Catholic affection for a see which, in these bishops, showed itself truly apostolic. Catholics consider that it is owing to the extreme watchfulness and foresight of the Popes in the last century that schism and heresy have been so little in evidence. More than one source or cause of these great disruptions has showed itself. But from whatever quarter the danger threatened, it was conquered by the action of the apostolic see. In the meantime, the numbers of its adherents have grown with the growth of the world, and may be set down at the opening of the twentieth century as more than one-half of the five hundred millions who bear the name of Christians. Nowhere, perhaps, is this phenomenal growth more noticeable than among the English-speaking peoples. From the most insignificant place in the statistics of Catholicism, they have come in the last century to count nearly 250 bishops, in a total of less than 1,000; and from a handful of believers outside of Ireland, to be more than 21,000,000, with over 21,000 priests and more than 18,000 churches.

The obstacles in the way of the Unity of Christendom are very great, and to many minds they seem hopeless; nevertheless, it is possible. Even Melancthon recognized its necessity; and for many years the theologians of the Reformation were occupied with the bases of such a step as might have been the noblest act of the sixteenth century. The hope clung to life in the hearts of Grotius, Leibnitz, George Calixtus. In the Anglican Church, Laud, and perhaps Usher, cherished the same desire. It has lived a cryptic life in Oxford, and among a small number of the more spiritual Anglican clergy. Very noble souls, like Ambrose de Lisle Phillips, have given themselves to the furtherance of the ideal. Societies exist in Germany and France for that purpose—societies of prayer, persuasion and example. The Popes have never ceased to solicit officially the wandering families of Christendom to come back within the common fold. Thereby we would again bring to bear upon the life of mankind the benign, regenerating influences of the example and teachings of Our Lord, but this time with the impact of

a common unity; and while the Church cannot sacrifice the truth of her teaching, in all other ways the return would be made easy. She has only deep sorrow and abundant tears for the dissensions of Christendom, knowing well that they are the chief cause of the persecutions it undergoes, the delay of its triumph over the hearts and souls of men, and the rejoicings of its eternal enemies that at last they have fixed the limits of its influence and marked the hour of its downfall and ruin. See also ROMAN CATHOLIC CHURCH and the various titles cross-references to which are given at the close of that article.

JAMES CARDINAL GIBBONS.

Catholic Church, the universal Church, the whole body of true believers in Christ; but the term is often used as equivalent to the Roman or Western Church.

Like most other words used in ecclesiology, the term Catholic was borrowed at first from the New Testament. It occurs in some editions of the Greek original—including that issued in connection with the recent revision—in the titles prefixed to the Epistles of James, I and II Peter, I John, and Jude, and is the word translated "general" in the Authorized Version of the Bible. The first to apply it to the Church was the Apostolic Father Ignatius. When he and his successors used it they meant to indicate that the Church of which they constituted a part comprised the main body of believers, and was designed, as it was entitled, to be universal. In this sense the Church was opposed to the sects and separate bodies of heretics who had separated themselves from it and were now outside its pale.

When, in the 8th century, the separation between the Eastern and Western Churches took place, the latter retained as one of its appellations the term "Catholic," the Eastern Church being contented with the word "Orthodox," still used by the Russian emperors in their politico-ecclesiastical manifestos.

When the Protestant churches separated from their communion with Rome in the 16th century, those whom they had left naturally regarded them as outside the Catholic pale. They, on the other hand, declined to admit that this was the case, and the term "Catholic Church" is used in the English Liturgy apparently in the sense of all persons making a Christian profession. "More especially we pray for the good estate of the Catholic Church . . . that all who profess and call themselves Christians. . . ." See ROMAN CATHOLIC CHURCH.

Catholic Epistles, the epistles in the New Testament addressed not to individual men or to individual churches, but to the

general body of Christians. They are James, I and II Peter, I John and Jude.

Catholic Knights of America, an organization of Roman Catholics in the United States, founded in 1877, as a fraternal and protective order. In 1909 it reported 600 subordinate councils, and over 19,000 members; president, Felix Gaudin, New Orleans, La. This order has disbursed over \$16,500,000 in benefits; over \$570,000 in a single year.

Catholic Majesty, a title which Pope Alexander VI. gave to the kings of Spain, in memory of the complete expulsion of the Moors from Spain in 1491 by Ferdinand of Aragon. But even before that time, and especially after the council at Toledo in 589, several Spanish kings are said to have borne this title.

Catholic University of America, an institution in Washington, D. C., founded in 1889, under the auspices of the Roman Catholic Church, for postgraduate study exclusively; has faculties of theology, philosophy, and law, with instruction in technology; buildings valued at over \$750,000; endowment exceeding \$4,700,000; volumes in the library, over 70,000; scientific apparatus, \$35,000; average number of teaching staff, 45; of students, 300; affiliated institutions in and out of Washington, 7; publishes a quarterly "Bulletin"; chancellor, Cardinal Gibbons.

Catiline (Lucius Sergius Catilina), a Roman conspirator; born about 108 B. C. He was just entering on the age of manhood when Rome became a prey to the rage of Marius and Sulla. Of patrician birth, but poor, he attached himself to the cause of the latter, had some share in his success, and still more in his proscriptions. Murder, rapine, and conflagration were the first deeds and pleasures of his youth. He appears to have served in the army with reputation. Sallust, who has written the history of his conspiracy, describes him as having a constitution that could support hunger, cold, fatigue, and want of sleep, to an incredible extent; with a spirit bold, cunning, fruitful in resources; lusting after the wealth of others, prodigal of his own; a man of fiery passions, but limited judgment. Such was his art, that, while he was poisoning the minds of the Roman youth, he gained the friendship and esteem of the severe Catulus. Equally well qualified to deceive the good, to intimidate the weak, and to infuse his own boldness into his associates, he evaded two accusations brought against him by Clodius. He was suspected also of having murdered his first wife and his son. A confederacy having been formed of many young men of high birth and daring character, who saw no other means of extricating themselves from their enormous debts than by obtaining the

highest offices of the state, Catiline was placed at their head. This eminence he owed chiefly to his connection with the old soldiers of Sulla, by means of whom he kept in awe the towns near Rome, and even Rome itself. At the same time he numbered among his adherents not only the worst and lowest of the populace, but also many of the patricians, and men of consular rank. Everything favored the audacious scheme. Pompey was pursuing the victories which Lucullus had prepared for him; and the latter was but a feeble supporter of the patriots in the senate, who wished him, but in vain, to put himself at their head. Crassus, who had delivered Italy from the gladiators, was now striving after power and riches, and countenanced the growing influence of Catiline as a means of his own aggrandizement. Cæsar, who was laboring to revive the party of Marius, spared Catiline, and perhaps even encouraged him. Only two Romans remained determined to uphold their falling country—Cato and Cicero; the latter of whom alone possessed the qualifications necessary for the task. The conspirators were now planning the elevation of Catiline and one of his accomplices to the consulship, by which they hoped to obtain possession of the public treasures and the property of the citizens under various pretexts, and especially by means of proscription. Cicero had the courage to stand candidate for the consulship; neither insults or threats, nor even riots and attempts to assassinate him, deterred him from his purpose; and being supported by the rich citizens, he gained his election 65 B. C. All that the party of Catiline could accomplish was the election of Caius Antonius, one of their accomplices, as colleague of Cicero. This failure, however, did not deprive Catiline of the hope of gaining the consulship the following year. For this purpose he revived the kind of terrorism by which he had laid the foundation of his power. Meanwhile he had lost some of the most important members of his conspiracy. Antony had been prevailed on or compelled by Cicero to remain neutral. Cæsar and Crassus had resolved to do the same. Piso had been killed in Spain. Italy, however, was destitute of troops. The veterans of Sulla only waited the signal to take up arms. This signal was now given by Catiline. The centurion Manlius appeared among them, and formed a camp in Etruria. Cicero was on the watch; a fortunate accident disclosed to him the counsels of the conspirators. One of them, Curius, was on intimate terms with a woman of doubtful reputation, Fulvia by name, and had acquainted her with their plans. Through this woman Cicero learned that L. Vargunteius, a senator, and C. Cornelius, a knight, had undertaken to assassinate him at his house. On the day

which they had fixed for the execution of their plan, they found the doors barred and guarded. Still Cicero delayed to make public the circumstances of a conspiracy, the progress and resources of which he wished first to ascertain. He contented himself with warning his fellow citizens, in general terms, of the impending danger. But when the insurrection of Manlius was made known, he obtained from the senate the decree, only promulgated on occasions of the utmost importance, that "the consuls should take care that the republic received no detriment." It was exceedingly difficult to seize the person of one who had soldiers at his command both in and out of Rome; still more difficult would it be to prove his guilt before judges who were accomplices with him, or at least were willing to make use of his plans to serve their own interest. Cicero had to choose between two evils—a revolution within the city, or a civil war; he preferred the latter. Catiline had the boldness to take his seat in the senate, known as he was to be the enemy of the Roman State. Cicero then rose and delivered that bold oration against him, beginning, "*Quosque tandem abutêre, Catilina, patientia nostra?*" ("How long then, Catiline, wilt thou abuse our patience?") Assuming a confidence he did not possess, he attempted a reply, but his words were instantly drowned by the cries of "parricide!" and "traitor!" which rose on all hands. Now fully conscious that his plans were discovered, he rushed from the assembly with threats and curses on his lips; he left Rome at dead of night. The conspirators who remained, Lentulus Sura, Cethegus, and other infamous senators, engaged to head the insurrection in Rome as soon as Catiline appeared at the gates. According to Cicero and Sallust, it was the intention of the conspirators to set the city on fire, and massacre the inhabitants. At any rate, these horrid consequences might have easily followed from the circumstances of the case, without any previous resolution. Lentulus, Cethegus, and the other conspirators, in the meanwhile, were carrying on their criminal plots. They applied to the ambassadors of the Allobroges to transfer the war to the frontiers of Italy itself. These, however, revealed the plot, and their disclosures led to others still more important. The correspondence of the conspirators with their leader was intercepted. As the circumstances of the case did not allow of a minute observance of forms in the proceedings against the conspirators, the laws relating thereto were disregarded, as had been done in former instances of less pressing danger. Cæsar spoke against immediate execution, but Cicero and Cato prevailed. Five of the conspirators were put to death. Caius Antonius was then appointed to march against Catiline, but on the pretext of ill

health, gave the command to his lieutenant, Petreius. He succeeded in inclosing Catiline, who, seeing no way of escape, resolved to die sword in hand. His followers imitated his example. The battle was fought with bitter desperation. The insurgents all fell on the spot which their leader had assigned them, and Catiline at their head, at Pistoia, in Etruria, Jan. 5, 62 B. C.

Catinat, Nicholas (ka-tĩ-na'), Marshal of France, born in Paris in 1637. He attracted the notice of Louis XIV. at the storming of Lille (1667), and by his conduct, especially at the battle of Senef, gained the friendship of Condé. He was sent as Lieutenant-General against the Duke of Savoy, gained the battles of Staffardo (1690), and Marsaglia (1693), occupied Savoy and part of Piedmont, and was made marshal in 1693. In Flanders he displayed the same activity, and took Ath in 1697. In 1701 he received the command of the army of Italy against Prince Eugene, but his ill-furnished forces were defeated at Carpi, and he was disgraced. He died in 1712.

Cat Island, the name of four islands. (1) Cat Island, or Guanahani, an island of the Bahama group for centuries supposed to be identical with the San Salvador of Columbus, a surmise now disproved. Length, 36 miles; breadth, 3 to 7 miles; population, 2,378. (2) A steamboat landing on the Mississippi, in Crittenden county, Ark. (3) An island of Lake Huron, Canada, between Horse Island and the Isle of Cove. (4) An island at the mouth of Lake Borgne, La.

Catlin, George, an American author and painter, born in Wilkesbarre, Pa., June 26, 1796. From 1832 till 1839 he traveled and lived among the Indians of America, of whom he painted hundreds of portraits; in 1841 he published "Illustrations of the Manners, etc., of the North American Indians," and subsequently, "Life Among the Indians," and "The Breath of Life." His little book, "Shut Your Mouth," was widely read; it was founded on his theory that the Indians owed their vigor of health to their habit of breathing through the nose. He died in Jersey City, N. J., Dec. 23, 1872.

Cato, Marcus Porcius, called (to distinguish him from the censor, his great grandfather) Cato of Utica, the place of his death; born 95 B. C. He formed an intimacy with the Stoic Antipater, of Tyre, and ever remained true to the principles of the Stoic philosophy. His first appearance in public was against the tribunes of the people, who wished to pull down a basilica erected by the censor Cato, which was in their way. On this occasion he displayed that powerful eloquence which afterward

rendered him so formidable, and won the cause. He served his first campaign as a volunteer in the war against Spartacus, and highly distinguished himself. He served as military tribune in Macedonia in 67 B. C. When the term of his office had expired he traveled into Asia, and brought back the Stoic Athenodorus with him to Rome. He was next made quæstor (65 B. C.), and executed his difficult trust with the strictest integrity, while he had the spirit to prosecute the public officers for their acts of extortion and violence. His conduct gained him the admiration and love of the Romans, so that, on the last day of his quæstorship, he was escorted to his house by the whole assembly of the people. The fame of his virtue spread far and wide. In the games of Flora the dancing-girls were not allowed to lay aside their garments as long as Cato was present. The troubles of the State did not permit him to remain in seclusion. The example of Sulla in usurping supreme power was followed by many ambitious men, whose mutual dissensions were all that saved the tottering constitution from immediate ruin. Crassus hoped to purchase the sovereignty with his gold; Pompey expected that it would be voluntarily conferred upon him; and Cæsar, superior to both in talent, united himself to both, and made use of the wealth of the one and the reputation of the other to attain his own objects. Cato, keeping aloof from all parties, served the commonwealth with sagacity and courage; but he often injured the cause which he was trying to benefit by the inflexibility of his character. In 63 B. C. he was chosen tribune of the people. About this time the conspiracy of Catiline broke out. Cato supported Cicero, who was then consul, with all his power, first gave him publicly the name of "father of his country," and urged, in a fine speech preserved by Sallust, the rigorous punishment of the traitors. He opposed the proposition of Metellus Nepos to recall Pompey from Asia, and give him the command against Catiline, and very nearly lost his life in a riot excited against him on this account by his colleague and Cæsar. After the return of Pompey he frustrated many of his ambitious plans, and first predicted the consequences of his union with Crassus and Cæsar. The triumvirate, in order to remove him to a distance, had him sent to Cyprus, of which he took possession on behalf of Rome (58-57). He was compelled to obey, and executed his commission with so much address that he enriched the treasury with a larger sum than had ever been deposited in it by any private man. In the meantime he continued his opposition to the triumvirate. Endeavoring to prevent the passage of the Tribonian law, for investing the triumvirs with extraordinary powers, he was drawn into tumults, and even

personal conflict. Being afterward made prætor (54 B. C.), he carried into execution a law against bribery that displeased all parties. After the death of Crassus the civil commotions increased, and Cato, as the only means of preventing greater evils, proposed that Pompey should be made sole consul, contrary to the constitution, which proposition was adopted. The year following (51 B. C.) Cato lost the consulship by not submitting to employ the necessary amount of bribery to procure a majority. Soon after (49 B. C.) the civil war broke out. Cato, then proprætor in Sicily, on the arrival of Curio with three of Cæsar's legions, departed for the camp of Pompey, at Dyrrachium. He had always hoped to prevent the war by negotiation; and when it broke out he put on mourning in token of his grief. Pompey, having been victorious at Dyrrachium, left Cato behind to guard the military chest and magazine, while he pushed after his rival. For this reason Cato was not present at the battle of Pharsalia, after which he sailed over with his troops to Cyrene, in Africa. Here he learned that Pompey's father-in-law, Scipio Metellus, had gone to Juba, King of Mauritania, where Varus had collected a considerable force. Cato immediately set off to join him, and after undergoing hunger, thirst, and every hardship, reached Utica, where the two armies effected a junction (47 B. C.). The soldiers wished him to be their general, but he gave this office to Scipio, and took the command in Utica, while Scipio and Labienus sallied out against Cæsar. Cato had advised them to protract the war, but they ventured an engagement, in which they were entirely defeated, and Africa submitted to the victor. Cato had at first determined to defend himself to the last, with the senators in the place; but he afterward abandoned this plan, and despairing of the commonwealth, and unwilling to live under the despotism of Cæsar, he resolved to die. On the evening before the day which he had fixed upon for executing his resolution, he took a tranquil meal, and discussed various philosophical subjects. He then retired to his chamber, and read the "Phædo" of Plato. Anticipating his intentions, his friends had taken away his sword. On finding that it was gone he called his slaves, and demanded it with apparent equanimity; but when they still delayed to bring it he struck one of the slaves who was endeavoring to pacify him. His son and his friends came with tears, and besought him to refrain from his purpose. At first he reproached his son for disobedience, then calmly advised those present to submit to Cæsar, and dismissed all but the philosophers Demetrius and Apollonius, whom he asked if they knew any way by which he could continue to live without being false to his principles. They

were silent, and left him weeping. He then received his sword joyfully, again read "Phædo," slept a while, and on awaking sent to the port to inquire if his friends had departed. He heard with a sigh that the sea was tempestuous. He had again sunk into slumber, when word was brought him that the sea was calm, and that all was tranquil in the harbor. He appeared satisfied, and the moment he was alone stabbed himself with his sword. His people rushed in, and taking advantage of a swoon into which he had fallen, bound up his wounds; but, on coming to himself, he tore off the bandages and expired (46 B. C.). The Uticans buried him honorably, and erected a statue to him. Cæsar, when he heard the news of his death, exclaimed, "I grudge thee thy death, since thou hast grudged me the honor of sparing thy life."

Cato, Marcus Porcius, the Censor, surnamed Priscus, also Sapiens, and Major (the Wise and the Elder); born in Tusculum, 234 B. C., and inherited from his father, a plebeian, a small estate in the territory of the Sabines, which he cultivated with his own hands. He was a youth at the time of Hannibal's invasion of Italy. He served his first campaign, at the age of 17, under Fabius Maximus, when he besieged Capua. Five years after he fought under the same commander at the siege of Tarentum. After the capture of this city he became acquainted with the Pythagorean Nearchus, who initiated him into the sublime doctrines of his philosophy, with which, in practice, he was already conversant. After the war was ended Cato returned to his farm. As he was versed in the laws, and a fluent speaker, he went at daybreak to the neighboring towns, where he acted as counselor and advocate to those who applied to him. Valerius Flaccus, a noble and powerful Roman, who had an estate in the vicinity, observed the talents and virtue of the youth, conceived an affection for him, and persuaded him to remove to Rome, where he promised to assist him with his influence and patronage. A few rich and high-born families then stood at the head of the republic. Cato was poor and unknown; but his eloquence, which some compared to that of Demosthenes, and the integrity and strength of his character, soon drew the public attention to him. In the forum and the popular assemblies he realized the fine definition which he himself gave of an orator, and which Quintilian has preserved to us: "A virtuous man skilled in the art of speaking well." At the age of 30 he went as military tribune to Sicily. In the following year he was quæstor, at which period there commenced between him and Scipio a rivalry and hatred which lasted till death. Cato, who had returned to Rome, accused Scipio of extravagance; and, although his rival was ac-

quitted of the charge, this zeal in the cause of the public gave Cato a great influence over the people. Five years after, having been already ædile, he was chosen prætor, and obtained the province of Sardinia. His strict moderation, integrity, and love of justice, were here still more strongly displayed than in Rome. On this island he formed an acquaintance with the poet Ennius, of whom he learned Greek, and whom he took with him to Rome on his return. He was finally made consul, 192 B. C., and had his friend Valerius Flaccus for colleague. He opposed with all his power the abolition of the Oppian law, passed in the pressing times of the second Punic War, forbidding the Roman women to wear more than half an ounce of gold, to dress in garments of various colors, or to wear other ornaments; but he was obliged to yield to the eloquence of the tribune Valerius, and still more potent female importunities. Soon after he set out for Spain, which was in a state of rebellion. His first act was to send back to Rome the supplies which had been provided for the army, declaring that the war ought to support the soldiers. He gained several victories with a newly-raised army, reduced the province to submission, and returned to Italy, where the honor of a triumph was granted to him. Scarcely had he descended from his triumphal car when he put off the toga of the consul, arrayed himself in the soldier's habit, and followed Sempronius to Thrace. He afterward put himself under the command of the Consul Manius Acilius, to fight against Antiochus, and to carry on the war in Thessaly. By a bold march he made himself master of the Callidromus, one of the highest peaks of the mountain pass of Thermopylæ, and thus decided the issue of the battle. He brought the intelligence of this victory to Rome, 189 B. C. Five years after, in spite of a powerful faction opposed to him, he obtained the most honorable, and at the same time the most feared, of all the magistracies of Rome, the censorship. He had not canvassed for the office, but had only expressed his willingness to fill it. In compliance with his wishes Valerius Flaccus was chosen his colleague, as the only person qualified to assist him in correcting the public disorders, and restoring the ancient purity of morals. He fulfilled this trust with inflexible rigor; and though his measures caused him some obloquy and opposition, they met, in the end, with the highest applause; and when he resigned his office, it was resolved to erect a statue to him with an honorable inscription. He appears to have been quite indifferent to the honor; and when, before this, some one expressed his wonder that no statue had been erected to him, he answered, "I would rather have it asked why no image has been erected to

Cato than why one has." Still he was not void of self-complacency. "Is he a Cato, then?" he was accustomed to say, when he would excuse the errors of another. Cato's political life was a continued warfare. He was continually accusing, and was himself accused with animosity, but was always acquitted. His last public commission was an embassy to Carthage to settle the dispute between the Carthaginians and King Massinissa. It is said that this journey was the original cause of the destruction of Carthage; for Cato was so astonished at the rapid recovery of this city from its losses, that he ever after ended every speech of his with the well-known words, "*Præterea censeo, Carthaginem esse delendam*" ("I am also of opinion that Carthage must be destroyed"). He died a year after his return (149 B. C.), 85 years old. Cato, who was so frugal of the public revenues, was not indifferent to riches. He was rigorously severe toward his slaves, and considered them quite in the light of property. He made every exertion to promote and improve agriculture. In his old age he gave himself up to the company of his friends and the pleasures of the table. He was twice married, and had a son by each of his wives. His conduct as a husband and a father was equally exemplary. He composed a multitude of works, of which the only one extant is that "*De Re Rustica*." Those of which the loss is most to be regretted are his orations, which Cicero mentions in terms of the highest encomium, and his history of the origin of the Roman people, which is frequently quoted by the old historians.

Catoptrics, that branch of optics which explains the properties of incident and reflected light, and particularly that which is reflected from mirrors or polished surfaces. The whole doctrine of catoptrics rests on the principle that the angle of incidence is equal to the angle of reflection and in the same plane.

Catoptromancy, a species of divination practiced by the Greeks, in which a mirror was let down by a cord into a fountain in the temple of Ceres, in Achaia, into which sick persons looked. If the observer's face appeared in it sickly or ghastly the omen was considered unfavorable, and the sick person would not recover; but if, on the other hand, it appeared fresh and healthy, the omen was considered favorable.

Catorce (kat-or'sa), a mining town of San Luis Potosi, Mexico, which received its name, signifying 14, from a gang of robbers, formerly a constant menace to its inhabitants. It contains valuable silver mines, now pretty well worked out. The ore is mixed with sulphur, and requires treatment by a high degree of heat. When the French invaded Mexico, a mint was

Catrail

started here, and worked until 1867. The amount coined was about \$52,000,000. The population is variable, ranging from 8,000 to 15,000, according to the state of mining.

Catrail (also known as the PICTS' WORK or PICTS' WORK DITCH), the name applied to the remains of a large earthwork in Scotland, about 50 miles in length, which, beginning at Torwoodlee Hill, near the junction of the Gala Water with the Tweed, runs with a semicircular sweep southward through the counties of Selkirk and Roxburgh to a point under Peel Fell, in the Cheviots. The earthwork consisted of a deep ditch, with a rampart on each side, and varied in breadth from 20 to 26 feet. Various causes have resulted in the destruction of the ramparts in many places. The Catrail has led to much speculation.

Cat's-eye, a phenocrystalline or vitreous variety of quartz. It exhibits opalescence, but without prismatic colors, especially when cut *en cabochon*, an effect due to fibers of asbestos. The finest specimens are brought from Ceylon. Composition: Silica, 95.0; alumina, 1.75; lime, 1.25; oxide of iron, 0.25.

Catskill, a village and county-seat of Greene Co., N. Y., on the W. side of the Hudson river and on the West Shore and the Catskill Mountain railroads; also connected with the New York Central by a ferry crossing the Hudson, 30 miles S. of Albany. It is a noted mountain summer resort and has a court house, opera house, free academy, two National banks, several public schools, weekly newspapers, manufacturing and hotels. Pop. (1890), 4,920; (1900) 5,484; (1910) 5,296.

Catskill Mountains, a chain of the Appalachian system, beginning in Greene county, N. Y., on the W. side of the Hudson river. The scenery of these mountains is remarkably picturesque and beautiful, while from the higher points may be seen extensive and interesting views, taking in a radius from the Green Mountains of Vermont to the West Point Highlands. An interesting natural development is the "Caaterskill Clove," in which two streams unite in an unbroken fall of 180 feet, afterward rushing over falls of 80 and 40 feet. During the winter this fall presents a wonderful appearance. The highest points at which hotels are built are the Mountain House, 2,231 feet, and Overlook, 3,800 feet. To this region numbers of summer guests repair yearly, living in farmhouses or hotels. A railroad has been built among the mountains, taking a W. direction from Kingston. The mountains are thickly wooded with oak, hickory, ash, pine, beech, and maple trees.

Cattaro, a strongly fortified port in the Austrian crown-land of Dalmatia, at the

Cattermole

head of the Gulf of Cattaro, 40 miles S. E. of Ragusa, under the steep Montenegrin hills. Cattaro has a cathedral, a naval school, and a population of over 5,000, chiefly engaged in the Montenegrin trade. At one time the capital of a small republic, the town in 1420 joined the republic of Venice, and after varied fortunes was handed over to Austria in 1814 by the treaty of Vienna. The Gulf of Cattaro, an inlet of the Adriatic, consists of three basins or lakes, connected by straits of about half a mile in breadth. Its length is 19 miles, and its depth from 15 to 20 fathoms.

Cattegat, or **Kattegat**, the bay or arm of the sea between the E. coast of Jutland and the W. coast of Sweden, to the N. of the Danish islands. It is connected with the Baltic Sea by the Great and Little Belt, and by the Sound, and the Skager Rack connects it with the North Sea. The length of the Cattegat is about 150 miles, and its greatest breadth 85 miles. Its greatest depth is 36 fathoms, but it has numerous sand-banks, and navigation is rendered more dangerous by its strong currents and violent storms. The Danish shores are low, with stretches of sand or reefs, but the Swedish shore is very steep and rocky.

Cattell, James McKeen, an American psychologist, born in Easton, Pa., May 25, 1860, graduated at Lafayette College in 1880, and studied at Leipsic, Paris, Geneva, and Göttingen. He was assistant under Wundt at the University of Leipsic, Professor of Psychology in the University of Pennsylvania in 1888-1891, and became Professor of Experimental Psychology in Columbia University in 1891. He is co-editor of the "Psychological Review" and "Science."

Cattell, William Cassidy, an American educator, born in Salem, N. J., Aug. 30, 1827. He was graduated at Princeton (1848), and at Princeton Theological Seminary (1852), was Professor of Latin and Greek in Lafayette College (1855-1860), and president of the institution (1863-1883), and was subsequently prominent in the Presbyterian Church. He died in Philadelphia, Pa., Feb. 11, 1898.

Cattermole, George, an English artist, born in Norfolk, Aug. 8, 1800. He was employed as a draughtsman on Britton's "English Cathedrals" when only 16, and drew the designs for various annuals, and for his brother's "History of the Civil Wars." In the earlier part of his career he painted chiefly in water-colors, but after 1857 devoted himself to oil-painting. Among the best known of his pictures are "Hamilton of Bothwellhaugh about to Shoot the

Cattle

Regent Murray," "Luther at the Diet of Spires," "The Armorer's Tale," etc. He died July 24, 1868.

Cattle, a collective term, denoting all animals of the bovine or ox kind. In the United States vast areas of grazing land in the Western States and Territories have been acquired by syndicates for the breeding and rearing of cattle; and with the view of improving the stock of native cattle, large numbers of well-bred bulls of the leading British varieties, either imported from the United Kingdom or descended from imported stock, have been sent to the West for use on ranches.

The cattle of the United States and Canada present almost endless variety of form and character. This is what might be expected when it is remembered that they are descended from importations of cattle from Spain, Holland, Sweden, Denmark, France, England, Scotland, and Ireland. About the year 1525, some six years after the discovery of Mexico by the Spaniard Cortes, cattle were introduced into that country from Spain, and in the abundant pasturage of the Mexican territory they increased rapidly, spreading with the enterprising Spanish settlers into Texas, California, and other parts of the Far West. Exactly a hundred years later the Dutch settlers in New York brought cattle thither from Holland, and a few years earlier small importations of cattle had been made from the West India Islands into Virginia. The earliest of these arrivals in Virginia are assigned to 1610 and 1611, but that colony was broken up in 1622 by the Indians, who massacred 347 men, women, and children, and, it is presumed, also destroyed their cattle. In 1624 — four years after the landing of the English Plymouth colony there — cattle were introduced into Massachusetts from England, and many other importations followed during the next few years. The Swedes brought cattle into Delaware in 1627, and in 1631 and two following years Danish emigrants introduced cattle from their native country into New Hampshire. English emigrants settled in Maryland in 1633, in North and South Carolina in 1660 and 1670, and in Pennsylvania in 1682, and took with them, or had sent after them, large numbers of English cattle. The French colonists brought cattle into Quebec as early as 1608; and toward the close of the 17th century fresh importations of European cattle poured into the great American continent. It so happens, however, that while importations of cattle were made from all the countries named, and perhaps from others also, the existing cattle stock of the United States — leaving out the Mexican, now more commonly called Texan, cattle, which are still a race by themselves

Catty

— are largely of British origin. There is no authentic information as to the character of the cattle first introduced into America, but all the leading breeds of the British Isles, as well as the chief milking breeds of the European continent, are now strongly represented in North America. There, as at home, the English shorthorn predominates, and there are also strong representations of the Hereford, Polled Aberdeen-Angus, Galloway, Devon, Norfolk and Suffolk Red Polls, Jersey and Dutch breeds. The cattle of the United States are being speedily improved, chiefly by the use of well-bred bulls, either imported from the British Isles or bred from imported cattle.

For a history of the improvement of cattle in the United States during the past 100 years, see BREEDING.

Cattle-plague, any plague by which large numbers of cattle are destroyed. Such plagues have existed at intervals, more or less, in all countries and in all ages. Among the severer visitations in centuries preceding the 19th may be mentioned a great plague which arose in Hungary in 1711, whence it spread to other countries, destroying in the next three years about one and a half millions of cattle. A second visitation, which affected England and the W. of Europe between 1745 and 1756, caused the death of about three millions of cattle.

The name is given in the United States specifically to the disease known as "Texas fever," the scientific name of which is *pleuro-pneumonia*. Although this pest has from time to time broken out endemically, there has never been any general epidemic here, such as has afflicted other countries. The appellation "cattle plague" is also loosely given to another disease among cattle in the United States, which is otherwise known as the "lumpy-jaw," a most virulent and incurable affection. Experiments have been time and again ineffectually tried to find a cure for this, though large governmental encouragement has been offered. A rigid examination of cattle is made by government inspectors at all receiving and shipping ports.

Catti, or **Chatti**, a German people, erroneously included by Cæsar under the name Suevi, who inhabited a country pretty nearly corresponding to the present Hesse. They took part in the general rising of the Germans under Arminius, and during the reign of Marcus Aurelius, in the end of the 2d century, they made incursions into Roman Germany and Rhætia. In the 3d century their name began to give place to that of the Franks.

Catty, in China and the Malayan Archipelago, a weight of $1\frac{1}{3}$ pounds.

Catubig

Catubig, a small town in the island of Samar, Philippine Islands. The place is garrisoned by United States troops, who, in June, 1900, withstood an attack by 600 insurgents. This episode was a stirring incident of the war. Pop. (1903) 9,563.

Catullus, Valerius (whose prænomen is stated by some to be Caius, by others Quintus), a famous Roman poet; born 86 B. C., in Verona (according to some, in Sirmium, a small town on a peninsula of Lake Benacus, now Lago di Garda), of rich and respectable parents; went in his youth to Rome, where his accomplishments soon won him the favor of those who adorned that splendid era. He was the friend of Cicero, of Plancus, Cinna, and Cornelius Nepos; to the last he subsequently dedicated the collection of his poems. This collection is not of great extent, but shows what he was capable of doing in several kinds of poetry, had he preferred a steady course of study to pleasure and traveling. Probably a part of his poems have not come down to us. Of the merit of his productions there has been but one opinion among the ancients as well as moderns. Tibullus and Ovid eulogize him; and Martial, in one of his epigrams, grants to him alone a superiority over himself. In sportive composition and in epigrams, when he keeps within the proper limits of that species of poetry, he is a model. He succeeded also in heroic verse, as in his beautiful episode of "Ariadne," which appears to have inspired the poet who afterward sang of Dido. He was the first of the Romans who successfully imitated the lyric poetry of the Greeks. A very weighty objection, however, against most of his writings is their licentiousness and indelicacy. The common opinion is that he died 57 B. C., in the 30th year of his age, but this is no doubt erroneous, as there are allusions in his own works which prove him to have been alive in the consulship of Vatinius as late as 47 B. C. A fine English translation of Catullus in the original meters is that of Prof. Robinson Ellis, who has also published an admirable annotated edition of the Latin text.

Catulus, Quintus Lutatius (kat'u-lus), a Roman general, historian, and poet, born about 152 B. C. He was consul in 102 B. C. with Gaius Marius, and in the following year was proconsul. During his proconsulship he, with Marius, defeated the Cimbri near Vercellæ, the modern Vercelli, in Northern Italy. As one of the aristocratic party and a partisan of Sulla, he was proscribed by Marius. He died 87 B. C.

Caub (kóub), a town in the Prussian province of Hesse-Nassau, on the Rhine, 30 miles W. N. W. of Wiesbaden. Here Blücher crossed the Rhine with his army, Jan. 1, 1814, and here, too, till 1866, toll

Caucasus

was levied by the Duke of Nassau—the only ruler who kept up this feudal privilege—from vessels navigating the Rhine. Caub has underground slate quarries, and opposite, on an island in the river, where Louis le Débonnaire died in 840, is a castle called the Pfalz, built in 1326, which is said to have been resorted to for safety by the Countess Palatine. In 1876 and 1879 Caub was the scene of two serious landslips.

Cauca, a river of Colombia, in South America, which, after a N. course of 600 miles, falls into the Magdalena. Its valley is one of the richest and most populous districts of the continent, and it gives name to the largest Colombian department, traversed by the Andean coast range, and extending along the Pacific from Panama to Ecuador; area, 26,030 square miles; pop. (1905, est.) 400,000. It is rich in minerals and possesses the most productive platinum mine in America. Capital, Popayán.

Caucasia, a province of the Russian Empire, between the Black and Caspian Seas, and extending from the frontier of Persia on the S. to the Kuma-Manych depression on the N. The Caucasus Mountains divide the territory into Cis-caucasia and Trans-caucasia. The total area of Caucasia, the two parts being nearly equal, is 180,843 square miles, and the population, in 1897, Trans-caucasia being the most thickly settled, 9,248,695.

Caucasian Race, the white man, one of the three more remarkable varieties of the species Man, the two others being the Yellow, or Mongolian, and the Black, or Ethiopian. The Caucasian Race occupies all Europe and Western Asia as far as the Ganges, likewise Northern Africa and the greater part of America. To it belong the more highly civilized nations. The region of the Caucasus has been supposed to have been the cradle of the race, hence its name. A fair skin, elevated forehead, small cheekbones, hair varying in color, but always smooth or wavy, together with high intellectual qualities, characterize the race. According to some modern ethnologists, the inhabitants of the Caucasus, so long held as the type of the European variety, should be excluded from it altogether, and classed with the sallow, flat-faced Mongols, to which it is considered the nature of their language and other facts ally them more closely than the symmetry of their shape, and complexion, do to the European variety.

Caucasus, a chain of mountains between Europe and Asia, extending from S. E. to N. W., and occupying the isthmus between the Black and Caspian seas. The length is computed at 700 miles, the breadth is various; from Mosdok to Tiflis it may be estimated at 184 miles. Torrents, precipices,

and avalanches render these mountains difficult to cross. The Caucasus is divided into several parallel chains. The central ridge, from which the mountains fall off on each side consists of granitoid syenite. The summits are covered with snow and ice; the lower parts are clothed with forests. According to the most recent measurements the heights of the four chief summits of the Caucasus are as follows: Elbruz, 18,572 feet; Koshtan-tau, 17,123; Dych-tau, 16,928; Kasbek, 16,546. Those mountains, as they lie N. of the Caucasian watershed, are to be looked upon as European. Elbruz and Kasbek were ascended to their summits for the first time by Messrs. Freshfield, Moore, and Tucker, in 1868. The limit of perpetual snow on the Caucasus varies from 9,500 feet to 12,500 feet. It is higher on the N. slope than on the S., the difference often amounting to more than 1,000 feet. Two of the passes, or gates, as they are often called, are remarkable — the Caucasian pass, and the Albanian or Caspian pass. Most of the rivers, which take their rise in the Caucasus, flow in an E. direction to the Caspian Sea, or in a W. course to the Black Sea. On the N. declivity the Terek flows E. into the Caspian, and the Kuban W. into the Black Sea; beyond these rivers the mountain chain sinks down by degrees to the sandy plains in the S. of Russia. On the S. declivity the Kur flows E. into the Caspian, and the Rion (called by the ancients the Phasis) W. into the Black Sea. Beyond these rivers rise the mountains of Turkish and Persian Armenia, which connect the Caucasus with the other chains of Western Asia.

The highest ridge of the Caucasian chain is rugged and barren, but part of the S. declivity is extremely fruitful. In many parts the country abounds with forests, and on the low grounds there are often orchards and vineyards, corn fields, and pastures, in rich alternation. Grapes and various kind of fleshy fruits, chestnuts and figs, grow spontaneously. Grain of every description, rice, cotton, and hemp, flourish abundantly. But agriculture can be carried on with success in a comparatively limited area, much of this region being too mountainous, while in many localities there is a deficiency of water. The agricultural implements are mostly of the simplest and rudest character. Silk worms are reared in various districts, and considerable quantities of raw silk produced. Manufacturing industries are of little importance, though weapons and other articles in metal, carpets and other textiles may be mentioned. The mineral kingdom is represented by various valuable minerals, including coal, salt, sulphur, lead, iron, manganese, copper, etc., which are worked to a greater or less extent. The most celebrated mineral production of this region, however, is petroleum,

which is obtained in immense quantities from the wells of BAKU (*q. v.*). Mineral waters abound in many districts. The trade is of importance, and is rapidly increasing, the chief centers being Baku, Tiflis, Batum, Poti, and Novorossisk. The exports are chiefly petroleum, grain, wool, silk, cotton; the imports, textile goods of cotton, wool, and silk, metal goods, etc. For internal communication much has been done in recent times by the construction of roads; while two main lines of railway now cross the country from N. W. to S. E., the one on the N. side of the Caucasus chain, the other on the S. (from Poti to Baku).

The original inhabitants consist of tribes of various origin and language — Georgians, Abassians, Lesghians, Ossetes, Circassians, Khists, Ingooshes, Charabulaks, Tshetshenzes, with Tartars, Armenians, Jews, and, in some parts, wandering Arabs. Some are Greeks and Armenian Christians, others are Mohammedans, others Jews, and a small number heathens. Many of the tribes are distinguished for the beauty, symmetry, and strength of their frames, particularly the Circassians and Georgians. Formerly the country was very unsettled owing to the wars between the petty princes who ruled over the mountaineers, but Russian rule has put an end to this.

The Russian province of the Caucasus embraces a large area on both sides of the main range of the Caucasus. Russia claimed the greater part of the Caucasian countries from 1813; but from the bold resistance which the inhabitants offered, and the natural strength of their mountain fastnesses, it was long before these regions were brought completely under Russian rule. The capture of Shamyl, the chief of the Lesghians, in 1859, may almost be said to have terminated the resistance of the mountaineers; although several petty tribes continued the hopeless struggle up to 1864. Considerable numbers of the inhabitants had emigrated before, being discontented with the Russian rule; and now many more left their homes for the purpose of settling in Turkish territory. From the want of sufficient transport and means to receive the multitude of emigrants, they suffered great hardships, and many of them died from disease and exposure. The whole of Caucasia is under the rule of a governor-general, with a number of governors under him. It is divided into Cis-Caucasia and Trans-Caucasia, nearly equal in size, and together covering 180,850 square miles. The pop. (1897) of the former was returned at 3,732,556; of the latter, at 5,516,139; total, 9,248,695. The whole is now divided as follows: Cis-Caucasia comprehends the territory of the Kuban, the government of Stavropol, and the Ter province. Trans-Caucasia comprises the government of Tiflis, the government of Kutaïs, the government

Cauchy

of Elisabethpol, the government of Baku, the government of Erivan, and the provinces of Daghestan and Kars. The Russians number about 2,200,000. The Turks and Tartars 1,458,000; the Georgians and allied peoples 1,200,000; the Armenians 975,000; the Lesghians 614,000. The districts S. of the Caucasus are still known also as Georgia or Grusia, Mingrelia, etc., while Circassia comprehends a large portion of the N. and part of the S. slope of the range. See CIRCASSIA.

Cauchy, Augustin Louis (kō-shē), a French mathematician, born in Paris, Aug. 21, 1789; published in 1815 a "Treatise on the Theory of Waves," which was afterward made the basis of the undulatory theory of light. Between 1820 and 1830 he wrote several important treatises, and at Prague, where he resided as tutor to the Comte de Chambord, he published his "Treatise on the Dispersion of Light" (1837). From 1848 to 1852 he was Professor of Astronomy at Paris, but refused the oath of allegiance to Napoleon III., and lived in retirement till his death, May 23, 1857.

Caucus, in the political nomenclature of the United States, a gathering preliminary to a public meeting of citizens for election or for other purposes, generally political; a private conclave designed to influence the general body of the citizens. Also a secret preliminary meeting of the leaders of a political party to determine on a course of action, the conclusions of the Caucus being binding on all the members.

Cauda-galli Grit, the basement subdivision of the Devonian system of North America. The name (lit. "cock's tail") is derived from the feathery forms of a common fossil, supposed to be a seaweed.

Caudex, in botany, the stem of a tree, more especially the scaly trunk of palms and tree-ferns. It often appears as a rhizome running along the surface of the earth or underground.

Caudine Forks, a pass of Southern Italy, in the form of two lofty fork-shaped defiles, in the Apennines (now called the valley of Arpaia), into which a Roman army was enticed by the Samnites, B. C. 321, and being hemmed in was forced to surrender.

Caul, a popular name for a membrane investing the viscera, such as the peritoneum or part of it, or the pericardium; also a portion of the amnion or membrane enveloping the fetus, sometimes encompassing the head of a child when born. This Caul was supposed to predict great prosperity to the person born with it, and to be an infallible preservative against drowning, as well as to convey the gift of eloquence. Sailors have often paid as much as \$150 for a caul.

Cause

Caulaincourt, Armand de (kō-lan-kör'), Duke of Vicenza, a French statesman, born at Caulaincourt (Aisne), Dec. 9, 1772; early distinguished himself as an officer, was made a general of division in 1805, and shortly after created Duke of Vicenza. Faithful to the last to Napoleon, he was made Minister for Foreign Affairs in 1813, and during the Hundred Days resumed the office, receiving a peerage of France, of which he was deprived after the restoration. He died in Paris, Feb. 19, 1827.

Cauliflower, an esculent vegetable consisting of the fleshy, young, undeveloped inflorescence of a variety of *Brassica oleraceæ*, hardly different from brocoli, except in being whiter and less hardy. It is said to have been imported from Cyprus about the middle of the 16th century. A very rich, light, warm soil is required for Cauliflower, which must be sown in beds, and afterward transplanted into sheltered situations, where they can be protected when young with hand-glasses. They are sown in August for a spring crop, in February for a summer crop, and in May in order to come in at the end of autumn and beginning of winter. The Cauliflower is a light, easily digested, and nutritious vegetable aliment.

Caulking, of a ship, driving a quantity of oakum into the seams of the planks in the ship's decks or sides in order to prevent the entrance of water. After the oakum is driven very hard into these seams it is covered with hot melted pitch to keep the water from rotting it.

Caulopteris, a genus of fossil tree ferns found in the coal measures.

Caura (kō'ra), a river of Venezuela, rises among the sierras of the frontier, and flows N. N. W. to the Orinoco. On both sides stretches the territory of Caura (22,485 square miles), with immense forests of tonka beans.

Caus, Caulx, or Cauls, Salomon de (kōs), a French engineer, born in Dieppe in 1576; was a Protestant, and lived much in England and Germany. He was in the service of the Prince of Wales in 1612, and of the Elector Palatine, at Heidelberg, in 1614-1620, but by 1623 he returned to France, and became engineer and architect to the king. At Frankfort, in 1615, appeared his "Causes of Kinetic Energy," a work in which is described an apparatus for forcing up water by a steam fountain, differing only in one detail from that of Della Porta. There is no reason to suppose that the apparatus ever was constructed, but on the strength of the description, Arago has claimed for De Caus the invention of the steam-engine. He died in Paris, June 6, 1626.

Cause, that which brings about any change in the state, condition, circum-

Cause

stances, etc., of things; that which produces an effect.

In law, suit or action. Any question, civil or criminal, contested before a court. In civil law, the consideration or motive for making a contract.

In philosophy, that by which something known as the effect is produced, and without which it could not have existed. Four kinds of causes have been distinguished by logicians: the material, the efficient, the formal, and the final. The material cause of a thing is that out of which that thing is made; in other words, that which is the ground of the possibility of a thing's coming into existence: *e. g.*, the marble out of which a statue is made. The efficient cause is that in which resides the moving power requisite in order to render the possible existence actual; as the sculptor. The formal cause is that which must supervene to the matter, in order to give the thing its precise individual existence as that thing and no other; as the shape which the sculptor communicates to the marble. This distinction is derived originally from Aristotle, with whom it is rather a metaphysical than a logical determination. The final cause of the thing is that very thing in its completeness; as the statue when made. The various opinions as to the nature and origin of the principle of causality in the human mind are ranged by Sir W. Hamilton in two great categories—the one comprehending those theories which consider this principle as empirical, or *à posteriori*—that is, as derived from experience; the other, those which view it as pure, or *à priori*—that is, as the condition of intelligence itself. These two primary genera he subdivides into several subordinate classes. He attempts to explain it by what he terms “the law of the conditioned,” or the law of limitation: that we are unable, on the one hand, to conceive of nothing becoming something; and, on the other hand, of something becoming nothing; that we are utterly unable to realize in thought the possibility of the complement of existence in the universe being either increased or diminished. *Ex nihilo nihil, in nihilum nil posse reverti*, expresses, according to him, “in its purest form, the whole intellectual phenomenon of causality.” This explanation, however, is not generally received by philosophers. The doctrine of final causes, which, with Aristotle, was merely an inquiry into tendencies, has, by the theologians of modern times, been employed to establish the truth of a divine providence. The argument from final causes, according to Dr. Reid, when reduced to a syllogism, has these two premises: (1) That design and intelligence in the cause may, with certainty, be inferred from marks or signs of it in the effect, and (2) that there are the clearest

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marks of design and wisdom in the works of nature; the conclusion being that the works of nature are the effects of a wise and intelligent cause.

Caustic, a name given to substances which have the property of burning, corroding, or disintegrating animal matter; or of combining with the principles of organized substances and destroying their texture. Lunar Caustic, a name given to nitrate of silver when cast into sticks for the use of surgeons, etc. Caustic potash, the hydrate of potassium. Caustic soda, protoxide of sodium.

Caustic, in optics, the name given to the curve to which the rays of light, reflected or refracted by another curve, are tangents. Caustics are consequently of two kinds—*catacaustics* and *diacaustics*—the former being caustics by reflection and the latter by refraction.

Cauterets, a watering-place in the department of Hautes-Pyrénées, France, 3,250 feet above sea-level, in the valley of the Lavedan, 42 miles S. S. E. of Pau. The stationary population of the place is only 1,260, but it is annually swelled in summer by 15,000 to 20,000 visitors, for whose accommodation numerous sumptuous hotels and bathing-establishments have been built. It is a good center and guide-station for ascents among the Pyrenees. The sulphurous springs, 25 in number, and varying in temperature from 60° to 131° F., are the most abundant in the Pyrenees (330,000 gallons per day), and have been known from Roman times; though their modern reputation dates from the 16th century, when Margaret, sister of Francis I., held her literary court and wrote much of her “Hep-tameron” at Cauterets.

Cautery, a substance used for “firing,” burning, or disorganizing the part to which it is applied. The red-hot iron was much used formerly for preventing hemorrhage from divided arteries. Nitrate of silver or lunar caustic is used for the same purpose and as an antiseptic. See ELECTRICITY, MEDICAL.

Cautin, a river in Chile; flows W. through a province named after it, and empties into the Pacific Ocean. Its length is about 200 miles. The province of Cautin has an area of 3,127 square miles; pop. (1895), 78,221; capital, Temuco; pop., 7,078.

Cautionary Towns, four towns in Holland (the Briel, Flushing, Rammekins, and Walcheren), so named because they were given to Queen Elizabeth in 1585 as security for their repaying her for assistance in their struggle with Spain. They were restored to the Dutch Republic by James I.

in 1616, although only a portion of the sum advanced was refunded.

Cavaignac, Jacques Marie Eugene Godefroy (kä-vān-yak'), a French politician, son of Louis Eugène Cavaignac, born May 22, 1853. He studied at the Lycée Charlemagne, Lycée Louis le Grand, École Polytechnique, and École des Ponts et Chaussées, interrupting his studies long enough to serve in the Franco-Prussian War. In 1882 he was elected to the Chamber of Deputies, and in 1885 was appointed Under-Secretary of State. In the Panama revelations of 1892 he bore a conspicuous part. On the organization of the Bourgeois cabinet, Oct. 30, 1895, he was appointed Minister of War. In August, 1898, he added to the excitement over the Dreyfus prosecution by forcing Lieutenant-Colonel Henry to confess to a forgery of certain letters bearing on the Dreyfus case, and the accused officer committed suicide within a few hours. In the following month Cavaignac resigned his office. He wrote "The State and Tariffs of Railroads" and "Formation of Contemporary Prussia." He died Sept. 25, 1905.

Cavaignac, Jean Baptiste, a French revolutionist, born in Gourdon, in 1762; became an advocate at the Parliament of Toulouse; and in the National Convention acted as deputy from the department of Haute-Garonne. He rose to be one of the leaders of the Mountain (Extreme Republicans), and, on his various dictatorial missions to the armies of the Republic, displayed the greatest energy, tact, and incorruptibility. He was a member of the Council of Five Hundred; and afterward became a Councillor of State in Murat's kingdom of Naples. During the Hundred Days he acted as prefect of the Somme. Banished as a regicide, at the second restoration, he died in Brussels, March 24, 1829.

Cavaignac, Louis Eugene, a French general who became famous in connection with the events of 1848; born in Paris, Oct. 15, 1802. His father, Jean Baptiste Cavaignac, was a furious revolutionist, and member of the Council of Five Hundred. Young Cavaignac entered the École Polytechnique in 1820, and afterward the military school at Metz, and in 1824 joined the 2d Regiment of Engineers. He served in the campaign in the Morea, and in 1829 was appointed captain. Being at Arras on the outbreak of the revolution of 1830 he was the first officer in his regiment to declare for the new order of things. In 1832 he was sent to Africa, where he remained for several years, and greatly distinguished himself both by his valor in defending the French settlement against the Arabs and his judicious organization of military hospitals, barracks, and works of defense. In 1840 he was appointed to the command of

the 3d Battalion of Zouaves, and shortly afterward was obliged to quit the service from ill health, but soon joined it again, and was made commander of the Zéphyr, or 2d Battalion of Light African Infantry. In this capacity he displayed great bravery in the defense of Cherchell against the Arabs, and was made first lieutenant-colonel and then colonel of Zouaves. In 1844 he received the appointment of Brigadier-General, with the government of the province of Oran in Algeria.

Cavaignac was in Africa when the revolution of February, 1848, took place. In March of that year he was created by the provisional government general of division and governor of Algeria. Shortly afterward the office of minister of war was offered to him but declined. On April 23 he was chosen representative of the department of Lot in the National Assembly, and proceeding to Paris to take his seat, arrived there on May 17. The capital was then in a state of great excitement from an attempt on the Assembly by the Red Republicans two days before. Cavaignac was offered again the portfolio of the minister of war, and this time accepted it. The measures which he adopted to guard against the crisis which was evidently approaching were prompt and decisive. In a few days an army of nearly 30,000 men was assembled in and around Paris, and this precaution was speedily justified by the events which followed. On June 23, at eleven o'clock, forenoon, the terrible Communist insurrection burst forth, and for three days Paris presented the most dreadful scene of tumult and bloodshed which had been witnessed there since the massacre of St. Bartholomew. About 15,000 persons perished, and property was destroyed to the value of upward of \$1,000,000.

By the energy of General Cavaignac, aided by the loyalty of the army and the national guard, the insurrection was suppressed on June 26, and France saved from a threatened dissolution of all the bonds of society. On that day the National Assembly delegated the entire executive power to Cavaignac as dictator, who resigned it again into its hands on the 29th, and received it anew on the same day, with an acknowledgment by the legislative body of the services rendered by him to his country. Notwithstanding these he was defeated in the elections for the presidency in the month of December following, and Louis Napoleon was preferred to the office. On Dec. 20 he resigned his dictatorship. After the *coup d'état* of Dec. 2, 1851, he was arrested and conveyed to the fortress of Ham, but was liberated after about a month's detention. Shortly afterward he married Mademoiselle Odier, daughter of the banker of that name. In 1852 and in 1857 he was elected member for Paris of the legislative body,

but on both occasions was incapacitated from taking his seat by refusing to take the oath of allegiance to the emperor. The last years of his life were spent at his country-seat in the department of Sarthe. He expired there suddenly of heart disease on Oct. 28, 1857. He was latterly one of the principal contributors to the "Siècle" newspaper.

Cavaille-Coll, Aristide (käv-ī'ā-kōl), a French organ builder, born in Montpellier, Feb. 2, 1811. He built the organs in the Parisian churches of St. Sulpice, the Madeleine, etc., and invented the pressure method for sounding tones of different depths and heights. He died in Paris, Oct. 13, 1899.

Cavalcanti, Guido (kav-al-kan'tē), a Florentine poet, born about 1246. He married Beatrice, daughter of Farinata degli Uberti (chief of the Ghibelline faction at Florence); but he himself seems to have had leanings toward the Guelph party; for, becoming too intimate with the followers of the Cerchi, he was banished (June 24, 1300), along with the others, to Sarzana. As a poet he was, until the coming of Dante, the head of that school of poetry which had been founded by Guicelli of Bologna, a school which delighted in philosophical, mystical sentiment. His writings are confined chiefly to sonnets, canticles, and ballads. His best known poem is his canzone on the "Nature of Love." Among his contemporaries his epicurean philosophy gained him suspicion of atheism. Cavalcanti's friendship with Dante, one of the most interesting things about his life, took the delightful form of exchange of sonnets; and to it we owe some of the most delicate work of both. He died in Florence in 1300.

Cavalcaselle, Giovanni Battista (käväl-kä'sel), an Italian historian, born in Legnano, Jan. 22, 1820. He became the literary associate of J. A. Crowe, with whom he produced the epoch-making "History of Painting in Italy" (1864-1871), the most complete work on the subject; "Early Flemish Painters" (1857-1872); "Life of Titian" (1877); and others. He died in November, 1897.

Cavalier, a horse-soldier; an armed horseman; a knight; the name given to the supporters of King Charles I., during the Great Civil War in England, from their gay dress and demeanor, as contrasted with the austerity of the Parliamentary party, who were styled Roundheads, from the mode in which the more puritanical of that body wore their hair closely cropped. In fortifications, a kind of interior bastion, several feet more elevated than the principal bastion of the fortress in which it is formed. The use of the Cavalier is twofold: it serves either to defilade the works from the fire of an enemy on an adjacent

height, or to command the trenches of the besiegers. Cavaliers are sometimes constructed in the gorges, or on the middle of the curtain, and their form is the semicircular; but when they are within the bastion they are now built with straight faces and flanks parallel to those of the work in which they are placed. French Cavaliers are works raised by besiegers on the glacis of a fortress, for the purpose of enabling them to direct a fire of musketry into the covered way.

Cavalier, Jean, a leader of the Camisards, or Protestants of Cevennes, when forced into rebellion against Louis XIV., by the persecutions of the Catholics, born in Cevennes, 1679. He defeated the best generals that came against him, and compelled Marshal de Villars to make a treaty with him. He was then taken into the King's service as colonel of a regiment; but being apprehensive that some design was formed against him, he entered into the service of England, and commanded, with his usual skill, a regiment of French refugees at the battle of Almanza, in Spain. He was afterward appointed Governor of Guernsey and Jersey, where he spent the remainder of his days. The marvelous defense of the Cevennes against the best regular troops of France has been often cited as a proof of the great deeds which may be done by bodies of riflemen voluntarily enrolled, and acting on their own soil. He died in 1740.

Cavalieri, Emilio del (käväl-yä'rē), an Italian musician, born about 1550. He was a Roman nobleman and a pioneer in musical composition, having probably written the first oratorio and the first work akin to the modern opera. His compositions were "Soul and Body," "Phileas's Despair," etc. He died in Florence about 1599.

Cavalieri, Francesco Bonaventura (käväl-yä'rē), an Italian mathematician, born in Milan, 1589. He studied at Pisa, and in 1629 became professor at Bologna. He originated the theory that a geometrical line consists of an infinite number of points; a plane, of an infinite number of lines, and a cube, of an infinite number of planes. He wrote, in Latin, "New Geometry" (1635); "Plane and Spherical Trigonometry" (1635); "Planetary Movements" (1640); and "Geometrical Exercises" (1647). He died in Bologna, Dec. 3, 1647.

Cavaliere Servente, a gallant.

Cavalli, Pietro Francesco (käväl'ē), an Italian composer, born in Crema, about 1600. He began to write operas in 1637, and continued to produce them for 32 years. Among his works are "Xerxes," "Jason," and "Hercules in Love." He is now believed to be the inventor of the "Da Capo."

which was generally attributed to Searlatti. He died in Venice, Jan. 14, 1676.

Cavallo, Tiberius, an Italian physicist and inventor, born in Naples, 1749; early removed to England, where he published, in 1775, a notice of "Extraordinary Electricity Observed at Islington." He invented several ingenious instruments for electrical and chemical experiments. His apparatus for measuring the force and quantity of electricity is remarkably delicate and accurate. In 1779 he was admitted to the Royal Society. His study of the influence of air and light on plant-development was brilliantly original, and paved the way for valuable discoveries in organic life. He wrote "A Treatise on the Nature and Properties of Air, etc." (1781); "Medical Electricity" (1780); "Complete Treatise on Electricity" (1786); "Treatise on Magnetism in Theory and Practice" (1787); "Elements of Natural and Experimental Philosophy" (1803); and other scientific works. He died in 1809.

Cavalotti, Felice (kä-väl-öt'tē), an Italian statesman, born in Milan, Nov. 6, 1842. He fought under Garibaldi and gained celebrity; was a political journalist. Elected to the Italian Parliament (1868), he opposed Crispi and became an extreme Republican. He also wrote successful plays, including "Alcibiades." He fought 32 duels, in the last of which he was killed in Rome, March 6, 1898.

Cavalry, one of the three great classes of troops. The efficacy of cavalry arises partly from the moral impression which it produces on an enemy. This is greater in proportion to the size of the mass and the rapidity of its motion. Its adaptation to speedy movements is a more obvious advantage, which enables a commander to avail himself immediately of a decisive moment, when the enemy exposes a weak point, or when disorder appears in his ranks. It is a very important instrument in completing the defeat of an enemy, in disconcerting him by a sudden attack, or overthrowing him by a powerful shock. It is very serviceable in protecting the wings and center of an army, for escorts, for intercepting the supplies of the enemy, for procuring intelligence, for covering a retreat, for foraging, etc. But in forests, in mountainous districts, on a marshy soil, etc., it is of but little avail in large bodies. The heavy cavalry, with or without defensive armor (cuirassiers), is more frequently employed in mass, where force is requisite; the lighter troops are used singly, and in small detachments, where swiftness and continued effort are required. Nevertheless, all forms of cavalry must be equally exercised in the duties appertaining to this kind of troops, and must be able to fight in the line as well as singly.

The use of cavalry is probably nearly as ancient as war itself; but some nations used chariots in war before they became accustomed to fight on horseback. The Egyptians are said to have had cavalry before the time of Moses. The Israelites, when at war with their neighbors, often had to encounter cavalry, but had none themselves till the time of Solomon. The cavalry of the Greeks formed a comparatively small force, but with them it was considered the most respectable class of troops, in which only the wealthy citizens served. The Persian cavalry, and, at a later period, the Macedonian, were much more numerous. The Romans had cavalry at an early period, as had also the Carthaginians. At a later period the cavalry of the Gauls was particularly good. In the Middle Ages the knights fought only on horseback, and disdained the foot-service. After the introduction of artillery, although cavalry was used, its maneuvers were awkward and inefficient. The genius of Gustavus Adolphus first perceived the important use which could be made of it, finding that its value chiefly consisted in the quickness of its motion, and Seidlitz, a general of Frederick the Great, further developed its use. Napoleon was aware of the great value of cavalry in large masses, but he often sacrificed them unsparingly. Lances are now common among the light cavalry of Europe, as they have proved a formidable weapon when skillfully used. In the Prussian cavalry, which are among the finest in the world, lancers are very numerous. The services of the Uhlans in the Franco-Prussian War are hardly to be overestimated. Mounted infantry, whose horses are only used as a means of rapid movement, have been found an exceedingly useful class of troops.

The British cavalry is classified as heavy, medium, and light. The heavy cavalry comprises five regiments, namely, the 1st and 2d Life Guards, the Royal Horse Guards, the 1st Royal Dragoons, and the 2d Dragoons or Scots Greys. The medium cavalry includes the 6th Inniskilling Dragoons, and 12 regiments of Dragoon Guards and Lancers; and 13 regiments of Hussars constitute the light cavalry. Each of the 31 regiments is divided into four squadrons. German cavalry includes cuirassiers, lancers, and dragoons and hussars, corresponding roughly with the heavy, medium, and light sections of British cavalry; and in addition to four active squadrons, there is in each regiment a fifth dépôt squadron. The same division of the regiment is observed in France, where the cavalry is classified as cuirassiers, dragoons, chasseurs, and hussars. In Austria the cavalry are all medium, and are divided into dragoons, hussars, and lancers, each regiment being in turn subdivided into six active and one dépôt squadron. The Rus-

sian regular cavalry comprises cavalry of the guard and cavalry of the line, the latter being more of the nature of mounted infantry. The cavalry of the guard includes cuirassiers, lancers, hussars, and dragoons. There are also regiments of Cossacks employed as a sort of irregular cavalry. Each regiment of the regular cavalry includes seven squadrons, of which one acts as a *depôt* squadron. The staff of a British cavalry regiment includes a lieutenant-colonel, senior major, adjutant, riding-master, quartermaster, veterinary surgeon, two warrant officers, and eight non-commissioned officers. Each squadron is under a major and a captain, or two captains. A cavalry brigade for purposes of exploration, etc., consists of 3 regiments, 2 machine guns, 1½ company of the Army Service Corps, bearer company, and a field hospital, making in all 114 officers, 2,167 non-commissioned officers and men, and 2,219 horses. A cavalry division for forming part of an army corps comprises 2 brigades, with 2 batteries of the Royal Horse Artillery, 2 machine guns, a mounted detachment of engineers, a battalion of mounted infantry, an ammunition column, a company of the Army Service Corps, and a field hospital, making in all 325 officers, 6,274 non-commissioned officers and men, and 6,518 horses.

Cavalry are usually armed with straight swords or sabers, pistols, and carbines. In the United States army a cavalry regiment consists of six squadrons of two troops or companies, containing 63 men each. In 1904 there were 15 regiments of cavalry. A body of cavalry forms a part of the National Guard of the principal States, but smaller in number than a regular army regiment.

Cave, or **Cavern**, an opening produced by nature in the solid crust of the earth. Caves are principally met with in limestone rocks, in gypsum, sometimes in sandstone, and in volcanic rocks (basalt, lava, tufa, etc.). The form of the caves depends partly on the nature of the substance in which they exist; but it is frequently altered by external causes. Out of some caverns rivers take their course; others again admit rivers, or may be said to swallow them for a space. There are many and various causes for the formation of caves. Those in limestone and gypsum are unquestionably the results of the dissolving power of water; in fact the almost perfectly uniform direction, the gentle and equable declivity of most caves, appear to be the effect of the long continuance of water in them, the action of which has widened the existing crevices. In trachyte and lava, caves appear to have been produced by the effects of gas. The caves of gypsum often contain foul air; the caves of limestone, various figures of stalactites, produced by the deposit of the lime dissolved in the wa-

ter. Many of these lime caves contain remnants of bones of animals, such as hyenas, elephants, bears (see below). Many caves are remarkable only on account of their great size, or sublime from the awful gloom which pervades them, and the echoes which roll like thunder through their vaulted passages. Some are of great depth, as that of Frederikshall, in Norway, which is calculated to be 11,000 feet in depth.

One of the grandest natural caverns known is Fingal's Cave, in Staffa, one of the Western Islands of Scotland. Its sides are formed of ranges of basaltic columns, which are almost as regular as hewn stone. The grotto of Antiparos, on the island of the same name, in the Archipelago, is celebrated for its magnificence. The roof is adorned with stalactites, many of them 20 feet long, and hung with festoons of various forms and brilliant appearance. In some parts immense columns descend to the floor; others present the appearance of trees and brooks turned to marble. The Peak Cavern in Derbyshire, England, is a celebrated curiosity of this kind. It is nearly half a mile in length; and, at its lowest part, 600 feet below the surface. The caves of Kirkdale, in England, and Gailenreuth, in Germany, are remarkable for the quantities of bones of the elephant, rhinoceros, and hyena found in them. In the rock of Gibraltar there are a number of stalactitic caverns, of which the principal is St. Michael's Cave, 1,000 feet above the sea.

The most celebrated caverns in the United States are Madison's Cave, in Rockingham Co., Va., extending 300 feet into the earth, and adorned with beautiful incrustations of stalactites; Weyer's Cave, in the same county, extending 800 yards, but extremely irregular in its course and size; Luray Cave, in Page Co., Va.; and the Mammoth Cave in Edmondson Co., Ky., which incloses an extent of about 40 miles of subterraneous windings. One of its chambers, called the Temple, is said to cover a space of nearly 5 acres, and to be surmounted by a dome of solid rock 120 feet in height. The Cumberland mountains, in Tennessee, contain some curious caverns, in one of which, at a depth of 400 feet, a stream was found with a current sufficiently powerful to turn a mill. Another cave in the same State is named Big Bone Cave, from the bones of the mastodon which have there been discovered. In the Raccoon mountains, near the N. W. extremity of Georgia, is a cave called Nickojack Cave, 50 feet high and 100 feet wide, which has been explored to the distance of 3 miles. A stream of considerable size runs through it, which is interrupted by a fall. Caves are sometimes found which exhale poisonous vapors. The most remarkable known is the Grotto del Cane, a small cave near Naples. In

Cave

Iceland there are many caves, formed by the lava from its volcanoes. In the volcanic country near Rome there are many natural cavities of great extent and coolness, which are sometimes resorted to as a refuge from the heat. In South America is the cavern of Guacharo, which is said to extend for leagues.

Caves in which the bones of extinct animals are found owe their origin, for the most part, to the action of rain-water on limestone rocks, in which they most frequently occur. The deposit contained in these caverns usually consists of clay, sand, and gravel combined. In this deposit are imbedded remains of animals, and stones either angular or rounded. The bones scarcely ever occur in entire skeletons, but are scattered in such a way as to show that they must have been moved from their places subsequent to the death of the animals. They seldom, however, have suffered much from friction; and at times look so fresh that, but for the complete abstraction of the animal matter which they must have originally contained, they might be supposed to have been brought into the cavern a few weeks before. The most remarkable fact with regard to these bones is, that the most of them belong to animals which do not now exist at all, or exist only in regions far remote from those where caverns occur. Some of those found in European caverns belong to animals now found only in the tropical or sub-tropical regions, and others are the remains of animals now living in more northerly areas; while others, although evidently molded on types similar to those of existing animals, differ from them in several essential features.

It adds to the difficulty of explanation that human bones have repeatedly been found mingled with those of the lower animals. The evidence of the cave remains proves the coexistence of man with animals not now living in the same areas; of these animals some are now extinct, as the cave bear and lion, the mammoth and mastodon, the tichorhine rhinoceros, etc., others have only migrated. Thus the reindeer is no longer found in Southern Europe; the *Hyæna crocuta*, found in the Gibraltar caves, now lives in South Africa. The ibex, the chamois, and a species of ground squirrel, once lived in the Dordogne, but are now found only on the heights of the Alps and Pyrenees. Thus it is evident that a considerable change of climate has taken place in Europe. Man's relation to these extinct animals, and his existence at the time these changes took place, are demonstrated by the discovery in the caves of human bones and worked flints beneath layers of hyena droppings, as in Wokey's Hole, near Wells; mixed up indiscriminately, as in Kent's Hole, with bones of elephant, rhinoceros,

Cave Dwellers

hyæna, etc.; and by the fact that many bones of the extinct animals are split up, evidently for the sake of the marrow. In the Dordogne and Savigné caves fragments of horn have been found, bearing carved, or rather deeply scratched, outline figures of ibex, reindeer, and mammoth. The most remarkable bone caves are those of Kirkdale, in Yorkshire; Kent's Hole, near Torquay; Wokey's Hole, near Wells; of Franconia, in Bavaria; the banks of the Meuse, near Liége; and the S. of France.

Caveat (L., "let him beware"), in law, a process in a court to stop proceedings, as to prevent the enrollment of a decree in chancery in order to gain time to present a petition of appeal to the Lord-Chancellor. In the United States this name is given to a notice lodged in the patent-office by a person who wishes to patent an invention, but desires to be protected till he has perfected it. It stands good for a year.

Cave Dwellers, prehistoric men dwelling in caves, and cave-dwelling animals of corresponding periods; also cave-dwelling men of more recent historic times. Long before the dawn of authentic history, primitive races of men dwelt in large numbers in natural caverns, which were often shaped, enlarged, fortified, or furnished by the occupants. The ages in which the prehistoric cave dwellers lived are usually called the Paleolithic, or ancient stone age, and the Neolithic, or later stone age. Some of the caves have been found and explored in England, France, Belgium, Spain, America, and Australia; notably a famous cave known as Kent's Hole in Devonshire, Eng.; caves at Brixham and Perigord, and the Madeliene cave on the Vezere river, France. In the Neolithic age numerous human skeletons are found, but very few in the earlier age. It is believed that some of these human remains possibly antedate the glacial drift period of Europe. The remains found in the caves are ordinarily overlaid with deposits of varying thickness, and different qualities. In Kent's Hole near Torquay, there were found four distinct strata of deposits overlying the cavern floor, the surface layer dark earth containing Neolithic and Roman remains, the second layer a thin stalagmite floor, the third a stratum of red earth containing flint implements and bones of animals, and the lowest deposit constituting a hard breccia, in which human and animal remains of a ruder and earlier period were found.

From the remains found it is inferred that the climate of Europe, even as far S. as middle France, was as cold in that age as Lapland is now. The bones of the reindeer are found in large numbers, some of them showing that the flesh had probably been cooked. It is believed that this an-

imal was a chief article of food with the cave dwellers. Implements of flint and stone are mingled with the remains. Rude carvings on stone and ivory and on the antlers of animals have been found. Among the animals known to have dwelt in the caves with men, or to have been carried there for food, or to furnish their skins for clothing, are the cave bear and cave lion, the mammoth, musk ox, horse, dog, bison, rhinoceros, and hyena. In 1820 Dr. Buckland explored a cave at Kirkdale, in Yorkshire, Eng., and proved that it had been inhabited by great numbers of hyenas that had dragged into it many other animals. Among the remains found in Europe nothing has been shown to indicate that the cave dwellers domesticated any animals, or used them for anything but food and clothing. Needles of ivory are found, leading to the inference that they knew how to sew skins together for garments. No traces of agriculture, and no implements used in agriculture have been discovered. Lance heads, arrow heads, hammers, saws made of flint, and harpoons, have been found. The great number of fish bones found, showing marks of cookery, indicates that they engaged in fishing extensively, but the variety of bird remains indicates their inferior skill in catching or killing winged creatures. They probably had no spinning implements and did not know the art of pottery.

In the cave of Cro-Magnon in the S. of France skeletons were found that are accepted by paleontologists as those of genuine cave men. Taking them as the type it is inferred that the Paleolithic cave dwellers were a tall, powerfully built race, with long narrow skulls, broad faces, and powerful jaws. Investigations in the Belgian caves seem to indicate that the cave men of that region were of much smaller stature, but with symmetrical, well-shaped bodies. The traces of the most ancient cave men found in Europe are believed to identify them ethnically with the Eskimo. The bone needles, harpoons, arrow and spear heads, and scrapers, are much like those of the Eskimo. The designs of their carvings also are much the same, as well as their habit of accumulating piles of bones around their dwellings, which they were accustomed to split for the marrow. The habitat of animals now common in the Arctic, where the Eskimo live, has shifted to the N., and their migration has been traced with the subsidence of climates, from Europe to the regions where the species that have survived now live. It is believed that the Eskimo in the same way is the descendant of the Paleolithic cave dweller, who has gradually receded to the N.

The caves belonging to the Neolithic age yield remains classified into three ages:

Neolithic (proper), bronze, and iron. They are widely distributed throughout Europe, and contain celts, flints, flakes, rude pottery, bones of the pig, dog, horse, sheep, and goat, with those of many wild animals still indigenous in Europe, and of some that are extinct, and many human skeletons. The latter show that the people populated the caves in great numbers. They were a race of short-statured people having common resemblances in various regions of Europe. They were in some regions cannibals, and slightly in advance of the Paleolithic races in the variety of their implements and occupations. Their gradual progress down to the dawn of history is shown by the substitution of bronze, and then of iron, in place of the stone of earlier ages for implements and weapons.

In America, caves with human remains have been investigated in Brazil, Ohio, Kentucky, Minnesota, Arizona, Colorado, Nevada, Utah, and California. There are remains that have been deposited within the period of authentic history. The conclusions drawn from cave remains, as to the antiquity of man, are subject to the doubts that beset all calculations as to the rate of deposit of geological strata and to the rapidity of changes in climates and zoölogical characteristics.

"Cavendish." See JONES, HENRY.

Cavendish, tobacco which has been softened and pressed into quadrangular cakes, so called from Thomas Cavendish, the Elizabethan circumnavigator.

Cavendish, Frederick Charles, Lord, second son of the Duke of Devonshire, an English statesman; born in Eastbourne, Nov. 30, 1836; was educated at Trinity College. He sat in Parliament as Liberal member for the N. division of the West Riding of Yorkshire from 1865 till the spring of 1882, when he succeeded Mr. Forster as chief secretary for Ireland. On the evening of May 6, he and Mr. Burke, an unpopular subordinate, were stabbed to death in the Phoenix Park. Eight months later, twenty "Irish Invincibles" were tried for the murder, and, Carey and two others having turned Queen's evidence, five of the rest were hanged, three sentenced to penal servitude for life, and the remaining nine to various terms of imprisonment. Carey himself disappeared; but in July news came from the Cape that he had been shot dead by an Irishman named O'Donnell on board an emigrant ship. O'Donnell was taken back to London and hanged.

Cavendish, George, an English biographer; born about 1500; became Wolsey's gentleman-usher at least as early as 1527. He remained in close attendance upon his

Cavendish

great master till the end (Nov. 28, 1530), after which he retired to his house at Glemsford, in Suffolk, where he lived quietly with his wife, a niece of Sir Thomas More, till the close of his own life in 1561 or 1562. His affection for the great cardinal was most devoted, and his "Life of Cardinal Wolsey" is one of the most interesting short biographies in the English language.

Cavendish, Henry, an English physicist and chemist; born in Nice, France, in 1731, the son of Lord Charles Cavendish and grandson of the second Duke of Devonshire. He devoted himself exclusively to science, and greatly contributed to the progress of chemistry, having discovered the peculiar properties of hydrogen, the composition of water, etc. He also wrote on electricity, and determined the mean density of the earth. He lived in great retirement, and though very wealthy his habits were extremely simple. His writings consist of treatises in the "Philosophical Transactions." He died in London in 1810.

Cavendish, Margaret (Duchess of Newcastle), an English writer; born in Essex, 1624(?). She wrote "Philosophical Fancies"; and a collection of poems, "The Pastime and Recreation of the Queen of Fairies." She died in 1674.

Cavendish, or Candish, Thomas, an English circumnavigator in the reign of Elizabeth; born about 1555. Having collected three small vessels for the purpose of making a predatory voyage to the Spanish colonies, he sailed from Plymouth in 1586, took and destroyed many vessels, ravaged the coasts of Chile, Peru, and New Spain, and returned by the Cape of Good Hope, having circumnavigated the globe in 2 years and 49 days, the shortest period in which it had then been effected. In 1591 he set sail on a similar expedition, during which he died, in 1592.

Cavendish, William, Duke of Newcastle; born in 1592. Son of Sir Charles Cavendish, he was made Earl of Newcastle by Charles I. On the approach of hostilities between the crown and Parliament he embraced the royal cause, and was invested with a commission constituting him general of all his majesty's forces raised N. of the Trent, with very ample powers. Through great exertions and the expenditure of large sums from his private fortune he levied a considerable army, with which, for some time, he maintained the King's cause in the N. When the royal cause became hopeless he retired to Holland. He returned after an absence of 18 years, and was rewarded for his services and sufferings with the dignity of duke. He was the author of several mediocre poems and plays,

Cavo Relievo

and a treatise on horsemanship. He died in 1676.

Cavendish, William, first Duke of Devonshire, a British statesman and patriot; was born in 1640. On various occasions he distinguished himself by his spirit and valor, and in 1677 began that opposition to the arbitrary measures of the ministers of Charles II. which caused him to be regarded as one of the most determined friends of the liberties of his country. He took an active part in promoting the Revolution, and was one of the first who declared for the Prince of Orange. His services were rewarded with the dignity of duke. He died in 1707.

Cavery, or Cauvery, a river of Southern India, which, after a winding S. E. course of about 470 miles, falls into the Bay of Bengal by numerous mouths. It is known to devout Hindus as the Ganges of the South, and is largely utilized for irrigation purposes.

Caverypauk, a town, Hindustan, North Arcot district, Madras presidency, where Clive gained a victory over the French in 1752.

Cave Temple, a cave used as a temple, but the name is especially applied to temples excavated in the solid rock, such as exist in considerable numbers in India.

Caviare, a prepared article of food consisting of the salted roes of several kinds of large fish, chiefly of the common sturgeon, *Accipenser Sturio*. It is prepared chiefly in Russia, where it is greatly esteemed as food. It is used also in Italy and France. The species of sturgeon from the roe of which chiefly it is prepared inhabit the Caspian and Black Seas and their tributary rivers.

Cavite (kā-vē-tā'), a small seaport of Luzon, Philippine Islands; about 11 miles S. W. of Manila and fronting directly on the bay; pop. (1903) 4,494. The town dates almost from the first occupation of the Spaniards and was elaborately fortified with docks and arsenals in the 18th century. Subsequently these works were permitted to decay and Cavité became a place of minor importance. On May 1, 1898, Admiral Dewey won his great victory over Admiral Montojo off Cavité. The Americans immediately occupied the arsenal, and upon the arrival of American troops Cavité was fortified and made a naval and military base. The town gives its name to a province; pop. (1903) 134,779.

Cavo Relievo, an Egyptian style of sculpture, in which the higher relief is only on a level with the plane of the stone, the rounded sides of the figures being cut into the material.

Cavour, Conte Camillo Benso di (kä-vör'), an Italian statesman, born in Turin, Aug. 10, 1810; was educated in the military academy at Turin, and after completing his studies he made a journey to England, where he remained for several years, making himself acquainted with the principles and working of the British constitution, and forming friendships with some of the



CONTE DI CAVOUR.

most distinguished men. He became a member of the Sardinian Chamber of Deputies in 1849, and the following year minister of commerce and agriculture. In 1852 he became premier, and not long afterward took an active part in cementing an alliance with Great Britain and France, and making common cause with these powers against Russia during the Crimean War. The attitude, however, thus taken by Sardinia could not fail to prove offensive to Austria. A collision, therefore, was inevitable, resulting in the campaign of 1859. The intimate connection formed at that time with France, who lent her powerful assistance in the prosecution of the war, was mainly due to the agency of Cavour, who was accused by some on this occasion of having purchased the assistance of Napoleon III. by unduly countenancing his ambitious projects. In 1860 Garibaldi's expedition to Sicily took place; but toward this and the subsequent movements of the Italian liberator Count Cavour was forced to maintain an apparent coldness. He lived to see the meeting of the first Italian Parliament, which decreed Victor Emmanuel king of Italy. He died June 6, 1861.

Cavy, a genus of South American rodents. It includes the guinea pig (*Cavia cobaya*). All have a short tail, or none at all, and bear a slight resemblance to a pig.

Cawdor, a village in Nairnshire, Scotland, $5\frac{1}{2}$ miles S. W. of Nairn. Cawdor Castle, near by, the seat of the Earl of Cawdor, was founded in 1454, but is one of the three places which tradition has assigned as the scene of King Duncan's murder by Macbeth in 1040. A series of papers from the charter-room at Cawdor was edited by Cosmos Innes under the title of "The Book of the Thanes of Cawdor" (1859).

Cawein, Madison Julius (kaw'en), an American poet, born in Louisville, Ky., March 23, 1865. Among his works are: "Blooms of the Berry," (1887); "The Triumph of Music," (1888); "Lyrics and Idyls," (1890); "Days and Dreams," "Moods and Memories," "Intimations of the Beautiful," "Accolon of Gaul," "Poems of Nature and Love," "Red Leaves and Roses," and "Undertones."

Cawnpur (ör), a town of India, United Provinces, on the right bank of the Ganges, which is here about a mile wide, 130 miles N. W. from Allahabad, 628 miles N. W. of Calcutta, and 266 miles S. E. of Delhi. It is a modern town with nothing specially noteworthy about it as regards site or buildings. It has manufactures of leather and cotton goods and a large trade. Including the native city, cantonments and civil station, it had in 1901 a pop. of about 197,000.

In 1857 the native regiments stationed here mutinied and marched off, placing themselves under the command of the Rajah of Bithoor, the notorious Nana Sahib. General Wheeler, the commander of the European forces, defended his position for some days with great gallantry, but, pressed by famine and loss of men, was at length induced to surrender to the rebels on condition of his party being allowed to quit the place uninjured. This was agreed to; but after the European troops, with the women and children, had been embarked in boats on the Ganges, they were treacherously fired on by the rebels; many were killed, and the remainder conveyed back to the city, where the men were massacred and the women and children placed in confinement. The approach of General Havelock to Cawnpur roused the brutal instincts of the Nana, and he ordered his hapless prisoners to be slaughtered, and their bodies to be thrown into a well. The following day he was obliged, by the victorious progress of Havelock, to retreat to Bithoor. A memorial has since been erected over the scene of his atrocities, and fine public gardens now surround the well.

Caxamarca, or Cajamarca (kä-hä-mär'-kä), a department and town of Peru; area of department about 14,200 square miles; pop. (1896) 442,412. The town is situated about 70 miles from the Pacific Ocean, 280 N. of Lima. Pop. 18,400. It was the scene of the imprisonment and murder of Atahualpa, the last of the Incas.

Caxias (kä-hē-as) (1), a town of Brazil, in the State of Maranhao, on the navigable Itapicuru, 190 miles from its mouth, with an active trade in cotton. Pop. 10,000. (2) an Italian agricultural colony in the Brazilian State of Rio Grande do Sul, founded in 1875. Pop. 13,680.

Caxton

Caxton, William, an English printer and scholar, born in the Weald of Kent, 1422(?). His "Recuyell (collection) of the Histories of Troy," translated by him from the French, appears to have been printed in 1474, most probably at Bruges in Belgium. It was the first book in English reproduced by typography. He set up a printing-office in Westminster, 1477; and on Nov. 18 of that year issued "The Dictes and Sayings of the Philosophers," folio, a work ever memorable as the first book printed in England—only 420 years ago! He printed in all 71 separate works, very many of them translated by him from the French; his translations even of Latin classic authors were made, not directly from the original language, but from French versions. He died in 1491.

Cayenne (kī-yen'), a fortified seaport, capital of French Guiana, on an island at the mouth of a river of the same name. A new town is connected with the older portion by the Place d'Armes, bordered with orange trees. The harbor is the best on the coast, but insecure and shallow. Cayenne, though it is the entrepôt of all the trade of the colony, is chiefly known as a great French penal settlement (since 1852). The climate is extremely unwholesome for Europeans, large numbers of the convicts having been carried off by various malignant fevers. The French took possession of the island in 1604, and again, after it had been held by the English and Dutch, in 1677. The name of the capital is sometimes used for the whole of French Guiana. Pop. 12,700.

Cayenne Pepper, or **Capsicum**, the name given to the powder formed of the dried and ground fruits, and more especially the seeds, of various species of *Capsicum*, and especially of *C. frutescens*. It is employed as a condiment to improve the flavor of food, aid digestion, and prevent flatulence. In medicine it is used as a stimulant, and is a valuable gargle for a relaxed throat. See CAPSICUM.

Cayes, or **Aux Cayes** (kī), a seaport of Haiti, on the S. W. coast, 95 miles W. S. W. of Port-au-Prince. Pop. 25,000.

Cayley, Arthur, an English mathematician, born in Richmond, Surrey Co., England, Aug. 16, 1821; was educated at King's College, London, and Trinity College, Cambridge; called to the bar at Lincoln's Inn in 1849. In 1863 he was elected first Sadlerian Professor of Pure Mathematics at Cambridge, and in 1875 to a fellowship of Trinity College. He has received honorary degrees from Oxford, Dublin, and Leyden. He was president of the Royal Astronomical Society (1872-1873), and of the British Association at

Cayvan

its Southport meeting in 1883, where his address on the ultimate possibilities of mathematics attracted much attention. In 1882 he gave a course of mathematical lectures at the Johns Hopkins University, Baltimore, and in the same year received the Copley medal of the Royal Society. His chief book is an "Elementary Treatise on Elliptic Functions" (1876); an edition of his "Mathematical Papers" was begun in 1889. He died Jan. 26, 1895.

Caylus, Anne Claude Philippe de Tumbieres, Count, a French archæologist, born in Paris, 1692. After having served in the army, he traveled extensively in Europe and the E. He left numerous works, tales as well as antiquarian researches. Among the latter is his "Recueil d'Antiquités Egyptiennes" (Paris, 1752-1767, seven volumes). Caylus was also an industrious and skillful engraver, after the first masters. His mother, Marquise de Caylus (1673-1729), niece of Madame de Maintenon, made herself known by a spirited little work, "Mes Souvenirs." He died in 1765.

Cayman Islands, three islands situated about 140 miles N. W. of Jamaica, of which they are dependencies. Grand Cayman, the largest and the only one inhabited, is 20 miles long and from 7 to 10 broad, and has two towns or villages. The inhabitants, about 2,500 in number, partly descendants of the buccaneers, are chiefly employed in catching turtle. The other two islands are Little Cayman and Cayman Brac.

Cayuga Indians, a tribe of Indians dwelling in New York State, one of those forming the Six Nations. They lived around Cayuga Lake, where less than 200 of them remain. They are of Iroquois stock.

Cayuga Lake, a lake of Central New York, noted for the picturesque scenery of its surroundings. It is a resort for tourists, navigable for small vessels; 38 miles long.

Cayuse, or **Willetpoo**, a tribe of North American Indians who formerly inhabited the region between the Des Chutes river and the Blue Mountains, Oregon, and also parts of Washington, S. of the Yakima river. There are now only about 415 persons, presumably of Cayuse blood, on the Umatilla reservation.

Cayvan, Georgia, an American actress, born in Bath, Me., in 1858. She went on the stage early in life and won note as Dolly Dutton in "Hazel Kirke." She was afterward with A. M. Palmer and Daniel Frohman. She became leading lady of the Lyceum Theater Stock Company in 1897. She died Nov. 19, 1906.

Cazauran, Augustus R. (kaz'or-an), a Franco-American author and playwright, born in Bordeaux, France, Oct. 31, 1820; educated at the University of Dublin. In 1848 he became implicated in an Irish rebellion, fled to the United States, and obtained employment as a reporter. During the Crimean War he acted as war correspondent to a London daily. Afterward he was connected with the Cincinnati "Enquirer," and became chief editor of the Memphis "Argus." When Lincoln was shot he was at the theater as dramatic critic, and wrote the first account of the assassination. In 1869 he went to New York, did dramatic work, and gathered about him a remarkable company of artists. He adapted "Miss Multon," "The Danicheffs," "Man of Success," "The Mother's Secret," "Lillian's Lost Love," "The Banker's Daughter," "The Celebrated Case," "Lost Children," "French Flats," "Mother and Son," "Felicia," "The Creole," "Daniel Rochat," "A Parisian Romance," and "The Ranzar." He died in New York, Jan. 27, 1889.

Cazembe's Dominion (kā-zem'bē), a native State of Central South Africa, between the rivers Luapula and Lualaba, W. of Lake Bangweolo, and now included in the Kongo Free State. It is a land of forest-covered sandstone ridges and grass plains, intersected by streams flowing northward. The country is vassal to the Muata Yamvo, the hereditary chief of Ulunda. Cassava, maize, sorghum, and cotton are cultivated.

Cazotte, Jacques (kā-zot), a French poet, born in Dijon in 1720. His masterpieces are: "Oliver" (1762), a poem of chivalry after the manner of Ariosto; and "The Devil in Love" (1772), a tale of wonder which is still a popular favorite. He had extraordinary skill in versifying, as shown by his adding a seventh canto to Voltaire's "Civil War of Geneva" with such perfect imitation of Voltaire's style and manner as to deceive all Paris. He died Sept. 25, 1792.

Ceara (thā-ä-rä'), a State of Brazil, on the N. coast, with an area of 40,253 square miles, and pop. (1900) 849,127. The interior presents a succession of wooded hills and wide plateaus; cattle-raising is an important industry; cotton, coffee, and sugar are largely grown; and iron and gold are found. The capital, Ceará, had formerly only an open roadstead, but extensive harbor improvements, with breakwater and viaduct, have been provided. It is the terminus of a railway to Baturité and has a large trade. Pop. (1906) 33,000.

Cebes (sē'bēz), a Theban, disciple and friend of Socrates, and reputed author of

the "Pinax," or "votive tablet," a philosophical dialogue representing allegorically the temptations of this life and teaching that true learning can alone make for happiness. In spite of its pure Attic, and its truly Socratic tendency, modern criticism now assigns the work to the 2d century A. D. It was extremely popular in the Middle Ages, a sort of "Pilgrim's Progress" indeed; was translated into all the languages of Europe, as well as Arabic, which latter version, made possibly in the 9th century, is our sole record of the close of the dialogue.

Cebu (thā-bō'), one of the Philippine Islands, between Luzon and Mindanao, 135 miles long, with an extreme width of 30 miles. Sugar cultivation and the manufacture of abaca are the chief industries. Pop. (1903) 653,727. The town of Cebu, on the E. coast of the island, the oldest Spanish settlement in the Philippines, is a place of considerable trade, and has a cathedral and several churches. It is about 360 miles from Manila and has a population of 31,079. There are valuable and extensive coal deposits near the town. The China Steam Navigation Co. began in 1900 to run a regular steamer from Hong Kong to the port of Cebu. Hemp was exported from the island in 1899 to the value of \$3,151,910; sugar, \$770,503; copra, \$241,953. The total shipments exceeded by \$1,456,000 those of 1898. Imports in 1899 were valued at \$1,055,286.

Cebus, a genus of American monkeys, characterized by a round head and short muzzle, a facial angle of about 60°, long thumbs, and a long, prehensile tail, entirely covered with hair. The species are numerous, all of a very lively disposition and gregarious habits, living in trees. They feed chiefly on fruits, but also on insects, worms, and mollusks. They are included under the popular designation of Sapajou in its wider sense, and some of them are the monkeys to which this name is sometimes more strictly appropriated. *C. fatuellus*, which ranges from Paraguay to Guiana, and *C. capucinus*, Guiana, Venezuela, and Peru, are common in menageries.

Cecco d'Ascoli (chek'ō- dās-kō'lē), properly Francesco Stabili, an Italian poet, born in Ascoli about 1257. He was a devoted student of astrology and of demonology. For the expression and defense of certain erroneous opinions he was burned at the stake. His heretical or impious doctrines are contained in a poem, unfinished but of encyclopædic compass, "Bitternesses," of which he lived to complete four books. The subject of the first book was astronomy with meteorology; of the second, stellar influence with physiognomy; of the third, minerals; of the fourth, sun-

Cech

dry problems, moral and physical. He died in Florence, Sept. 16, 1327.

Cech, Svatopluk (chech), a Czech writer, born at Ostredek, Feb. 21, 1846. He was editor in succession of several journals, and at the same time practiced law. After winning some celebrity as a writer of stories and short poems, he made a bolder flight in 1872 with "Dreams," in which he shows great epic power. Besides "Dreams," he has written several other poems, as "The Adamites"; "The Storm"; "Songs of Morning." He is the most popular of Czech poets. As a novelist he excels in lively wit and rich humor. Among his works of prose fiction may be named: "Stories, Arabesques, and Humoresques," and the most amusing "Candidate for Immortality." He wrote also (1885) "Memories from the Orient," fruit of his travels.

Cecidomyia, a genus of two-winged flies, *Diptera*, of the family *Tipulidæ*, having the wings resting horizontally with three longitudinal nervures; head hemispherical; antennæ as long as the body, and generally 24-jointed, the joints hairy (in females 14-jointed); the two basal joints short, legs long; basal joint of tarsi very short, second long. Stephens enumerates 26 species, all of which are of small size. *C. tritici*, the Wheat-fly, is well known from its attacks on wheat.

Cecil, Robert (ses'il), Earl of Salisbury, an English statesman, second son of William Cecil, Lord Burleigh, born about 1563. He was of a weak constitution, on which account he was educated at home till his removal to the University of Cambridge. Having received the honor of knighthood he went to France as assistant to the English ambassador. On the death of Sir Francis Walsingham he succeeded him as principal secretary, and continued to be a confidential minister of Queen Elizabeth to the end of her reign. Having secretly supported the interests of James I. previous to his accession to the crown he was continued in office under the new sovereign and raised to the peerage. In 1603 he was created a baron, in 1604 Viscount Cranbourn, and in 1605 Earl of Salisbury. In 1608 Lord Salisbury was made Lord High-Treasurer, an office which he held till his death, in 1612.

Cecil, William, Lord Burleigh. See BURLEIGH.

Cecilia, St. There are several saints of this name in the Roman Catholic Church. The most celebrated is the patron saint of music, who has been falsely regarded as the inventress of the organ, and who is said to have suffered martyrdom A. D. 230, although other dates are given. Her pagan parents, says the legend, betrothed her, contrary to her wishes, to Valerian, a young pagan. But she had internally vowed to

Cecropia

the Lord a perpetual virginity; and while the instruments sounded she sang in her heart to the Lord, that is, she prayed — "O Lord, allow my heart and my body to remain unpolluted." As soon as the bridegroom appeared she forbade his approach, assuring him that an angel of the Lord protected her innocence. The unbelieving Valerian wished to convince himself of this assertion; she referred him to the Bishop Urban, who was concealed among the tombs of the martyrs, and who instructed him in the Christian religion and baptized him. When he returned to the bride he saw the protecting angel. Valerian now induced his brother Tubirtus to embrace the Christian faith.

The Roman prefect Almachius caused both of the brothers to be beheaded as professors of Christianity. Life was to be given to Cecilia if she would sacrifice to the heathen gods; but she remained firm in her belief. On this the tyrant caused her to be shut up in a bath of boiling water, in which she was found the day after unhurt. The executioner was then directed to behead her; he inflicted three blows, but was not able to separate the head from the body. She lived for three days, exhorting the faithful and giving alms to the poor.

As early as the 5th century we find a church in Rome dedicated to her. Pope Paschalis, who was very anxious to gather relics, endeavored to discover her body. She appeared to him, as he relates in his letters, while he was sleeping, and pointed out the place of her sepulcher. Paschalis caused the body to be disinterred in 821, and placed it in the church which he rebuilt, where her monument is still to be seen. How Cecelia came to be the patron saint of music is not agreed. The various opinions, however, seem to be united in this point, that it was either through a misunderstanding, or through an allegorical interpretation of the words above cited from her legend. Her worship in this character is very ancient. Her story forms one of Chaucer's "Canterbury Tales," and Dryden in his "Alexander's Feast," and Pope in his ode for music on St. Cecelia's Day have sung her praises. Raphael, Domenichino, Dolce, and Mignard, have represented her in celebrated paintings. In the picture of Raphael she appears as the personification of heavenly devotion.

Cecropia, a genus of large-leaved, soft-wooded milky trees, natives of tropical South America, and belonging to the order of *Artocarpads*. More than 25 species are known. *C. peltata*, the trumpet tree of the West Indies, is so called from its hollow branches being used for musical instruments, especially a species of drum called by the native Indians amboobus. It grows very rapidly and attains a height of upward of 50 feet. The wood is very light and is

Cecropia Moth

commonly used in the West Indies for making floats for fishing nets.

Cecropia Moth (*Platysamia cecropia*), the largest moth of the United States. It belongs to the silk worm family, and its caterpillar spins a large cocoon from which a coarse silk may be prepared.

Cecrops, a mythical personage, who is said by Apollodorus to have been the first King of Attica. According to some authorities he was an Egyptian, who emigrated into Attica about 1580 B. C. He is said to have instructed the semi-barbarous inhabitants in the advantages of social life, of marriage, property, justice, and civil rights. To him is also attributed the erection of the first temples in the country, the institution of the court of Areopagus, and the distribution of the inhabitants of Attica into 12 local sections.

Cecrops, a genus of parasitic entomostromatic crustaceans, found on the gills of the tunny and turbot, and called by fishermen fish lice.

Cedar, a tree which forms large forests on the mountains of Syria and Asia Minor; the *Pinus C.* of Linnaeus, the *C. Libani* of some other botanists, while by others it is referred to the genus *Larix*, and by others again, along with the larch, to the genus *Abies*. It is an evergreen, grows to a great size, and is remarkable for its durability. Of the famous cedars of Lebanon comparatively few now remain, and the tree does not grow in any other part of Palestine. The most celebrated group is situated not far from the village of Tripoli, at an elevation of about 6,000 feet above the sea. The circumference of the 12 largest trees here varies from about 18 to 47 feet. Cedar timber was formerly much prized, but in modern times is not regarded as of much value, perhaps from the trees not being of sufficient age. Some fine cedars are met with in England. The name is given also to the deodar (*C. deodara*), which is indeed regarded by many botanists as a mere variety of the cedar of Lebanon, and which produces excellent timber. It is a native of India, and is a large and handsome tree, growing in the Himalayas to the height of 150 feet, with a circumference of 30. It has wide-spreading branches. The leaves are tufted or solitary, larger than those of the cedar of Lebanon and very numerous, of a dark-bluish green, and covered with a glaucous bloom. The cones are rather larger than those of the Lebanon, and very resinous. The wood is well adapted for building purposes, being compact and very enduring. The deodar was introduced into Great Britain in 1822, and is now common in lawns and parks. The Mount Atlas cedar (*C. Atlantica*), as its name implies, is a native of the mountains of North Africa.

Cedar Mountain

This cedar, though differing in habit and minor features, is regarded by some botanists as specifically identical with the other two. The name is also applied to many trees which have no relation to the true cedar, as the Bermuda cedar (*Juniperus bermudiana*, used for making pencils, the red or Virginian cedar (*J. virginiana*), the Honduras, or bastard Barbadoes cedar (*Cedrela odorata*), and the red cedar of Australia (*C. australis*).

Cedar Bird, a name given to the American wax-wing (*Ampelis americanus* or *Bombycilla carolinensis*), from its fondness for the berries of the red cedar. It is a handsome and sprightly bird, occurring throughout the whole of the United States, but has no song.

Cedar Creek, scene of a memorable battle between Union and Confederate armies in the American Civil War, at Alacken, Shenandoah Co., Va. On Oct. 19, 1864, at daylight, during Gen. Sheridan's absence, his army was surprised by the Confederates under Early, who turned the left flank and took the camps of the 8th and 19th corps, with 20 guns and some prisoners. Gen. Wright, in command of the Federals, retreated and reformed their line. Gen. Sheridan arriving 10 A. M., after a famous "ride," celebrated in T. B. Read's poem, repelled an assault, routing the Confederates, retaking what had been lost, capturing 30 guns and 2,000 prisoners. The cavalry pursued next day, and in the night Early retreated.

Cedar Lake, a lake of Canada, in the Saskatchewan district, a sort of expansion of the Saskatchewan river, receiving the waters of this large stream to pour them over the Grand Rapids into Lake Winnipeg. Between Grand Rapids and Cedar lake is another expansion, known as Cross lake. Cedar lake is nearly 30 miles long, and where widest 25 broad; area about 312 square miles. Its depth of water is sufficient for the largest craft, except on the N. W., where the quantity of alluvium brought down by the Saskatchewan is rapidly filling it up. Both the mainland and the islands are well wooded with balsam spruce, birch, poplar, tamarack, Banksian pine, and cedar, the last growing on its shores, particularly the N. W., and from its being somewhat rare in other parts of the country, giving it its name.

Cedar Mountain, an elevation in Culpeper Co., Va., where, in the American Civil War, on Aug. 9, 1862, Gen. Banks was defeated by a superior Confederate force under General Jackson, and retired for reinforcements from General Pope, with a loss of 1,400 killed and wounded, 400 prisoners, and many missing. The Confederates, who held the field two days and then

Cedar Mountains

fell back to meet Lee at Gordonsville, lost 1,314.

Cedar Mountains, a range in Cape Colony, South Africa, parallel with the Atlantic, and nearly half way between it and the dividing ridge of the country. They form the height of land between the Oliphant river on the W. and the Great Thorn, its principal tributary, on the E., varying in height from 1,600 to 5,000 feet.

Cedar Oil, an aromatic oil obtained from the red or Virginian cedar (*Juniperus virginiana*).

Cedar Rapids, a city in Linn county, Ia., on the Cedar river, and the Burlington, Cedar Rapids, and Northern, the Chicago and Northwestern, the Chicago, Milwaukee, and St. Paul, and the Illinois Central railroads; 79 miles S. W. of Dubuque. The city is regularly laid out and well built, and is the trade center of the surrounding country. It contains large pork-packing establishments, and the river supplies power for numerous manufactories and machine shops. It is the seat of the College of the Sacred Heart, and has electric lights and railways, waterworks, a high school, several churches, daily and weekly newspapers, public and Masonic libraries, four National banks, St. Luke's Hospital, and an assessed property valuation of \$15,000,000. The city is connected with the opposite bank of the river by a handsome bridge. Pop. (1890), 18,020; (1900) 26,656; (1910) 32,811.

Cedilla, a mark used under the letter c, especially in French (thus ç), to indicate that it is to be pronounced like the English s.

Cedrelaceæ, the mahogany family, a natural order of dicotyledonous plants, nearly allied to, if really separate from, the *Meliaceæ*. They are trees with alternate pinnate leaves and a woody capsular fruit. Different species yield mahogany, satinwood, yellow-wood, etc.

Cedrela, a genus of plants, the typical one of the order *Cedrelaceæ*. *C. odorata*, or Barbadoes Bastard-cedar, a native of South America, has wood of a brown color, very fragrant, and is imported under the name of Honduras, or Jamaica cedar. *C. Toona*, a native of Bengal, furnishes timber much like mahogany. The bark is very astringent, and has been found valuable in fevers, dysentery, etc. The flowers are used for producing a red dye. The bark of *C. febrifuga* is used against the intermittent fevers of Java.

Ceiling, a word which seems to have been suggested by the use of arched coverings for churches, and even for rooms, which prevailed in the Middle Ages, and was not unknown to the Romans. Arched

Celastraceæ

Ceilings among the Romans were known by the name *camera* or *camera*, the Greek origin of which seems to furnish an argument in favor of the view that the arch was known to the latter people. The *camera* was formed by semicircular beams of wood, at small distances from each other, over which was placed a coating of lath and plaster. In later times the *camera* were frequently lined with plates of glass, when they were termed *vitrea*. But the ceilings most common among the Romans were flat, the beams, as in modern times, having been at first visible, and afterward covered with planks and plaster. Sometimes hollow spaces were left between the planks, which were frequently covered with gold and ivory, or paintings. The oldest flat Ceiling in existence is believed to be that of Peterborough Cathedral, England, and one of the most noteworthy flat Ceilings in the United States is that of the First Presbyterian Church, Newark, N. J.

Celakovsky, Frantisek Ladislav (chel'-ä-kōv'skē), a Czech poet, born in Strakonitz, March 7, 1799. His earlier work was journalistic and pedagogical, his reputation in poesy dating from the appearance of "Slav Folk-Songs" (1822), to which succeeded various brilliant performances of a like nature: "Echo of Russian Folk-Songs" (1829), "Echo of Bohemian Folk-Songs" (1840), etc. He translated Herder and Scott into his own vernacular with felicitous results. He died in Prague, Aug. 5, 1852.

Celandine, a name given to two plants, the greater celandine and the lesser celandine; also called swallow-warts, because the plants were believed to flower when the swallow arrived, and to die when it departed. The former is *Chelidonium majus*, and the latter *Ficaria ranunculoides* or *Ranunculus Ficaria*. This latter is a favorite wild flower from its being one of the earliest plants to come into blossom, having petals of a fine golden yellow color. Its root consists of small, fleshy tubers. It is often called pilewort, being a reputed cure of piles. The greater celandine belongs to the poppy family; it is full of a yellow juice of a poisonous acrid nature.

Celano, Tommaso da (chā-lä-no), one of the reputed authors of the Latin hymn "Dies Iræ," born in Celano in the Abruzzi, about 1200. He was one of the most devoted adherents of St. Francis of Assisi, whose life he wrote. He died in Italy after 1250.

Celastraceæ, spindle-trees, a natural order of calycifloral polypetalous dicotyledons, classed by Lindley in his Rhamnal alliance. They are shrubs or small trees, and are widely spread. There are two sub-orders: (1) *Euonymæ*, fruit dry and cap-

sular; (2) *Elæodendracæ*, fruit drupaceous or cherry-like. They are all more or less acrid in their properties. They have a beautiful scarlet aril, which is derived from the sides of the opening in the seed. The wood of the European Spindle-tree is used in the manufacture of powder. There are 35 known genera and 280 species.

Celaya, a town in the Mexican State of Guanajuato, on the Rio Laja, about 150 miles N. W. of the city of Mexico; has several fine plazas, handsome churches, and manufactures of cotton and woolen cloths and saddlery. The burning of its bull-ring, on Easter Sunday, 1888, caused considerable loss of life. Pop. (1900) 25,565.

Celebes (sel'eb-ēz), one of the larger islands of the Indian Archipelago, between Borneo on the W. and the Moluccas on the E. It consists mainly of four large peninsulas stretching to the E. and S., and separated by three deep gulfs; total area, 71,470 square miles. No part of it is more than 70 miles from the sea. Celebes is mountainous chiefly in the center and the N., where there are several active volcanoes. It has also broad grassy plains and extensive forests. Gold is found in all the valleys of the N. peninsula, which abounds in sulphur. Copper occurs at various points, and in Macassar tin also. Diamonds and other precious stones are found. The island is entirely destitute of feline or canine animals, insectivora, the elephant, rhinoceros, and tapir (though these are found in Borneo), but it has the antelopean buffalo (*Anoa*), the spiral-tusked pig (*Babiroussa*), etc. Among domesticated animals are small but vigorous horses, buffaloes, goats, sheep, and pigs. Trepang and turtle are caught in abundance. Marsupical animals are represented by the cuscus, an opossum-like animal with a prehensile tail. Among the trees are the oak, teak, cedar, upas, bamboo, etc. Among cultivated plants are the coffee-tree, indigo, cacao, sugar-cane, manioc root, tobacco, etc.

The maritime districts are inhabited by Malays; the Peninsula of Macassar is occupied by Bugis and Macassars. Mandhars dwell in the W. of the island, and the mountainous regions in the interior, especially in the N., are inhabited by Alfories. The inhabitants may be classed into two groups: the Mohammedan semi-civilized tribes, and the pagans, who are more or less savages. The capital is Macassar, in the S. W. of the island. The trade in trepang is very important, Macassar being the chief staple place for this article of commerce. The three great languages of the island, not reckoning the dialects of the savage tribes, are those of the Bugis, the Macassars, and the Mandhars. The ancient Bugi is the language of science and religion. The Bugis have a considerable

body of literature. Celebes was first visited by the Portuguese in 1512, but no factory was established by them there till a few years later. In 1660 Macassar was taken by the Dutch, the southern portion of the island put under Dutch rule, and the Portuguese expelled. In 1683 the northern part likewise fell into their hands. The island was conquered by the British in 1811, but a few years later it was again given up to the Dutch, in whose possession it has remained ever since. Pop. estimated at (1901) 884,140.

Celeres, a body of cavalry traditionally stated to have been introduced by Romulus. They consisted of those among the citizens who were rich enough to furnish a horse. They are said to have been 300 in number, and to have been subdivided into three centuries, under the name of Ramnes, Titienses, and Luceres. It is said that the number of the centuries of the Celeres was raised to six by Tarquinius Priscus, and that this was the origin of the Equites or knights, who in after-times formed a separate class of citizens.

Celeriac, turnip-rooted celery, a variety of celery in which the root resembles a turnip and may weigh 3 or 4 pounds. It is not earthed up, but is grown upon the surface of the ground, and kept free from weeds by frequent hoeing.

Celery, the common English name of *Apium graveolens*, a species of parsley. The blanched leaf-stalk of the cultivated varieties is used extensively for salads, etc. In its native state the seeds and whole plant are acrid and poisonous, and over indulgence in the cultivated plant is said to induce urinary disorders. Celery is the basis of a nerve tonic much used in the United States.

Celeste, Madame (sel-est'), a French dancer, born in Paris, Aug. 6, 1814. A pupil at the Conservatoire, she early showed remarkable talent. She made her début in 1827 at New York, and during her residence in the United States married a Mr. Elliott. At Liverpool, in 1830, she played Fenella in "Masaniello"; in 1831-1833, she became extremely popular in London. Her second visit to the United States (1834-1837) is said to have brought her \$200,000. After her return she took part successively in the management of the Theater Royal, Liverpool, and the Adelphi and Lyceum in London. Her imperfect English long-confined her to non-speaking parts. She retired from the stage in 1874, and died at Paris, Feb. 12, 1882.

Celestial Empire, The, a popular name for the Chinese Empire, taken from the Chinese words "Tien Chao" (Heavenly Dynasty). Hence the name "Celestials," applied to natives of China.

Celestial Sphere, the background of sky on which we see all celestial objects projected. It is supposed to be of indefinite radius with the observer at the center. It is crossed by systems of imaginary circles which serve to fix positions upon its surface by means of spherical co-ordinates. See CO-ORDINATES.

Celestine, native sulphate of strontia, $\text{SrO} \cdot \text{SO}_3$. It occurs in prismatic or tabular crystals, belonging to the rhombic system. Specific gravity, 4. Its name refers to the sky-blue color sometimes presented by it. It is pretty widely distributed. By the action of nitric acid it is converted into nitrate of strontia, which is used for red-fire in pyrotechnics. It is called also Celestite.

Celestine I., or **Cælestinus**, a Pope and saint, succeeded Boniface I. in 422. He was engaged in disputes with the Nestorians at the instigation of Cyril, bishop of Alexandria, and condemned them in a council held at Rome 430. Died 432, and was succeeded by Sixtus III.

Celestine II., a Tuscan, succeeded Innocent II., and died five months after, 1144.

Celestine III., succeeded Clement III. in 1191, crowned the Emperor Henry VI., excommunicated Leopold, Duke of Austria, and died 1198.

Celestine IV., a Milanese, succeeded Gregory IX. in 1241, and died about three weeks after his election.

Celestine V. (Pietro di Monrone), a Benedictine monk, who founded the order of the Celestines. He was elected Pope in 1294, after an interregnum of six years. A few months after, he resigned his office and was succeeded by Boniface VIII., who confined him in the castle of Fumone, where he died. He was canonized in 1313 by Clement V.

Celestines, a monastic order instituted about 1254 by Pietro di Morone, afterward Pope Celestine V. Their first convent was at Morone, in the Apennines of Abruzzo. The order was a reform of that of St. Bernard. It became a very rich order both in France and Italy. In 1776-1778 it was suppressed by Pope Pius VI.

Celibacy, the state of being celibate or unmarried; specially applied to the voluntary life of abstinence from marriage followed by many religious devotees and by some orders of clergy, as those of the Roman Catholic Church. The ancient Egyptian priests preserved a rigid chastity; the priestesses of ancient Greece and Rome were pledged to perpetual virginity, and celibacy is the rule with the Buddhist priests of the East. Among Christians the earliest aspirants to the spiritual perfection supposed to be attainable through

celibacy were not ecclesiastics as such, but hermits and anchorites who aimed at superior sanctity. During the first three centuries the marriage of the clergy was freely permitted, but by the Council of Elvira (305) continence was enjoined on all who served at the altar. For centuries this subject led to many struggles in the church, but was finally settled by Gregory VII. positively forbidding the marriage of the clergy. The Council of Trent (1593) confirmed this rule. In the Greek Church celibacy is not compulsory on the ordinary clergy. Protestants hold that there is no moral superiority in celibacy over marriage, and that the church has no right to impose such an obligation on any class of her ministers.

Cell, a term of various applications: (1) the compartments of a honey-comb, (2) one of the small structures composing the substance of plants, generally indistinguishable by the naked eye, and each at least, for a time, being a whole complete in itself, being composed of solid, soft, and fluid layers, different in their chemical nature, and disposed concentrically from without inward. For the most part, a group of them is in close contact, and firmly united; they then form a cell tissue. Each cell fulfils its own definite part in the economy of the plant, and shows a variety in form corresponding to the different functions. By far the largest proportion of cells in the living succulent parts of plants are seen to be made up of three concentrically-disposed layers; first, an outer skin, firm and elastic, called the cell wall or cell membrane, consisting of a substance peculiar to itself. The second layer is soft and elastic, and always contains albuminous matter. And thirdly, the cavity inclosed by the protoplasm sac is filled with a watery fluid called cell sap.

(3) A term often applied to any small cavity but properly restricted to a microscopical anatomical element with a nucleus cell-wall and cell-contents when typically formed. The animal cell is ordinarily a closed sac, the environing membrane almost always consisting of a nitrogenous compound. The sac generally contains a liquid or semi-fluid protoplasm, in which are suspended molecules, granules, globules, or other very minute cells. Along with these are nuclei, which again contain nucleoli. Cells may be formed from a protoplasm existing without the cell or within other cells. Or they may be made within others by what has hence been called an endogenous method or by division or in other ways.

(4) The space between the two ribs of a vault, or the space inclosed within the walls of an ancient temple.

(5) A structure in a wrought-iron beam or girder; a tube consisting of four wrought-iron plates riveted to angle-iron at the corners.

(6) In electricity, a single jar, bath, or division of a compound containing a couple of plates, *e. g.*, copper and zinc, united to their opposite or to each other usually by a wire.

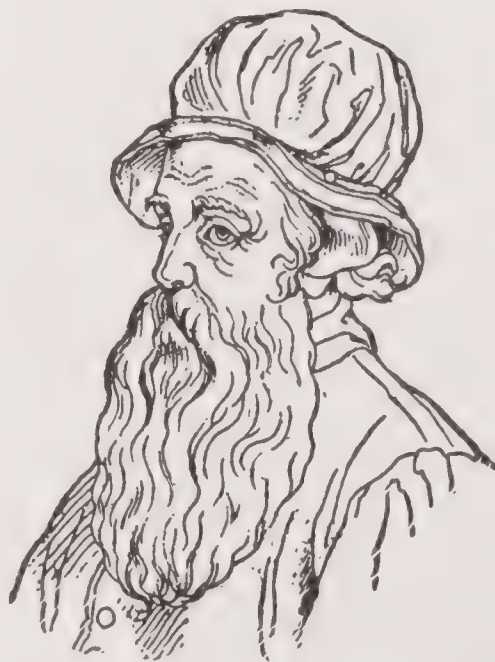
Celle, a town in Prussia, in the province of Hanover, landdrostei of Lüneburg; 23 miles N. E. of the town of Hanover. It stands in the midst of a sandy plain, at the confluence of the Fuse with the Aller, and on a railway communicating with Hanover and Hamburg. It is well built, contains a royal palace, with a fine chapel and a garden, in which a monument has been erected to Matilda, the sister of George III., the unhappy Queen of Denmark, who died here. On account of the Higher Court of Appeal which has existed there since 1711, Celle is sometimes called the Hanoverian Wetzlar. The manufactures consist chiefly of linen, flannel, hats, and tobacco. The British sovereigns are descended from one of the Dukes of Celle. Pop. (1900) 19,872.

Cellini, Benvenuto (chel-lē'nē), a Florentine sculptor, engraver, and goldsmith, born in 1500. Of a bold, honest, and open character, but vain and quarrelsome, he was often entangled in disputes which frequently cost his antagonists their lives. At the siege of Rome (if we believe his own account, given in his autobiography) he killed the Constable of Bourbon and the Prince of Orange. He was afterward imprisoned on the charge (probably false) of having stolen the jewels of the Papal crown, and with difficulty escaped execution. He then visited the court of Francis I. of France. He afterwards returned to Florence, and under the patronage of Cosmo de' Medici made a Perseus with the head of Medusa in bronze, which is still an ornament of one of the public squares; also a statue of Christ, in the chapel of the Pitti Palace, besides many excellent dies for coins and medals. His works may be divided into two classes. The first, for which he is most celebrated, comprises his smaller productions in metal, the embossed decorations of shields, cups, salvers, ornamented sword and dagger hilts, clasps, medals, and coins. The second includes his larger works as a sculptor, such as the Perseus mentioned above; a colossal Mars for a fountain at Fontainebleau; a marble Christ in the Escorial Palace; a life-size statue of Jupiter in silver, etc. His life, written by himself, is very racy and animated. He died in Florence in 1571.

Cellites, so called from the cells which they inhabited, an order of monks who arose at Antwerp in the 14th century. They

specially attended to the visitation of the sick and dying. They were sometimes called Lollards.

Cell Theory of Life, The, a speculation concerning the origin of organic existence. The late Professor Virchow, one of the greatest of German biologists, proved that each cell arises from a cell. He believed that the life of an organ is naught else than the sum of the lives of the single cells which are gathered together into it, and that the life of the whole organism is not an individual, but a collective function. He greatly elaborated his "cell" theory of life and believed that within the egg cell are contained those elements which determine both life and the body of the perfected organism. The human ovum, or egg, is about the 120th part of an inch in diameter. It is round and is enclosed by a tough and rather thick membrane. Within this is the protoplasm which contains the nucleus. These things can be actually seen under the microscope. The human egg, is in fact, a fully organized cell. Starting from this point science is striving to discover how it happens that this cell, when it develops more fully, should be able to divide into more cells, each having its own nucleus. The egg first splits into two cells, each containing a nucleus. Then the two become four and the four become eight, and so on, until the egg is a mass of cells. After a little three layers of cells are formed. The layers are called the ectoderm, mesoderm and entoderm. From the ecto-



BENVENUTO CELLINI.

derm develops the skin and all its structures, hair, nails, the cerebro-spinal system and nerves, and the organs of special sense. From the middle layer of cells come the muscles, bones, connective tissues, blood and blood vessels, and some other parts. From the inner layer is derived the whole lining of the digestive tract. This

scientist also draws an analogy between the cell and the bacteria of disease. Each is an independent living being. Professor Metschnikoff hopes to find a means to strengthen the cells in their fight against bacteria. Biologists are hampered in their investigations because modern microscopes will not distinguish the very minute structures they wish to examine, although the most powerful and the most perfect objective lenses ever made by man are now in use. The science of optics, as at present understood, says that investigators cannot hope to resolve lines closer together than the length of one-half a wave of light.

Cellular Tissue, a kind of tissue made of a number of separate cells of minute bags adherent together. These, when first formed, are usually nearly globular or egg-shaped, but afterward by pressure become flattened. It is often called parenchyma. Also a fibro-cellular connective or areolar tissue. It is found filling interstices between the various organs in man and the vertebrated animals.

Celluloid, an ivory-like compound, which can be molded, turned, or otherwise manufactured for various purposes for which, before its introduction, ivory and bone were employed. The process of manufacture is as follows: Paper, by immersion in sulphuric and nitric acids, is converted into nitrocellulose. This product, after washing and bleaching, is passed through a roller-mill, with the addition of a certain quantity of camphor. Celluloid softens at 176° F., when it can be molded into the most delicate forms, to become hard when cold. It is very inflammable, unless blended with some chemical having an opposite property. The word celluloid as applied in the United States to this compound is a legally registered trademark.

Cellulose, a substance of general occurrence, and constituting the basis of vegetable tissues. Its chemical formula is $C_{24}H_{21}O_{21}$ or $2(C_{12}H_{10}O_{10}) + HO$. It is in many respects allied to starch, and is changed into starch by the unaided action of heat, or by sulphuric acid, or caustic potash. Cellulose was long considered as peculiar to vegetable tissues, but it has been shown by Schmidt, Lowig, and others to exist in the tissues of ascidia and other molluscos animals. Pure cellulose is a ternary compound of carbon and the elements of water.

Corn pith cellulose is an American preparation used as a packing in warships to protect them from sinking when pierced by shot or shell. This packing is placed like a belt three feet in thickness, inside the steel hull along the water line. For several years a packing of cocoa fiber was employed, but after the discovery of corn

pith cellulose the Navy Department ordered that it should be used, and the "Kearsage," "Alabama," "Kentucky," and "Illinois" are thus protected. The great superiority of the corn pith lies in the fact that as soon as the water reaches it, it begins to swell and completely fills up the hole made by the shot, thus practically making the vessel as good as new. The great abundance of the material and its cheapness in the United States are also items to be considered. Experiments made with it in foreign countries have been successful.

Celma, a Thessalian lady, who, with her husband, Celmus, was changed into adamant for denying the immortality of Jupiter.

Celsius, the name of a Swedish family, several members of which attained celebrity in science and literature. The best known is Anders Celsius, born in 1701, died in 1744. After being appointed Professor of Astronomy at the University of Upsal he traveled in Germany, England, France, and Italy, and in 1736 he took part in the expedition of Maupertuis and others for the purpose of measuring a degree of the meridian in Lapland. He is best known as the constructor of the Centigrade thermometer.

Celsius Scale, another name for the Centigrade thermometric scale, from that of the inventor, Anders Celsius. See THERMOMETER.

Celsus, an Epicurean philosopher of the 2d century after Christ, who is usually said to have been the author of an attack on Christianity entitled, "Logos Alēthēs" (True Word), which is now lost, but is mostly preserved in the extracts contained in the more celebrated work "Contra Celsum," in which it was answered by Origen.

Celsus, Aurelius Cornelius, a Latin physician and author, who flourished probably in the reigns of Augustus and Tiberius, and is supposed to have practiced medicine at Rome. The only work of his that has come down to us, called "De Medicinā," and consisting of eight books, is considered the most precious book of its kind which the Romans have left us. Celsus was styled the Hippocrates of the Latins, and is universally admired for the purity of his language. Eighty editions of his "De Medicinā" have been published, and a good English translation by Dr. Grieve appeared in 1756.

Celt (Lat. *celtis*—a chisel, perhaps from being used by the Celts), the longitudinal and grooved instrument of mixed metal often found in Scotland, also a stone instrument of a wedgelike form found in barrows and other repositories of Celtic antiquarian remains. Though the primary

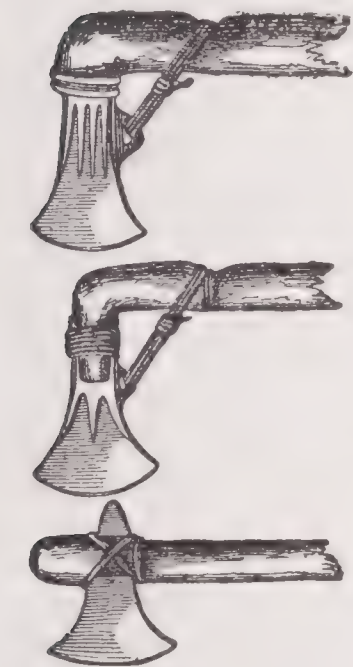
application of the word celt was to the metallic implement, yet the stone celt is believed by archæologists and geologists to be the older of the two.

Celtes, Konrad (tsel'tes), a celebrated German humanist, born in 1459. His most celebrated work is a volume of "Odes" (1513). He did much to promote the study of the classics, and wrote his own poems in Latin. He died in 1508.

Celtiberi, a people of ancient Spain, supposed to have arisen from a union of the aborigines, the Iberians, and their Celtic invaders. Various limits have been assigned to their country, which included probably all the N. of Spain as far S. as the sources of the Guadalquivir. Hannibal subdued the Celtiberi, and they afterward passed under the Roman yoke. They revolted 181 B. c., and were subdued by Tiberius Gracchus 179 B. c. Two struggles

for independence followed, called respectively the first Celtiberian Numantine, and the second Celtiberian or Sertorian wars, in the latter of which they were finally vanquished, and after 72 B. c. do not again appear in history.

Celts, the earliest Aryan settlers in Europe according to the common theory. They appear to have been driven westward by succeeding waves of Teutons, Slavonians, and others, but there are no means of fixing the periods at which any of these



CELTIC AXES.

movements took place. Herodotus mentions them as mixing with the Iberians who dwelt round the river Ebro in Spain. At the beginning of the historic period they were the predominant race in Great Britain, Ireland, France, Belgium, Switzerland, Northern Italy, Spain, and elsewhere. The Romans called them generally Galli, that is, Gauls or Gael. They appear to have reached the zenith of their power in the 2d and 3d centuries B. c. Some tribes of them, overrunning Greece, settled in a part of Asia Minor to which the name of Galatia was given. They finally went down before the resistless power of Rome, and either became absorbed with the conquering races or were cooped up in the extreme N. W. of Europe. At an early date the Celts divided into two great branches, speaking dialects widely differing from each other, but doubtless belonging to the

same stock. One of these branches is the Gadhelic or Gaelic, represented by the Highlanders of Scotland, the Celtic Irish, and the Manx; the other is the Cymric, represented by the Welsh, the inhabitants of Cornwall, and those of Brittany. The Cornish dialect is now extinct.

The sun seems to have been the principal object of worship among the Celts, and groves of oak and the remarkable circles of stone commonly called "Druidical Circles," their temples of worship. All the old Celts seem to have possessed a kind of literary order called Bards. The ancient Irish wrote in a rude alphabet called the Ogham; later they employed the Roman alphabet, or the Anglo-Saxon form of it. The chief literature existing consists of the hymns, martyrologies, annals, and laws of Ireland, written from the 9th to the 16th centuries. The Scottish Gaelic literature extant includes a collection of manuscript in the Advocates' Library, Edinburgh, some of which date from the 12th century; the "Book of the Dean of Lismore," 16th century; a number of songs from the 17th century to the present day; and the so-called poems of Ossian. The Welsh literary remains date from the 9th century, and consist of glossaries, grammars, annals, genealogies, histories, poems, prose tales, etc.

Cement, a substance with which two bodies are joined together. There are many varieties, according to the special needs of different trades. In building the principal are known as Portland and Roman. There are many places in the United States in which are found the ingredients necessary for the manufacture of the various cements described below, and many different varieties of the article are made. Where Portland cement is specified in a building contract the imported variety is meant.

Portland cement was patented in England by Joseph Aspdin in 1824. It is so called because it resembles in color Portland-stone. It is manufactured by calcining a mixture of clayed mud from the Thames with a proper portion of chalk. The calcined mass is then reduced to a fine powder, and intimately mixed with the addition of water. The resulting paste is molded into bricks, dried and burnt. The heat during the process of calcining must be a white heat, otherwise the carbonic acid and water may be expelled without the reaction between the lime and the clay necessary for the production of cement. The material is then assorted, all which has been too much or too little calcined being set aside and pulverized.

Roman cement is a name given to certain hydraulic mortars, varying considerably in their chemical composition, though physically possessing the same general character. Lime stone is calcined and mixed with

Cement

sand in various proportions. Any limestone containing from 15 to 20 per cent. of clay will, when properly prepared, form this cement. Calcine any ordinary clay and mix it with two-thirds its quantity of lime, grind to powder, and calcine again. The epithet Roman is improperly given, since the preparation was entirely unknown to the Romans.

Hydraulic cement is a kind of mortar used in building piers and walls under or exposed to water. There are many varieties, one of the best being composed of ground Portland stone, 62 parts; sand, 35, and litharge, 3.

The production of cement in the United States in 1909 was: Portland, 62,508,461 barrels, valued at \$50,510,385, and rock, 1,527,279 barrels, valued at \$623,141. Pennsylvania, Indiana, and Kansas led in the production of Portland cement, and New York, Indiana, Illinois, and Pennsylvania in rock cement.

Cemetery, a place of sepulture, in the United States, usually at a convenient distance from the centers of population. Cemeteries are generally the property of private corporations, or in rare cases are owned by municipal corporations. Lots are sold in them either in fee or are leased for a term of years. They are governed by boards of directors, who act in obedience to their by-laws, made in conformity with the statutes of the State in which they are located. They are usually under the jurisdiction of the department of public health of their respective commonwealths, and no interments or resurrections can take place without a legal permit from the proper officer. In England a permanent grave can be purchased in a cemetery, whereas it cannot be in a church-yard, by reason of the existence of a national Church.

Cenci, Beatrice (chen'chē), called the beautiful parricide, the daughter of Francesco Cenci, a noble and wealthy Roman, who, according to the common story, after his second marriage, behaved toward the children of his first marriage in the most shocking manner, procured the assassination of two of his sons, on their return from Spain, and debauched his youngest daughter Beatrice. She failed in an appeal for protection to the Pope, and planned and executed the murder of her father. She was beheaded in 1599 and the Cenci estates confiscated. She is the alleged subject of an admired painting by Guido, and is the heroine of one of Shelley's most powerful plays. Recent researches have deprived the story of most of its romantic elements, and have shown Beatrice to be a very commonplace criminal, whatever the evil deeds of her father may have been. Her step-mother and brother, who were equally

Censer

guilty with her, were also executed. The portrait by Guido is now believed not to represent her at all.

Cenis (se-nē') a mountain belonging to the Graian Alps, between Savoy and Piedmont, 11,755 feet high. It is famous for the winding road constructed by Napoleon I., which leads over it from France to Italy, and for an immense railway tunnel, which, after nearly fourteen years' labor, was finished in 1871. The tunnel does not actually pass through the mountain, but through the Col de Fréjus, about 15 miles to the S. W., where it was found possible to construct it at a lower level. The Mount Cenis Pass is 6,765 feet above the level of the sea, whereas the elevation of the entrance to the tunnel on the side of Savoy is only 3,801 feet, and that on the side of Piedmont 4,246 feet. The total length of the tunnel is 42,145 feet, or nearly 8 miles. The total cost amounted to about \$12,000,000, which was borne partly by the French and Italian governments and partly by the Northern Railway Company of Italy. The tunnel superseded a grip railway which was constructed over the mountain by Mr. Fell, an English engineer, 1864-1868.

Cenobites, an order of Monachism, so called from the union of common life and personal solitude which this class of monks adopted. Instead of the strict solitude of the anchorites or hermits, they dwelt in convents or communities. The original monastic life was cenobitism, which, in the time of its founder, St. Anthony (3rd century) was about synonymous with Asceticism.

Cenozoic, a geological term applied to the latest of the three divisions into which strata have been arranged, with reference to the age of the fossils they include. The *Cenozoic* system embraces the tertiary and post-tertiary systems of British geologists, exhibiting recent forms of life, in contradistinction to the *Mesozoic*, exhibiting intermediate, and the *Palæozoic*, ancient and extinct, forms. It corresponds nearly with what has been called the age of mammals.

Cenotaph, an empty monument, that is, one raised to a person buried elsewhere.

Censer, a vase or pan in which incense is burned, or a bottle with a perforated cap, used for sprinkling odors. Censers were much used in the Hebrew service, but their form is not accurately ascertained. Josephus tells us that King Solomon made 20,000 gold Censers for the temple of Jerusalem to offer perfumes in, and 50,000 others to carry fire in. The Censer used in the Roman Catholic Church at mass, vespers, and other offices, is suspended by chains, which are held in the hand, and is tossed in the air, so as to throw the smoke of the incense in all directions.

Censor, the title of two Roman magistrates originally appointed for the purpose of taking the census, or register of the number and property of the citizens. But their powers were much increased subsequently when they had the inspection of public morals entrusted to them, with authority to degrade senators and knights from their respective orders, and remove other citizens from their tribes, depriving them of all their privileges except liberty, which was termed making them *Ærarians*. The Censors had also the power of making contracts for public buildings, and the supply of victims for sacrifices. They were originally appointed for a whole lustrum; but by law of Mamercus Æmilius, B. C. 443, the term of office was limited to 18 months. The magistracy was confined to patricians, until Censor Marcius Rutilus, a plebeian, was elected in B. C. 351. No person might be twice invested with it; and if one of the Censors died, another was not substituted in his room, but his surviving colleague was obliged to resign. The office of Censor was abolished under the emperors, who, however, exercised the greater part of its functions.

There is in England and some other countries a Censor whose duty it is to inspect and examine books, plays, etc., before they are published, to insure that they shall contain nothing to offend against public morality or decency. In Russia the office is one of unlimited authority over all publications. Also an official appointed in time of war, at military headquarters, to supervise and endorse all press dispatches.

Census, a periodical enumeration of the people of any State or country, with information regarding sex, age, family, occupation, possessions, religious beliefs, and other details. The original idea of counting the people was for the sake of obtaining the greatest number of men capable of bearing arms, and, secondly, of facilitating the raising of taxes. Such enumerations go back to a remote antiquity. Amasis in Egypt made a census 500 years before Christ. The first chapter of "Numbers" chronicles an enumeration of the Children of Israel for military purposes. King David numbered the people and it is said that it was contrary to the will of the Lord, and consequently was punished by a plague which carried off 50,000 people (see Book of Kings). Solon at Athens established a census for the purpose of facilitating taxation and classifying the citizens. It is stated that after the time of Servius Tullius, or about 443 B. C., the census was taken every five years for military and tax purposes in Rome. The especial officers who served in this work were called censors. The property of the Roman citizens was

registered by means of a census taken under Augustus. It is said that during the Middle Ages religious prejudices prevented the census from being taken, but various cities made attempts at different times to register the number of inhabitants. Thus Nuremberg held an enumeration in 1449 and Strasburg in 1475. Many of the details of these mediæval censuses are valuable as showing the property qualifications and other facts regarding life at that time. The ancient church books also contain interesting details regarding marriages, births, and deaths of citizens.

In the 18th century censuses began to be made in the more important countries of Europe. Thus in Sweden, in 1748, the first important enumeration of the people took place in 1749 and a special board for that purpose was called into life. Regular censuses were first established in the United States in 1790, in England and France in 1801, in Prussia in 1816, in Holland in 1819, in Sardinia in 1838, in Switzerland in 1841, and in Belgium in 1846. Censuses are now taken in Austria, Belgium, Italy, Norway, Sweden, Russia, Switzerland, the United States of America, India and most of the British colonies, every ten years; in France and Germany, every five years; in Spain, at irregular intervals, the last having been in 1887. The International Statistical Congress, which consists of eminent statisticians from all countries, has done much to improve the taking of censuses, and now several countries, such as Austria, Belgium, Italy, Prussia, Russia, and Switzerland, have statistical bureaus for the purpose, among other things, of controlling the taking of the periodical census. In the United Kingdom the practice is for Parliament to pass special acts directing the taking of each census. These acts provide that the registrars of births and deaths shall be the officers through whom the census is to be taken by enumerators; at the census of 1881 there were upward of 30,000 of these officers employed in England alone. All the registrars' districts are so subdivided that no enumerator has more houses than he can conveniently visit in one day. The enumerators have to deliver schedules at all houses, requiring particulars concerning every person who is alive at midnight preceding the census day, and on the census day to collect them. Account has also to be taken of all persons not dwelling in houses, wherever found, and of persons traveling, and persons in ships, barges, etc. The enumerators are authorized to require the information necessary for the census, and persons refusing to answer or wilfully giving false answers to the questions are rendered liable to penalties. The particulars to be required in each census are specified by law.

Census

The Thirteenth Census of the United States, taken as of April 15, 1910, was restricted by the authorizing act of Congress (July 2, 1909) to population, agriculture, manufactures, and mines and quarries, and the results were ordered to be completed within three years from July 1, 1909. The enumeration was in charge of E. Dana Durand, Director of the Bureau of the Census (now a permanent branch of the Department of Commerce and Labor), who was assisted by 300 district supervisors, about 70,000 enumerators, and 3,500 clerks. The combination and tabulation of the fig-

Census

ures as gathered by the enumerators were performed entirely by means of ingenious automatic electrical machinery. Congress made an initial appropriation of \$10,000,000 for taking the census, and it was estimated that the ultimate cost would exceed \$13,000,000. In the authorizing act Congress also directed that in 1915, and once in every ten years thereafter, a census of agriculture and livestock should be taken.

Population of the United States in 1910.—The following is a list of the cities having 25,000 and upward population in 1910, with their changes since 1900:

CITIES	Population		In-crease since 1900	CITIES	Population		In-crease since 1900
	1910	1900			1910	1900	
New York, N. Y....	4,766,883	3,437,202	1,329,681	Youngstown, Ohio ..	79,066	44,885	34,181
Chicago, Ill.	2,185,283	1,698,575	486,708	Houston, Tex.	78,800	44,633	34,167
Philadelphia, Pa. ..	1,549,008	1,293,697	255,311	Duluth, Minn.	78,466	52,969	25,497
St. Louis, Mo.	687,029	575,238	111,791	St. Joseph, Mo.	77,403	102,979	b25,576
Boston, Mass.	670,585	560,892	109,693	Somerville, Mass. ..	77,236	61,643	15,593
Cleveland, Ohio	560,663	381,768	178,895	Troy, N. Y.	76,813	60,651	16,162
Baltimore, Md.	558,485	508,957	49,528	Utica, N. Y.	74,419	56,383	18,036
Pittsburg, Pa.	533,905	a451,512	82,393	Elizabeth, N. J.	73,409	52,130	21,279
Detroit, Mich.	465,766	285,704	180,062	Fort Worth, Tex.	73,312	26,688	46,624
Buffalo, N. Y.	423,715	352,387	71,328	Waterbury, Conn. ..	73,141	45,859	27,282
San Francisco, Cal..	416,912	342,782	74,130	Schenectady, N. Y..	72,826	31,682	41,144
Milwaukee, Wis. ...	373,857	285,315	88,542	Hoboken, N. J.	70,324	59,364	10,960
Cincinnati, Ohio ...	364,463	325,902	38,561	Manchester, N. H. ...	70,063	56,987	13,076
Newark, N. J.	347,469	246,070	101,399	Evansville, Ind.	69,647	59,007	10,640
New Orleans, La. ...	339,075	287,104	51,971	Akron, Ohio	69,067	42,728	26,339
Washington, D. C. ...	331,069	278,718	52,351	Spokane, Wash.	67,554	36,848	67,554
Los Angeles, Cal. ...	319,198	102,479	216,719	Norfolk, Va.	67,452	46,624	20,828
Minneapolis, Minn..	301,408	202,718	98,690	Wilkesbarre, Pa. ...	67,105	51,721	15,384
Jersey City, N. J. ...	267,779	206,433	61,346	Peoria, Ill.	66,950	56,100	10,850
Kansas City, Mo.	248,381	163,752	84,629	Erie, Pa.	66,525	52,733	13,792
Seattle, Wash.	237,194	80,671	156,523	Savannah, Ga.	65,064	54,244	10,820
Indianapolis, Ind. ...	233,650	169,164	64,486	Oklahoma City, Okl.	64,205	32,452	31,753
Providence, R. I.	224,326	175,597	48,729	Harrisburg, Pa.	64,186	50,167	14,019
Louisville, Ky.	223,928	204,731	19,197	Fort Wayne, Ind.	63,933	45,115	18,818
Rochester, N. Y.	218,149	162,608	55,541	Charleston, S. C.	58,833	55,807	3,026
St. Paul, Minn.	214,744	163,065	51,679	Portland, Me.	58,571	50,145	8,426
Denver, Col.	213,381	133,859	79,522	East St. Louis, Ill..	58,547	29,655	28,892
Portland, Ore.	207,214	90,426	116,788	Terre Haute, Ind. ...	58,157	36,673	21,484
Columbus, Ohio	181,548	125,560	55,988	Holyoke, Mass.	57,730	45,712	12,018
Toledo, Ohio	168,497	131,822	36,675	Jacksonville, Fla. ..	57,699	28,429	29,270
Atlanta, Ga.	154,839	89,872	64,967	Brockton, Mass.	56,878	40,063	16,815
Oakland, Cal.	150,174	66,960	83,214	Bayonne, N. J.	55,545	32,722	22,823
Worcester, Mass. ...	145,986	118,421	27,565	Johnstown, Pa.	55,482	35,936	19,546
Syracuse, N. Y.	137,249	108,374	28,875	Passaic, N. J.	54,773	27,777	26,996
New Haven, Conn. ...	133,605	108,027	25,578	South Bend, Ind.	53,843	35,999	17,844
Birmingham, Ala. ...	132,685	38,415	94,270	Covington, Ky.	53,270	42,938	10,332
Memphis, Tenn.	131,105	102,320	28,785	Wichita, Kan.	52,450	24,671	27,779
Scranton, Pa.	129,867	102,026	27,841	Honolulu, Hawaii ..	52,183	39,306	12,877
Richmond, Va.	127,628	85,050	42,578	Altoona, Pa.	52,127	38,973	13,154
Paterson, N. J.	125,600	105,171	20,429	Allentown, Pa.	51,913	35,416	16,497
Omaha, Neb.	124,096	102,555	21,541	Springfield, Ill.	51,678	34,159	17,519
Fall River, Mass. ...	119,295	104,863	14,432	Pawtucket, R. I.	51,622	39,231	12,391
Dayton, Ohio	116,577	85,333	31,244	Mobile, Ala.	51,521	38,469	13,052
Grand Rapids, Mich.	112,571	87,565	25,006	Saginaw, Mich.	50,510	42,345	8,165
Nashville, Tenn. ...	110,364	80,865	29,499	Canton, Ohio	50,217	30,667	19,550
Lowell, Mass.	106,294	94,969	11,325	San Juan, Porto Rico	48,716	c32,048	16,668
Cambridge, Mass. ...	104,839	91,886	12,953	Binghamton, N. Y. ...	48,443	39,647	8,796
Spokane, Wash.	104,402	36,848	67,554	Sioux City, Iowa. ...	47,828	33,111	14,717
Bridgeport, Conn. ...	102,054	70,996	31,058	Lancaster, Pa.	47,227	41,459	5,768
Albany, N. Y.	100,253	94,151	6,102	Springfield, Ohio ...	46,921	38,253	8,668
Hartford, Conn.	98,915	79,850	19,065	Atlantic City, N. J..	46,150	27,838	18,312
Trenton, N. J.	96,815	73,307	23,508	Little Rock, Ark.	45,941	38,307	7,634
New Bedford, Mass..	96,652	62,442	34,210	Rockford, Ill.	45,401	31,051	14,350
San Antonio, Tex. ...	96,614	53,321	43,293	Bay City, Mich.	45,166	27,628	17,538
Reading, Pa.	96,071	78,961	17,110	York, Pa.	44,750	33,708	11,042
Camden, N. J.	94,538	75,935	18,603	Sacramento, Cal. ...	44,696	29,282	15,414
Salt Lake City, Utah	92,777	53,531	39,246	Chattanooga, Tenn..	44,604	30,154	14,450
Dallas, Tex.	92,104	42,638	49,466	Malden, Mass.	44,404	33,664	10,740
Lynn, Mass.	89,336	68,513	20,823	Pueblo, Col.	44,395	28,157	16,238
Springfield, Mass. ...	88,926	62,059	26,867	Haverhill, Mass. ...	44,115	37,175	6,940
Wilmington, Del. ...	87,411	76,508	10,903	Lincoln, Neb.	43,973	40,169	3,804
Des Moines, Iowa. ...	86,368	62,139	24,229	New Britain, Conn..	43,916	25,998	17,914
Lawrence, Mass. ...	85,892	62,559	23,333	Salem, Mass.	43,697	35,956	7,741
Tacoma, Wash.	83,743	37,714	46,029	Topeka, Kan.	43,684	33,608	10,076
Kansas City, Kan. ...	82,331	51,418	30,913	Davenport, Ia.	43,028	35,254	7,774
Yonkers, N. Y.	79,803	47,931	31,872				

Census

Census

CITIES	Population		In-crease since 1900	CITIES	Population		In-crease since 1900
	1910	1900			1910	1900	
McKeesport, Pa. . . .	42,694	34,227	8,467	Mount Vernon, N. Y.	30,919	21,228	9,691
Wheeling, W. Va. . . .	41,641	38,878	2,763	Lima, Ohio	30,508	21,723	8,785
Augusta, Ga.	41,040	39,411	1,629	Niagara Falls, N. Y. .	30,445	19,457	10,988
Macon, Ga.	40,665	23,272	17,393	La Crosse, Wis.	30,417	28,895	1,522
Berkeley, Cal.	40,434	13,214	27,220	Newport, Ky.	30,309	28,301	2,008
Superior, Wis.	40,384	31,091	9,293	Pasadena, Cal.	30,291	9,117	21,174
Newton, Mass.	39,806	33,587	6,219	Austin, Tex.	29,860	22,258	7,602
San Diego, Cal.	39,578	17,700	21,878	Aurora, Ill.	29,807	24,147	5,660
Kalamazoo, Mich. . .	39,437	24,404	15,033	Orange, N. J.	29,630	24,141	5,489
El Paso, Tex.	39,279	15,906	23,373	Lynchburg, Va.	29,494	18,891	10,603
Butte, Mont.	39,165	30,470	8,695	Council Bluffs, Ia. . .	29,292	25,802	3,490
Flint, Mich.	38,550	13,103	25,447	Colorado Sp'ngs, Col.	29,078	21,085	7,993
Chester, Pa.	38,537	33,988	4,549	San José, Cal.	28,946	21,500	7,446
Dubuque, Ia.	38,494	36,297	2,197	Lorain, Ohio	28,883	16,028	12,855
Montgomery, Ala. . .	38,136	30,346	7,790	New Rochelle, N. Y. .	28,867	14,720	14,147
Woonsocket, R. I. . .	38,125	28,204	9,921	Easton, Pa.	28,523	25,238	3,285
Racine, Wis.	38,002	29,102	8,900	Zanesville, Ohio . . .	28,026	23,538	4,488
Fitchburg, Mass. . .	37,826	31,531	6,295	Shreveport, La. . . .	28,015	16,013	12,002
Tampa, Fla.	37,782	15,839	21,943	Poughkeepsie, N. Y. .	27,936	24,029	3,907
Elmira, N. Y.	37,176	35,672	1,504	Norristown, Pa. . . .	27,875	22,265	5,610
Galveston, Tex. . . .	36,981	37,789	808	Danville, Ill.	27,871	16,354	11,517
Quincy, Ill.	36,587	36,252	335	Waltham, Mass. . . .	27,834	23,481	4,353
Knoxville, Tenn. . .	36,346	32,637	3,709	Newburg, N. Y. . . .	27,805	24,943	2,862
Newcastle, Pa. . . .	36,280	28,339	7,941	Brookline, Mass. . .	27,792	19,935	7,857
West Hoboken, N. J.	35,403	23,094	12,309	Meriden, Conn. . . .	27,265	24,296	2,969
Hamilton, Ohio . . .	35,279	23,914	11,365	Newport, R. I.	27,149	22,441	4,708
Springfield, Mo. . .	35,201	23,267	11,934	Watertown, N. Y. . .	26,730	21,696	5,034
Lexington, Ky. . . .	35,099	26,369	8,730	Waterloo, Ia.	26,693	12,580	14,113
Ponce, Porto Rico . .	35,027	27,952	7,075	Waco, Tex.	26,425	20,686	5,739
Roanoke, Va.	34,874	21,495	13,379	Sheboygan, Wis. . . .	26,398	22,962	3,436
Joliet, Ill.	34,670	29,353	5,317	Columbia, S. C. . . .	26,319	21,108	5,211
Auburn, N. Y.	34,668	30,345	4,323	South Omaha, Neb. .	26,259	26,001	258
East Orange, N. J. .	34,371	21,506	12,865	Lewiston, Me.	26,247	23,761	2,486
Taunton, Mass. . . .	34,259	31,036	3,223	Nashua, N. H.	26,005	23,898	2,107
Charlotte, N. C. . . .	34,014	18,091	15,923	Elgin, Ill.	25,976	22,433	3,543
Everett, Mass.	33,484	24,336	9,148	Kingston, N. Y. . . .	25,908	24,535	1,373
Portsmouth, Va. . .	33,190	17,427	15,763	Shenandoah, Pa. . .	25,774	20,321	5,453
Oshkosh, Wis.	33,002	28,284	4,778	Bloomington, Ill. . .	25,768	23,286	2,482
Cedar Rapids, Ia. . .	32,811	25,656	7,155	Wilmington, N. C. . .	25,748	20,976	4,772
Quincy, Mass.	32,642	23,899	8,743	Ogden, Utah	25,580	16,313	9,267
Chelsea, Mass.	32,452	34,072	1,620	Clinton, Ia.	25,577	22,698	2,879
Perth Amboy, N. J. .	32,121	17,699	14,422	Madison, Wis.	25,531	19,164	6,367
Pittsfield, Mass. . .	32,121	21,766	10,355	Hazleton, Pa.	25,452	14,230	11,222
Joplin, Mo.	32,073	26,023	6,050	Newark, Ohio	25,404	18,157	7,247
Williamsport, Pa. . .	31,860	28,757	3,103	Chicopee, Mass. . . .	25,401	19,167	6,234
Jackson, Mich. . . .	31,433	25,180	6,253	Muskogee, Okl. . . .	25,278	14,418	10,860
Jamestown, N. Y. . .	31,297	22,892	8,405	New Albany, Ind. . .	25,275	20,628	4,647
Amsterdam, N. Y. . .	31,267	20,929	10,338	Battle Creek, Mich. .	25,267	18,563	6,704
Lansing, Mich. . . .	31,229	16,485	14,744	Green Bay, Wis. . . .	25,236	18,684	6,552
Huntington, W. Va. .	31,161	11,923	19,238	Stamford, Conn. . .	25,138	15,997	9,141
Decatur, Ill.	31,140	20,754	10,386				

a Pittsburg and Allegheny.

b Decrease.

c 1899.

Population by States and Territories in 1910 and increase since 1900 :

STATES, ETC.	1910	1900	Increase	STATES, ETC.	1910	1900	Increase
Alabama	2,138,093	1,828,697	309,396	New Mexico	327,301	195,310	131,991
Arizona	204,354	122,931	81,423	New York	9,113,279	7,268,894	1,844,385
Arkansas	1,574,449	1,311,564	262,885	North Carolina . .	2,206,287	1,893,810	312,477
California	2,377,549	1,485,053	892,496	North Dakota . . .	577,056	319,146	257,910
Colorado	799,024	539,700	259,324	Ohio	4,767,121	4,157,545	609,576
Connecticut	1,114,756	908,420	206,336	Oklahoma	1,657,155	†790,391	866,764
Delaware	202,322	184,735	17,587	Oregon	672,765	413,536	259,229
Dist. of Columbia .	331,069	278,718	52,351	Pennsylvania	7,665,111	6,302,115	1,362,996
Florida	751,139	528,542	222,597	Rhode Island	542,610	428,556	114,054
Georgia	2,609,121	2,216,331	392,799	South Carolina . .	1,515,400	1,340,316	175,084
Idaho	325,594	161,772	163,822	South Dakota . . .	583,888	401,570	182,318
Illinois	5,638,591	4,821,550	817,041	Tennessee	2,184,789	2,020,616	164,173
Indiana	2,700,876	2,516,462	184,414	Texas	3,896,542	3,048,710	847,832
Iowa	2,224,771	2,231,853	†7,082	Utah	373,351	276,749	96,602
Kansas	1,690,949	1,470,495	220,454	Vermont	355,956	343,641	12,315
Kentucky	2,289,905	2,147,174	142,731	Virginia	2,061,612	1,854,184	207,428
Louisiana	1,656,388	1,381,625	274,763	Washington	1,141,990	518,103	623,887
Maine	742,371	694,466	47,905	West Virginia . . .	1,221,119	958,800	262,319
Maryland	1,295,346	1,188,044	107,302	Wisconsin	2,333,860	2,069,042	264,818
Massachusetts . . .	3,366,416	2,805,346	561,070	Wyoming	145,965	92,531	53,434
Michigan	2,810,173	2,420,982	389,191	Continental U. S. .	91,972,267	75,994,575	15,977,692
Minnesota	2,075,708	1,751,394	324,314	Alaska	64,356	63,592	764
Mississippi	1,797,114	1,551,270	245,844	Hawaii	191,909	154,001	37,908
Missouri	3,293,335	3,106,665	186,670	Porto Rico	1,118,012	*953,243	.....
Montana	376,053	243,329	132,724	Military and naval service	55,607	91,219	.....
Nebraska	1,192,214	1,066,300	125,914	Total U. S.	93,402,151	77,256,630	16,145,521
Nevada	81,875	42,335	39,540				
New Hampshire . .	430,572	411,588	18,984				
New Jersey	2,537,167	1,883,669	653,498				

*1899. †Decrease.

‡Including Indian Territory

Cent

Cent, or Centime (san-tēm), the name of a small coin in various countries, so called as being equal to a 100th part of some other coin. In the United States and in Canada the cent is the 100th part of a dollar. In France the centime is the 100th part of a franc. Similar coins are the *centavo* of Chili, and the *centesimo* of Italy, Peru, etc. Cents or centimes, and their equivalents, are written simply as decimals of the unit of value.

Centaur, a mythical creature, half man, half horse, said to have sprung from the union of Ixion and a Cloud; the most celebrated was Chiron. They inhabited Thes-



CENTAUR.

saly, and were also called Hippocentaurs. The myth probably arose from some herdsman on horseback, who, being seen by individuals unacquainted with the uses of the horse, was supposed to form, together with his steed, one integral body.

It is also the name of a constellation in the Southern Hemisphere. Professor Airy says that the bright star *Alpha Centauri* has an annual parallax of 2", and that, if this is the case, the distance from us is only 200,000 times that of the sun.

Centaurea (so called because Chiron the Centaur was healed by it), an extensive genus of composite plants, comprising both annual and perennial, herbaceous, or half-shrubby plants, some of them common weeds, as *C. nigra*, the knapweed of our pastures, while a certain number are esteemed border flowers. Of the annual species one of the most remarkable is *C. americanus*, or *Plectocephalus americanus*

Center

of some authors, which has a stout, erect stem 4 to 5 feet high, oblong lance-shaped leaves, and very large capitules of a lilac-purple tint. The blue cornbottle is *C. cyanus*. *C. calcitrapa* was once used as a febrifuge.

Centaury, the *Erythrœa Centaurium*, an annual herb of the gentian family, with pretty red flowers. It is common throughout Europe, and is extolled for its medicinal properties by the old herbalists. It is common in England, especially on dry, sandy, or chalky soils.

Centenary, the commemoration of any event, as the birth of a great man, which occurred 100 years before.

Centennial Exposition. See EXPOSITIONS AND FAIRS.

Centennial State, Colorado; it was admitted to the Union in 1876, the 100th year of American independence.

Center, a point equi-distant from the extremities of an object. Among its best known applications are:

Center of Inertia.—If m_1 and m_2 be the masses of two particles placed at the points A_1 and A_2 , and if the right line A_1A_2 be divided in B_1 , so that

$$m_1A_1B_1 = m_2A_2B_1,$$

the point B_1 is called the center of inertia, or center of mass, of the two particles. If m_3 be a third mass at A_3 , and if B_1A_3 be divided in B_2 , so that

$$(m_1 + m_2)B_1B_2 = m_3A_3B_2,$$

B_2 is called the center of inertia of the three particles. In

general, if there be any number of particles, a continuation of the above process will enable us to find their center of inertia.

Every body may be supposed to be made up of a multitude of particles connected by cohesion. From this it is obvious that the center of inertia is a definite point for every piece of matter.

In general, the determination of the center of inertia requires the use of the integral calculus. In the case of some bodies, such as those which have a simple geometrical form and are of uniform density, elementary mathematical methods will generally be sufficient. Any straight line or plane that divides a homogeneous body symmetrically must contain its center of inertia. For the particles of the body may be arranged in pairs of equal mass and at equal distances from the straight line or plane; and, since the center of inertia of each pair lies in the line or plane, the center of inertia of the whole must also lie in the same line or plane. For example, the

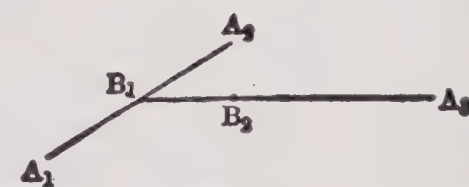


Fig. 1.

center of inertia of a uniform thin straight rod is its middle point; that of a uniform thin rod bent in the form of a parallelogram, the point of intersection of its diagonals; that of a lamina, uniform in thickness and density and in form a circle, ellipse, or parallelogram, its center of figure; that of a uniform spherical shell, its center; that of a homogeneous sphere, its center; that of a parallelopiped, the intersection of its diagonals; that of a circular cylinder with parallel ends, the middle point of its axis.

An important case is that of a uniformly thin triangular plate. Let ABC be the plate. Bisect AB in P and join CP. Let the triangle be divided by right lines parallel to AB into an indefinitely great number of indefinitely narrow strips. The center of inertia of each strip is its middle point. But all the middle points lie on CP. The center of inertia of the whole plate must therefore lie on CP. Again, if BC be bisected in Q, and AQ be joined,

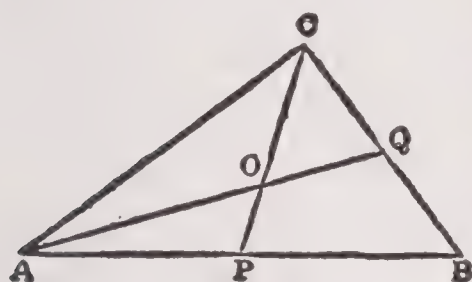


Fig. 2.

ed, the center of inertia of the whole plate must lie in AQ. The center of inertia must therefore be O, the point of intersection of CP and AQ. It is easily proved by elementary geometry that $OP = \frac{1}{3}$ of CP. Hence, the center of inertia of a triangular plate is obtained by joining a vertex to the middle point of the opposite side and taking the point two-thirds of this line measured from the vertex. By a similar method the center of inertia of other plane figures may be obtained.

Center of Gravity.—If a body be sufficiently small, relatively to the earth, the weights of its particles may be considered as constituting a system of parallel forces acting on the body. Now, the magnitude of the weight of a particle is proportional to its mass. Hence, the line of action of the resultant of the parallel forces will approximately pass through the center of inertia. For this reason such bodies are said to have a center of gravity. Strictly speaking, there is no such point of necessity for every body, since the directions of the forces acting on the body are not accurately parallel. Hence, it is only approximately that we can say of a body that it has a center of gravity. On the other hand, every piece of matter has, as is shown above, a center of inertia. For all heavy bodies of moderate dimensions it is, however, sufficiently accurate to assume that the center of inertia and gravity coincide. For example, the center of gravity of a uniform

homogeneous cylinder with parallel ends is the middle point of its axis, that of a uniformly thin circular lamina its center, and so on.

The center of gravity of a body of moderate dimensions may be approximately determined by suspending it by a single cord in two different positions, and finding the single point in the body which, in both positions, is intersected by the axis of the cord.

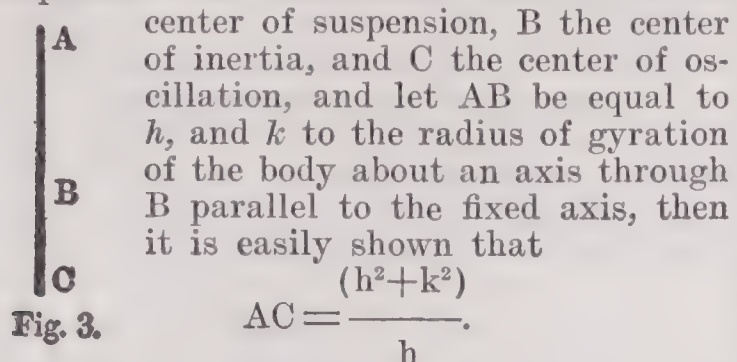
The term center of gravity is also used in a stricter sense than the one just explained. Thus, if a body attracts and is attracted by all other gravitating matter as if its whole mass were concentrated in one point, it is said to have a true center of gravity at that point, and the body itself is called a *centrobaric* body. A spherical shell of uniform gravitating matter attracts an external particle as if its whole mass were condensed at its center. Such a body has a true center of gravity. When such a point exists, it necessarily coincides with the center of inertia.

Center of Oscillation.—A heavy particle suspended from a point by a light, inextensible string constitutes what is called a simple or mathematical pendulum. For such a pendulum it is easily proved that the time of an oscillation from side to side of the vertical is proportional to the square root of its length for any small arc of vibration. A simple pendulum is, however, a thing of theory, as in all physical problems we have to deal with a rigid mass, and not a particle, oscillating about a horizontal axis. In a pendulum of this kind the time of oscillation will not vary as the square root of the length of the string, for it is obvious that those particles of the body which are nearest the point of suspension will have a tendency to vibrate more rapidly than those remote. The former are, therefore, retarded by the latter, while the latter are accelerated by the former. There is thus one particle which will be accelerated and retarded to an equal amount, and which will, therefore, move as if it were a simple pendulum unconnected with the rest of the body. The point in the body occupied by this particle is called the center of oscillation.

As all the particles of the body are rigidly connected, they all vibrate in the same time. Hence it follows that the time of vibration of the rigid body will be the same as that of a simple pendulum, called the equivalent or isochronous simple pendulum, whose length is equal to the distance between the centers of suspension and oscillation.

The determination of the center of oscillation of a body requires the aid of the calculus. It may be stated, however, that it is always farther from the axis of sus-

pension than the center of inertia, and is always in the line joining the centers of suspension and oscillation. Let A be the



From this there follows the important proposition that the centers of oscillation and suspension are convertible, a proposition which was taken advantage of by Kater for the practical determination of the force of gravity at any station.

Center of Percussion.—If a body receive a blow which makes it begin to rotate about a fixed axis without causing any pressure on the axis, the point in which the direction of the blow intersects the plane in which the fixed axis and the center of inertia lie is called the center of percussion. That such a point must exist is easily shown by suspending a straight rod by a long string attached to one end, and striking it with a hammer in different points. If the rod is struck near the top the foot will move in one direction, and if the blow be applied near the foot the top will move in the opposite direction. It is thus evident that there must be some point which does not move at all at the instant of the blow. If a line through this point be regarded as an axis of rotation, the point at which the body was struck is the center of percussion, since no pressure is produced on the axis. It is easily proved by means of higher mathematics that the center of percussion with respect to any axis is the same point as the center of oscillation.

From what has been said it is obvious that in order that no jar may be felt on the hand a cricket ball must be hit in the center of percussion of the bat with respect to an axis through the hand.

There are, it may be mentioned, many positions which the axis may have in which there will be no center of percussion. For example, there is no center of percussion when the axis is a principal axis through the center of inertia.

Center of Pressure.—When a plane surface is immersed in a fluid at rest, and held in any position, the pressures at different points of the surface are perpendicular to the surface. These pressures may, therefore, be looked upon as constituting a system of parallel forces whose resultant is the whole pressure. The point at which this resultant acts is called the center of pressure, and may be defined as the point at which the direction of the single force

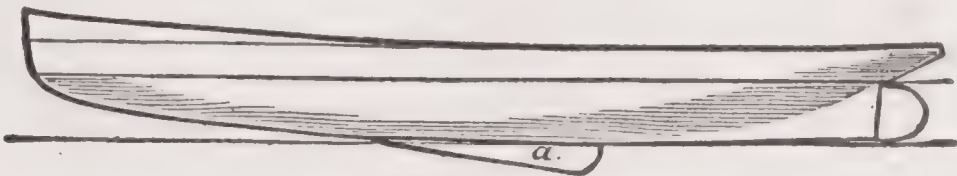
which is equivalent to the fluid pressures on the plane surface meets the surface. The resultant action of fluids on a curved surface is not always reducible to a single force. The definition given above is, therefore, limited to plane surfaces. In the case of a heavy fluid it is clear that the center of pressure of a horizontal area corresponds with the center of gravity. When, however, the plane is inclined at any angle to the surface of the fluid, the pressure is not the same at all points, being greater as the depth increases; since in the same liquid the pressure varies with the depth. In general, the center of pressure will be below the center of gravity. The determination of the center of pressure requires the use of the integral calculus, but special cases may be treated by ordinary algebra. In the case of a parallelogram, one edge of which is in the surface of the fluid, the center of pressure is at a distance of one-third up the middle line from the base. In the case of a triangle, having one side in the surface of the fluid, the center of pressure is at the middle point of the median corresponding to the vertex immersed; while in the case of a triangle, with its apex in the surface, and the base horizontal, the center of pressure is on the median corresponding to the vertex and at a distance of three-fourths of the median from the vertex.

Center of Buoyancy.—The pressures which act on every point of a surface immersed in a fluid can be resolved into horizontal and vertical components. The former balance one another. The resultant pressure must, therefore, be vertical; and, as the pressure increases with the depth, it is clear that the upward pressures must be greater than the downward. Hence the resultant pressure on an immersed body must be a force acting vertically upwards. Now it is easily shown that the magnitude of this pressure is equal to the weight of the fluid displaced. The point in the displaced fluid at which the resultant vertical pressure may be supposed to act is called the center of buoyancy, or center of displacement. Hence, we see that when a body floats in a fluid, it is kept at rest by two forces, the weight of the body acting downwards through its center of gravity, and the weight of the fluid acting vertically upward through its center of gravity, or center of buoyancy. The relative positions of the center of gravity and the center of buoyancy have an important bearing on the safety of ships at sea. If the center of buoyancy be above the center of gravity, the equilibrium is stable; in other words, if the ship is displaced, it will tend to return to its original position. If, on the other hand, the center of buoyancy be below the center of gravity, the equilibrium

Center=board

will generally be unstable, although a body may float in stable equilibrium even if the center of buoyancy be below the center of gravity. See also CENTRAL FORCES.

Center=board, a contrivance used in yachts or shallow keelless vessels to counteract the tendency to drift to leeward,



a, Center-board.

caused by the absence of a keel. It is lowered from the deck or cabin through a slit cut in the craft's bottom.

Centering, the framing of timber by which the arch of a bridge or other arched structure is supported during its erection. The same name is given to the woodwork or framing on which any vaulted work is constructed. The centering of a bridge has to keep the stones or *voussoirs* in position till they are keyed in, that is, fixed by the insertion of the requisite number of stones in the center.

Center of Population, the center of gravity of the population of a country, each individual being assumed to have the same weight. The center of population in the United States has clung to the parallel of 39° lat. and has moved in a westward direction during the last 110 years. The following table shows the movement of the center of population since 1790:

YEARS. CENSUS	NORTH LATITUDE.	WEST LONGITUDE.	APPROXIMATE LOCATION BY IMPORTANT TOWN.
1790	39° 16.5'	76° 11.2'	23 miles E. of Baltimore, Md.
1800	39 16.1	76 56.5	18 miles W. of Baltimore, Md.
1810	39 11.5	77 37.2	40 miles N. W. by W. of Washington, D. C.
1820	39 5.7	78 35.0	16 miles N. of Woodstock, Va.
1830	38 57.9	79 16.9	19 miles W. S. W. of Moorefield, W. Va.
1840	39 2.0	80 18.0	16 miles S. of Clarksburg, W. Va.
1850	38 59.0	81 19.0	23 miles S. E. of Parkersburg, W. Va.
1860	39 0.4	82 48.8	20 miles S. of Chillicothe, O.
1870	39 12.0	83 35.7	48 miles E. by N. of Cincinnati, O.
1880	39 4.1	84 39.7	8 miles W. by S. of Cincinnati, O.
1890	39 11.9	85 32.9	20 miles E. of Columbus, Ind.
1900	39 9' 36"	85 48' 54"	6 miles S. E. of Columbus, Ind.

Centiare (san-tyar'), a French measure, the 100th part of an are; a square meter, equal to 1.19 square yards.

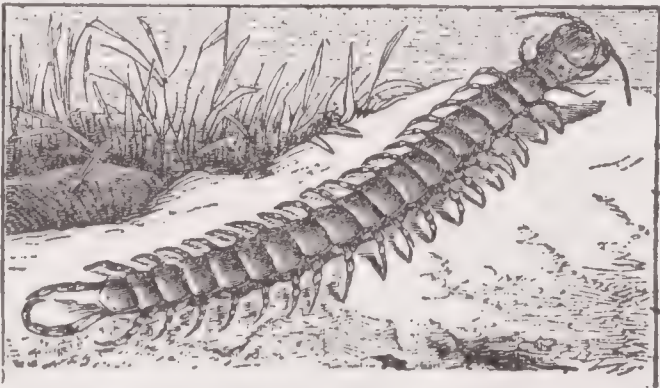
Centigrade Thermometer (Lat. *centum*, a "hundred," *gradus*, "a step"), a thermometer scaled to represent the interval between the freezing and the boiling point of water, divided into 100 equal parts, the freezing-point being taken as zero, and the

Centlivre

boiling-point as 100°. 1° C. is equal to 1.8° F.

Centipede, a genus of *Myriapoda*, having a long, slender, depressed body, protected by coriaceous plates, 21 pairs of legs, distinct eyes, 4 on each side, and antennæ with 17 joints. The name is, however, pop-

ularly extended to species of nearly allied genera. Centipedes run nimbly, feed on insects, and pursue them into their lurking-places. They have not only a pair of horny jaws, like those of insects, but also another



GIANT CENTIPEDE.

pair of organs closely connected with the mouth, and which are regarded as transformed legs, dilated and united at the base,

terminated by a strong hook, and pierced beneath the extremity for the emission of a venomous fluid, which makes their bite quickly fatal to insects, and, in the case of the larger species, very painful, and even dangerous to the larger animals and to man.

Centlivre, Susanna (sän-lëv'r), an English dramatist, born in Ireland about 1667.

When very young she married a nephew of Sir Stephen Fox. Becoming a widow within a year she took for a second husband an officer of the army of the name of Carol, who was killed in a duel the second year of their wedlock. This event reduced her to considerable distress and led her to attempt dramatic composition. Her first production was a tragedy entitled the "Perjured Husband," which was performed in 1700. This was followed by several comedies, chiefly translations from the French, which exhibited the vivacity that distinguished her literary character and met with some temporary success. She also tried the stage as an actress on the provincial boards. She married Mr. Centlivre in 1706. She continued writing for the stage and produced several more comedies. Some of these remain stock pieces, of which number are the "Busy Body," the "Wonder," and "A Bold Stroke for a Wife." They are diverting from the variety of incident and the livelihood of the characters, but want the accompaniments of adequate language and forcible delineation. They partook of the license of the age. Mrs. Centlivre enjoyed the friendship of Steele, Farquhar, Rowe, and other wits of the day. Having, however, offended Pope, she obtained a place in the "Duncaid," but is introduced by no means in a characteristic manner. She died in 1723.

Centner, a common name on the continent of Europe for a hundredweight. In Switzerland it is equal to 110 pounds; in Austria, 110½; in Sweden, 112.06; in Germany, 110.25.

Cento, a name applied to literary trivialities in the form of poems manufactured by putting together distinct verses or passages of one author, or of several authors, so as to make a new meaning. After the decay of genuine poetry among the Greeks, this worthless verse-manufacture came into vogue, as is proved by the "*Homero-centones*" (ed. by Teucher, Leip., 1793), a patchwork of lines taken from Homer and forming a consecutive history of the fate and redemption of man. It was much more common, however, among the Romans in the later times of the Empire, when Vergil was frequently abused in this fashion, as in the "Cento Nuptialis" of Ausonius, and especially in the "Cento Vergilianus," constructed in the 4th century by Proba Falconia, wife of the Proconsul Adelfius, and giving, in Vergil's misplaced words, an epitome of sacred history. The cento was a favorite recreation in the Middle Ages. In the 12th century a monk at Tegernsee, named Metellus, contrived to make a cento of spiritual hymns out of Horace and Vergil.

Cento, a town of Italy, 13 miles N. of Bologna; on the E. bank of the canal of

Cento, and near the Reno river. It is surrounded by a rampart and ditch, and contains several churches, convents and a cathedral. The celebrated painter, G. F. Barbieri, commonly called Guercino, was born here about 1590. Pop. 5,000.

Central America, the strip of land which unites the continents of North and South America, extending from about lat. 7° to 18° N. As different limits are assigned to it by various authorities, these cannot be said to be exactly determined; but those most generally accepted include the six republics of Guatemala, Honduras, San Salvador, Nicaragua, Panama, and Costa Rica, British Honduras and the Mexican provinces of Chiapas, Tabasco, and Yucatan. It thus has Mexico on the N. W., Colombia on the S. E., and the Pacific Ocean and Caribbean Sea on either side. Its entire length is about 800 miles, with a breadth varying from between 20 and 30 miles to 350 miles. The area is estimated at about 200,000 square miles; the pop. at 3,200,000. It is traversed throughout its whole length by a chain of mountains which connects the Andes of South America with the mountain ranges of Mexico and the Rocky mountains of the United States. This chain is divided into three groups: the Costa Rica group, the Honduras and Nicaragua group, and the group of Guatemala. The Costa Rica group traverses the Isthmus of Panama. Some parts of this range, toward the S., attain an elevation of 9,000 feet; and the volcano of Irasu rises to 11,478 feet; but there are others said to be of still greater height. The more general elevations, however, are from 3,000 to 5,000 feet. The Honduras and Nicaragua group is separated from the former by Lake Nicaragua and the San Juan river. On the N. side of the lake the border of the plateau forming its W. limit rises suddenly to a height of fully 8,200 feet.

The Guatemala group is remarkable for containing, with exception of the island of Java, the greatest number of active volcanoes known to exist within similar limits on the surface of the globe. The highest in Central America is Agua, which is said to attain an elevation of 15,000 feet. The volcano of Agua has obtained its name from its emitting torrents of water and stone instead of fire. The mountains of Central America do not generally attain an elevation equal to those of the two adjoining continents, with exception of the volcanoes. The coast lands are generally narrow, and in some places the mountains and high lands come close down to the water's edge. The rivers of this territory are small, and have necessarily, from the narrowness of the land, short courses, the longest not exceeding from 200 to 300 miles, while many of them are not more than 50. Of the lat-

ter are those that fall into the Pacific; of the former those that join the Atlantic, both having their sources in the mountainous regions of the country, the one flowing N. E., the other S. W. The largest river is the Usumasinta, which falls into the Gulf of Campeachy. There are about 30 other rivers worth noting, many of which are navigable for several miles into the interior. The principal lake is that of Nicaragua, which is upward of 100 miles in length, and about 50 miles in breadth. The other considerable lakes are those of Managua or Leon, Golfo Dolce, Golfete, Peten, Atitlan, Amatitlan, Guija, and Cojutepeque.

Climate and Productions.—The climate is exceedingly various owing to the inequality of the surface. The low grounds on the coast of the Caribbean Sea are exposed to violent tropical heats, and are generally unhealthy; but on the table-lands any temperature, according to altitude, may be obtained all the year round, with a salubrious climate. The dry season lasts from about October to May; the rest of the year is called the wet season, although the rain falls during the night only, the days being fair and cloudless, and the air pure and refreshing. The vegetable productions are as various as the climate. On the higher parts of the table-land the grains, fruits, and vegetables of Europe are raised. The lower and warmer districts produce in great abundance Indian corn, sugar cane, bananas, and all sorts of tropical fruits, with sweet potatoes, indigo, cacao, cochineal, tobacco and cotton. The forests, which are very extensive, produce mahogany, pimento, sarsaparilla, vanilla, rubber, and the balsam commonly called Peruvian balsam, together with various other drugs, gums, and valuable woods, including logwood, mahogany, and *lignum vitæ*. The forests contain about a hundred different kinds of trees, which grow most luxuriantly in the moist, hot, and unhealthy regions. Various creepers and parasitic plants, and among them beautiful orchids, adorn the forests. The zoölogy of Central America differs little from that of other parts of tropical America. Among the mammals are the puma, jaguar, and various other carnivores, monkeys, sloths, tapirs, armadillos, peccaries, etc. Among the birds, the most remarkable are humming-birds; parrots; toucans; the resplendent trogon, whose feathers are of a bright emerald green and scarlet; the great macaw; and several others of the most splendid plumage. Serpents are numerous, some of them dangerous, especially on the thickly-wooded coast of the Pacific. Alligators infest some of the streams and lakes, and often attack domestic animals. The rivers, lakes, and seas abound with fish. Of the geology little is known with accuracy. Granite, gneiss, and mica-slate form the substrata of the country; but

the abundance of igneous rocks bears witness to strong volcanic action, both in ancient and in modern times. Gold, silver, iron, lead, and mercury are found; but none are worked to any great extent. Jasper and marble are worked in Honduras; and sulphur is collected near the volcano of Quezaltenango. There are also many salt springs; and salt is procured in large quantities on the shores of the Pacific.

People.—The population consists of three main classes—whites; mestizoes, or the offspring of whites and Indians; and pure-blooded Indians or aboriginal natives. The proportions of this population have been estimated at one-twelfth whites, four-twelfths mixed races, and seven-twelfths Indians. Morality is at a low ebb among all classes, especially the whites; while ignorance, vice, and superstition prevail to an extent unsurpassed in any other part of the world. The Roman Catholic religion is professed by all. The chief occupation of the people is agriculture; manufactures proper do not exist. The chief export is coffee; others include cocoa, fruits, hides, indigo, sugar. The imports are mostly manufactured goods. Trade is much hampered by the absence of good roads, railways, or navigable rivers. The idea of constructing a ship canal between the Atlantic and Pacific Oceans, and thereby avoiding the circuitous navigation round Cape Horn, is so obvious that one need not wonder that it has been entertained for upward of three centuries. See ISTHMIAN CANAL: NICARAGUA CANAL: PANAMA CANAL.

History.—The E. coast of Central America was visited by Columbus in his fourth voyage in 1502. At this time the dominant race in the country was the Quiches, who had made remarkable advances in civilization, had built large cities, and possessed written chronicles narrating their past history for a considerable period. Ruins of these cities may still be seen, but there are other ruins of cities which are believed to have been the work of an earlier race. The Quiches appear to have come from Mexico to Central America. At the time of the conquest of Mexico by Cortez, Utatlan was the principal seat or capital of the Quiches. They were subdued by Pedro de Alvarado, acting under a commission from Cortez. He set out from Mexico on this expedition in 1523 with an army of 300 Spaniards, and with a large body of auxiliary Indians from Mexico, Cholua, and Tlascala. Many desperate and sanguinary battles were fought before the invaders could break the spirit of the Quiches and effect the subjugation of the country. Some of these took place near Zamal river which thus acquired, in the vicinity of the fields of carnage, the name of Xiquigel, or River of Blood. After the death of their king, Tecum Umam, who fell in battle at the

Central America

head of his subjects, the Quiches had recourse to a stratagem as bold as it was grand in conception. Their chief city, Utatlan, abounded in palaces and other sumptuous edifices, being hardly surpassed in splendor by Mexico and Cuzco. It was encompassed by a lofty wall and was capable of being entered only at two points; on one side by a causeway, and on the other by a flight of steps. Within, the buildings stood high and compact. In the hope of exterminating their enemies the Quiches invited the Spaniards into their capital, pretending a willingness to submit. After their entrance the Quiches set fire to the city, and if the Indians of another tribe had not betrayed the secret, Alvarado and his followers would have perished.

Having escaped this danger, the Spaniards pursued their victorious course until all opposition was crushed. In 1524 they laid the foundations of the city of Guatemala. After the subjugation of the Quiches, the remaining tribes were subdued with comparative facility, and the dominion of the conquerors was permanently established. The government of this country, as constituted by Spain, was subject to the Mexican; but the dependence was far from being close. It was denominated the kingdom of Guatemala, and governed by a captain-general. Its inhabitants remained true to Spain till 1821 when they declared their independence; and although for a time a large part of the country was joined to Mexico under the rule of Iturbide, yet on his downfall, they recurred to their original purpose of forming a separate republic. A constituent congress was convoked, which on July 1, 1823, published a decree declaring the five States already mentioned a republic under the title of the United States of Central America. Civil dissensions were not long in making themselves felt, however, and in 1839 the union between the States was formally dissolved. Guatemala, Honduras, Nicaragua, and San Salvador again formed a union in 1842, but this lasted only till 1845. Since that time several attempts (one in 1898) have been made to unite the States, but without permanent success.

Central America contains antiquities of a very interesting nature, which indicate that the aboriginal inhabitants of the country had even attained a very respectable proficiency in the knowledge of the arts of life. Ruins of large cities exist in various places, with remains of temples, altars, and ornamental stones, statues of deities, and other works of sculpture. See AMERICAN ANTIQUITIES.

Central America, United States of, a brief-lived federal union fashioned after the plan of the United States government, and composed of the Republics of Hon-

Central Forces

duras, Nicaragua, and Salvador. On June 28, 1895, by the Treaty of Amapala these republics united under the title of the Greater Republic of Central America. This union was perfected by a new treaty signed at Managua, Aug. 27, 1898, by which the name was changed to the United States of Central America. Provision was made for the election of a President to serve four years; of a Congress composed of a Senate and House of Representatives, and other matters pertaining to legislation. The accomplishment of the union was celebrated with elaborate proceedings at Amapala on Nov. 1, 1898, and on Nov. 30 the Federal organizers declared the union dissolved, the three States resuming their separate sovereignty. The collapse was due to the failure of the troops of Honduras, acting in behalf of the Federal organizers, to suppress an outbreak in Salvador against the proposed federation, and to force Salvador into the Union.

Central College, a coeducational institution in Fayette, Mo., organized in 1857, under the auspices of the Methodist Episcopal Church, South; has grounds and buildings valued at over \$150,000; endowment exceeding \$185,000; scientific apparatus, \$10,500; volumes in the library, over 11,000; average annual income, about \$27,500; professors and instructors, 13; students, 180; graduates, over 300.

Central Falls, a town in Providence county, R. I., on the Blackstone river, and the New York, New Haven and Hartford railroad, 4½ miles N. of Providence. It has large manufactories of cotton, woolen, silk, and hair cloth goods, and of machinery and leather, for which the river supplies excellent power. There are several churches, newspapers, and a National bank. Pop. (1910) 22,754.

Central Forces, the forces whose action is to cause a moving body to tend toward a fixed point called the center of force. By Newton's first law of motion we know that "every body continues in its state of rest or of uniform motion in a straight line, except in so far as it is compelled by forces to change that state." From this we learn that if the speed of a body changes, or if the line of motion be not straight, whether the speed be unaltered or not, some force must be acting. In the latter case the forces acting are called central forces. The doctrine of central forces considers the paths which bodies will describe round centers of force, and the varying velocity with which they will pass along these paths. It investigates the law of the force in order that a given curve may be described, and many other problems which can only be solved by mathematical methods. Gravity affords the simplest illustration of a cen-

Central Forces

tral force. If a stone be slung from a string, gravity deflects it from the rectilinear path which it would otherwise pursue, and makes it move in a curve called a parabola. Again, the moon is held in her orbit round the earth by the action of gravity, which is constantly preventing her from going off in the line of the tangent to her path at any instant.

In connection with this subject we have to make some remarks on what is called centrifugal force. We have seen that force must always be applied to make a body move in a curved path. Such a force is called a centrifugal force, the old erroneous notion being that bodies have a tendency to fly outward from the center about which they are revolving. The use of the term will, however, cause no inconvenience, provided we interpret it merely as indicating that, to keep a body moving in a curve instead of in its natural straight line, a force directed toward the center of curvature is always required.

Many familiar illustrations of the action of the so-called centrifugal force will occur to the reader. A ball fastened to the end of a string, and whirled round, will, if the motion is sufficiently rapid, at last break the string, and fly off in a tangential path. This is due to the fact that the cohesion of the particles of the string are no longer able to supply the force necessary to keep the ball moving in its circular path. For a similar reason a fly-wheel or a grindstone bursts when it is made to rotate too rapidly. It is found that at a curve on a railway it is the outer of the two rails which is most worn. This is due to the fact that the outer rail has to supply the force necessary to keep the trains moving in curved paths. A glass of water may be whirled so rapidly that, even when the mouth is downward, the excess of the centrifugal force over the weight of the water is sufficient to prevent the water from falling out. The centrifugal force increases with the velocity. As a matter of fact, it can be shown that when a body moves in a circle of radius r , with velocity v , its

centrifugal force is $\frac{mv^2}{r}$. By means of this

formula it can be proved that about $\frac{1}{298}$ of its weight is required merely to keep a body on the earth's surface at the equator. By this amount the weight of a body is diminished. Now 289 is equal to 17^2 . Hence it follows that if the earth were to rotate 17 times as fast as it does now, the attraction of gravitation would only just be able at the equator to keep bodies from flying off its surface. If the rotating body be plastic, it will swell out in all directions perpendicular to the axis of rotation, and assume the form of an oblate spheroid.

Central University

For the same reason the earth itself has assumed the form of an oblate spheroid, a result which is seen on a greater scale in the case of Jupiter and Saturn on account of their larger size and more rapid rotation. See also CENTER.

Central India, the official term for a group of feudatory States in India, which fall into nine political agencies, but are all under the supervision of the governor-general's agent. The region in which these States lie is to the N. of the British "Central Provinces" of India, and touches the United Provinces, Rajputana, Khandesh in the Bombay Province, and Chutia-Nagpur in Bengal. The total area is about 78,772 square miles; pop. (1901) 8,628,781.

Centralization, a term in a specific sense applied to a system of government where the tendency is to administer by the central government matters which had been previously, or might very well be, under the management of local authorities.

Central Park, the most noted park in New York City. It contains 840 acres and extends from 59th street to 110th street, and from Fifth avenue to Eighth avenue. It was laid out by Messrs. Olmsted and Vaux, and contains among other objects of interest, the Mall, the Croton Reservoirs, Cleopatra's Needle (the Obelisk), the Metropolitan Museum of Art, the Museum of Natural History, the Arsenal, and several natural and artificial lakes.

Central Provinces, an extensive British territory in India. They became a separate administration in 1861, and are under the authority of a chief commissioner. Their total area is 115,936 square miles, of which 86,501 square miles are British territory, and 29,435 the territory of native protected states, 15 in number. For administrative purposes the province is divided into four commissionerships, Jabalpur (Jubbulpore), Nagpur, Nerbada (Nerbudda) and Chhattisgarh. The Central Provinces contain much waste land and jungle. Coal is found at Ballarpur, Mohpacio, and Chandameta. The only important industries are cotton spinning and weaving, but the business of extracting and exporting manganese ores is of growing value, and various branches of the cotton industry are rapidly expanding. The Berars (area, 17,710 square miles; pop. 2,843,998) are attached to the Central Provinces for administration purposes. Pop. (1901) 9,876,646.

Central Tennessee College, former name of WALDEN UNIVERSITY (*q. v.*)

Central University of Iowa, a co-educational institution in Pella, Ia.; organized in 1853, under the auspices of the Baptist Church; has grounds and buildings valued at over \$100,000; endowment exceeding

Central University

\$125,000; scientific apparatus, \$11,000; volumes in the library, over 6,000; average annual income, \$18,000; professors and instructors, 23; number of students, including summer school, about 300; graduates, over 600.

Central University of Kentucky, an educational institution in Danville, Ky., originally organized in 1819, under the auspices of the Presbyterian Church, as Center College; is now non-sectarian in control; comprises the former Center College, as its classical, scientific, and literary department, the Kentucky Theological Seminary at Louisville, the Hospital College of Medicine at Louisville, and the College of Dentistry, also at Louisville; has grounds and buildings valued at over \$250,000; endowment, funds exceeding \$500,000; scientific apparatus valued at over \$30,000; volumes in the libraries, over 25,000; average annual ordinary income, about \$45,000; average number of professors and instructors, 110; students, about 1,200; graduates, nearly 3,000.

Central Wesleyan College, a co-educational institution in Warrenton, Mo., organized in 1864, under the auspices of the Methodist Episcopal Church; has grounds and buildings valued at over \$150,000; endowment funds aggregating \$150,000; volumes in the library, over 8,000; average annual ordinary income, about \$32,000; professors and instructors, 25; students, including summer school, 325; graduates, over 550.

Centrifugal and Centripetal. See CENTRAL FORCES.

Centumviri, judges of ancient Rome, three from each tribe, who determined ordinary causes. The extent of their jurisdiction is uncertain.



CENTURION.

Hollweg would confine it to civil cases; it seems probable that they at first handled questions relating to quiritian ownership, which determined the status of the citizens.

Centurion, a Roman military officer commanding a century or a company of infantry, consisting of 100 men. He answered to our captain.

Centuripe (chen-tō'-ri-pā; ancient, *Centuripa*), also called *Centorbi*, a town of Sicily, in the province of Ca-

tania, situated in a fertile district yielding soda, sulphur, and marble. The ancient

Cephalization

city, of which considerable remains exist, was one of the most flourishing of Sicily.

Century, an aggregate number of 100 of things; a period of 100 years. This is the uniformly accepted sense of the word now. Modern chronology among Christian nations centers at the birth of Christ, and the centuries are numbered according to their order either before or after that era; as the 1st or the 20th century A. D.; the 1st or the 3d century B. C.

The word is also applied to a division of the Roman tribes for the election of magistrates, the passing of laws, etc., on which the voting was by centuries; to a company of cavalry; a sub-division in the Roman army.

The "Centuries of Magdeburg" is an ecclesiastical history arranged in 13 centuries, compiled by a great number of Protestants at Magdeburg. Bacon also wrote a work on natural history, under the title of "Ten Centuries of Natural History," it being divided into 10 books, each containing 100 short articles.

Century-plant, a popular name of the *Agave americana*, or American aloe.

Ceos (sometimes called by the Italianized name of *Zea* or *Tzia*), one of the Cyclades, in the Ægean Sea, 14 miles off the Attic coast. It is 13 miles long, 8 broad and 39 square miles in area. The central and culminating point is Mount Elias, 1,863 feet high. It is fairly fertile, raising fruit, wine, honey, and valonia. In ancient times Ceos was noted as the birthplace of the poets Simonides and Bacchylides, and the physician Erasistratus; and the Cean laws were famous for their excellence.

Cephalaspis, a genus of ganoid fossil fishes found in the old Red Sandstone formation. The cephalic shield is prolonged behind into three acute projections, the two lateral ones produced backward so as to make the buckler resemble "a saddler's knife," i. e., the instrument with which leather merchants and shoemakers cut their leather. The species are sometimes called bucklerheads. The most common one is *Lyellii*.

Cephalization, in biology, a term proposed to denote a tendency in the development of animals toward a localization of important parts in the neighborhood of the head, as by the transfer of locomotive members or limbs to the head (in the Cephalopoda, for example). The term is also used to indicate the degree in which the brain dominates over the other parts of the animal structure.

Cephalodiscus

Cephalodiscus, one of the most curious and interesting organisms dredged by the "Challenger" expedition. It was found in the Strait of Magellan, was first supposed to be a compound *Ascidian*, was monographed (1887) by Professor McIntosh as one of the *Polyzoa* (section *Aspidophora*), but is regarded by Mr. Harmer as closely allied to that marvelous vertebrate-like worm, *Balanoglossus*. The organisms form a spreading seaweed-like brownish colony, measuring in some cases 9 inches by 6, and including a great number of little individuals, protected by a membranous, flexible investment or house. Each individual resembles *Balanoglossus* (and also in part backboneed animals) in many important points, such as (a) the presence of gill-slits; (b) the existence of a notochord as a dorsal outgrowth from the gut, growing forward into the anterior region or proboscis; and (c) the possession of a dorsal central nervous system, most richly developed in the middle region (or collar), but extending to the proboscis. As another apparent connecting link between invertebrates and vertebrates, *Cephalodiscus* is of the greatest zoölogical interest.

Cephalonia (ancient, *Kephallenia*), an island of Greece, the largest of the Ionian islands, W. of the Morea, at the entrance of the Gulf of Patras, about 31 miles in length, and from 5 to 12 in breadth; area, 348 square miles; pop., 80,543. The coastline is very irregular and deeply marked with indentations, and the surface is rugged and mountainous, rising in Monte Negro, the ancient Ænos, to a height of 5,380 feet. There is rather a deficiency of water on the island. The principal towns are Argostoli (9,000 inhabitants), and Lixuri (6,000). The chief exports are currants, oil, and grain; wine, cheese, etc., are also exported. The manufactures are inconsiderable.



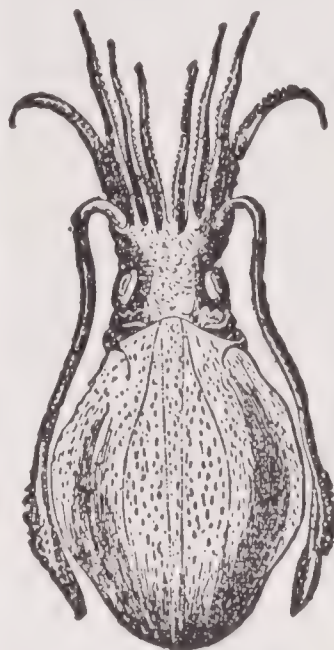
COIN OF CEPHALONIA.

Earthquakes are not infrequent. One of the most destructive was that of the year 1867.

Cephalopoda, a class of mollusks, the highest in organization of that division of the animal kingdom. To this class belong the Nautili, Spirulæ, Argonauts, Poulpes, Squids or Calamaries, Cuttle-fish, etc., of the present time, and the Ammonites, Belemnites, etc., of former geological periods. The Cephalopoda receive their name from having organs of prehension and locomotion attached to the head, an arrangement to-

Cephas

ward which a gradual approach may be traced in the highest gasteropod mollusks. These organs have been variously designated arms, feet, and tentacula. The body of the Cephalopoda is sack-like, formed of the mantle, open only at the end to which



A CEPHALOPOD.

the head is attached. In some this bag is almost spherical, and locomotion is accomplished only by the appendages of the head; in others the body is elongated and furnished with two fin-like expansions, which are the principal instruments of locomotion. The head is roundish, generally furnished with two large and prominent eyes, very similar to those of vertebrate animals. There are also ears, but they consist merely of little cavities, one on

each side of the brain, in each of which is suspended a membranous sac containing a small stone. The brain is more concentrated and highly developed than in other mollusks, and the whole nervous system is more complex than in the lower mollusks.

Cephaloptera, a genus of cartilaginous fishes of the ray family, having a pair of little fins which stand out from the head like horns; hence called fin-headed rays or horned rays. Only one species (*C. Giorna*) has been found near the British coast.

Cephalothorax, the anterior segment in spiders, scorpions, crustaceans, etc., consisting of the head and thorax combined.

Cephalus, the son of Deioneus, King of Thessaly, and husband of Procris, an Athenian princess. Aurora became enamored of him, but he remained faithful to his wife. Aurora, however, with a view of estranging his affections from Procris, wished him to prove his wife's fidelity. Disguised as a merchant, he entered his own house, and Procris's virtue was not proof against the riches he offered her. He then drove her from his door; but a reconciliation was soon effected between them. Finally, Cephalus, while hunting, accidentally pierced her with his spear; and, in despair at her death, killed himself with the same weapon.

Cephas, a surname given by Christ to Simon. In the Greek it is *Pētros* ("a rock"), in Latin, *Petrus*, and in English, Peter.

Cepheus

Cepheus (sēfūs), a king of Ethiopia and husband of Cassiopeia; his name was given to a constellation of stars in the N. hemisphere surrounded by Cassiopeia, Ursa Major, Draco, and Cygnus.

Cephissus, one of the two rivers which water the Athenian plain. It rises on the W. slope of Mount Pentelicus and the S. side of Mount Parnes, and flows past Athens on the W. into the Saronic Gulf near Phalerum.

Ceram, an island in the Moluccas, W. of New Guinea; area, about 7,000 square miles; pop., estimated at 200,000. It is about 200 miles long with an average width of 35 miles. Its interior is traversed by mountain ranges from 6,000 to 8,000 feet high, but is little known. The vegetation is luxuriant, the sago-palm supplying the chief food of the inhabitants as well as an article of trade. The inhabitants of the coast are of Malay origin, the interior being peopled by Alfoories. It is under the Dutch.

Ceramiaceæ, an order of *florideous algæ*. Rose-red or purple sea-weeds (one fresh-water?) with a filiform frond, consisting of an articulated, branching filament, composed of a single string of cells, sometimes coated with a stratum of small cells.

Ceramic Art, that department of plastic art which comprises all objects made of baked clay, as vases, cups, urns, bassi-rilievi, statuettes, etc., and including all the varieties of earthenware and porcelain which can be regarded as works of art. See POTTERY.

Cerastes, a genus of African vipers, remarkable for their fatal venom, and for two little horns formed by the scales above the eyes. Hence they have received the name of horned vipers. The tail is very distinct from the body. *C. vulgāris* is the horned viper of Northern Africa, a species known to the ancients. There are several other species.

Cerasus, the cherry-tree, a genus of trees of the order *Amygdalaceæ*. Three species are British: (1) *C. vulgaris*, called also *Prunus cerasus*, the Dwarf Cherry; (2) *C. Avium*, called also *Prunus Avium*, the Gean, and (3) *C. Padus*, called also *Lauro-cerasus Padus* and *Prunus Padus*, the Bird Cherry. Hooker considers Nos. 1 and 2 mere varieties of each other. The first of these is generally supposed to have originated the Garden Cherry, and the second the Morella. The leaves, bark and fruit of *C. Lauro-cerasus* (the Common Laurel), and the oil derived from them, are virulent poisons, owing to the amount of prussic acid which they contain. For a similar reason *C. capricida*, of Nepal, kills, as the Latin specific name imports, the goats of that region. *C. Padus*

Cercaria

and *C. virginiana* have the deleterious property in less measure. All the species of *Cerasus* yield a gum analogous to gum tragacanth. The leaves of *C. avium* have been used as a substitute for tea. A variety of the same tree is used in the Vosges and in the Black Forest in the preparation of the liquor called "Kirschenwasser." The kernel of *C. occidentalis*, a West Indian species, is employed in flavoring the liquor called "Noyau." The bark of *C. virginiana* is prescribed as a febrifuge. So also is that of *C. capollim* of Mexico. Some of the species are useful as expectorants, and are much used in bronchial affections.

Cerate, the name of an external medication, more or less liquid, having for its basis wax and oil. Simple cerate consists of 8 ounces of lard and 4 of white wax melted together and stirred till cold.

Ceratodus, a genus of fishes, order *Dipnoi*. With *Lepidosiren*, till lately placed among the *Amphibia*, it stands in organization at the head of the fishes, and constitutes the point of transition between them and reptiles. *C. Fosteri* is the Australian Mud-fish, and there are other recent species. Agassiz first founded the genus on certain horned teeth found in *Triassic* and *Jurassic* rocks. Seventeen types of teeth have since been found in Queensland in Australia, and in Central India.

Cerberus, the three-headed dog which guards the entrance of the kingdom of Hades and Persephonē. Orpheus, when he descended into the infernal regions in search of Eurydice, lulled him to sleep with his lyre; and Hercules dragged him from the gate of Hades, when he went to redeem Alceste. The fellow-monster of Cerberus was Orthros. The names of these dogs appear in the Vedic poems under the forms of Sarvara and Vritra, the two dogs of Yama.

Cercaria, originally considered a genus of *Infusoria*, but since shown to be the second stage in the development of a *Trematode* worm or fluke. The body is oblong, depressed, changeable; the mouth subterminal, armed or unarmed; acetabulum subcentral; tail filiform, simple, attenuate at the apex, deciduous. They are found parasitically on the body, or within the intestines, liver, ovaries, etc., of mollusca (*Symnæus*, *Planorbis*, etc.) and may be obtained by wounding the body in water.

Cercariæ Seminis Spermatozoa, or *Spermatic Animalcules*, is a name given by the older naturalists to certain moving bodies found in the seminal vessels in animals, and even in plants. Ohrenberg placed them under the *Haustellate Entozoa*. They are by the mass of biologists not now believed to be organisms.

Cercis

Cercis, a common genus of plants. Tribe, *Bauhinieæ*. *C. siliquastrum* is a tree, a native of the S. of Europe, and of several countries in Asia. It is a handsome, low tree with a spreading head. The leaves are remarkable for their unusual shape; they are of a pale, bluish-green color on the upper side, and sea-green on the under. The flowers have an agreeable acid taste, and are mixed in salads, and the flower-buds are pickled. It has received the name of the Judas-tree, from the tradition that it was upon a specimen of it, near Jerusalem, that the traitor Judas hanged himself.

Cercopithecus, a genus of monkeys, one of them being the Diana monkey (*C. Diana*), another the Mona monkey (*C. Mona*).

Cercyon, a famous robber, killed by Theseus.

Cerdic, a king of the West Saxons, who invaded England about the end of the 5th century, and established the kingdom of Wessex about 516. At his death in 534 his kingdom included the present counties of Berks, Wilts, Dorset, and Hants (including the Isle of Wight).

Cere (sēr), the naked skin that covers the base of the bill in some birds, and which is supposed to exercise a tactile sense.

Cerealia, the festival of Ceres, celebrated at Rome.

Cereals, a term derived from Ceres, the goddess of corn; though sometimes extended to leguminous plants, as beans, lentils, etc., is more usually and properly confined to the *Gramineæ*, as wheat, barley, rye, oats, and other grasses, cultivated for the sake of their seed as food.

Cerebration, exertion or action of the brain, conscious or unconscious.

Cerebro-spinal, pertaining to the brain and spinal cord together, looked on as forming one nerve mass.

Cereopsis, the pigeon-goose, an Australian genus of the *anatidæ* or duck family, and the sub-family *anserinæ*, or geese. *C. Novæ Hollandiæ* is abundant on the S. coast of Australia and the adjacent islands.

Ceres (sēr'ēz), the daughter of Saturn and Vesta, and goddess of corn, harvests, and tillage. To Jupiter she bore a daughter, Proserpine. Ceres corresponds with the *Isis* of the Egyptians, and the *Demeter* of the Greeks. She is represented with a garland of ears of corn on her head, holding in one hand a lighted torch, and in the other a poppy, which was sacred to her. The Romans instituted in her honor the festivals called *Cerealia*.

Ceres, an asteroid, the first found. It was discovered by Piazzi on Jan. 1, 1801. Having observed it at Palermo, in Sicily, he

Cerinthus

called it Ceres, after the old tutelary divinity of that island. Under favorable circumstances it has been seen by the naked eye as a star of the seventh magnitude, but more generally it looks like one of the eighth magnitude, only the light has a red tinge, and a haze is round the planet as if it had a dense atmosphere.

Cereus, the Torch-thistle, a large genus of plants of the order *Cactaceæ*, remarkable for their singularity of form and the beauty of the flowers. *C. giganteus*, the Suwar-row or Saguaro of the Mexicans, is the largest and most striking of the genus. It rises to the height of 50 or 60 feet, and looks more like a candelabra than a tree of the normal type. Other notable species are *C. senilis*, the long gray bristles of which give it the appearance of the head of an old gray-haired man. *C. grandiflorus* is the night-flowering Cereus, but there are others which also flower at night. *C. speciosissimus*, an erect plant, and *C. flagelliformis*, a creeper, are not unfrequently met with in gardens. The genus are generally useful as cardiac agents and anti-pyretics—particularly the Mexican fever-few, *C. Bonplandi*.

Cerigo (cher-ē'gō; ancient, *Cythēra*), a Greek island in the Mediterranean, S. of the Morea, from which it is separated by a narrow strait; area about 100 square miles. It is mountainous and barren, though some of the valleys are fertile, producing corn, wine, and olives. Excellent honey is produced. Sheep, hares, and quails are abundant. Pop. 13,250. On its W. coast is the town of Cerigo; pop. 1,200. It is the see of a Greek bishop.

Cerinthus, a heretic who lived at the close of the apostolic age, but of whom we have nothing better than uncertain and confused accounts. He is said to have been a native of Alexandria. He passed from Egypt into Asia Minor, and lived in Ephesus contemporaneously (according to the belief of the Church) with the aged apostle John. It is related by Irenæus, on the authority of Polycarp, that John held the heretic in such detestation that, on a certain occasion, when he encountered Cerinthus in the baths of Ephesus, he immediately left the baths, saying to those about him: "Let us fly, lest the bath fall on us, since Cerinthus is within, the enemy of the truth." It is also said by Irenæus that the Gospel by St. John was written in direct opposition to the tenets of Cerinthus. He held that the world was not made by the highest God, but by some angel or power far removed from and ignorant of the Supreme Being. He is also said to have held coarse and sensual millenarian views, to have believed the Jewish ceremonial law to be in part binding upon Christians, and to

Cerithium

have taught that the Divine Spirit was first united with the man Jesus in his baptism by John. Cerinthus being, so far as is known, the oldest teacher of Judaico-Gnostic principles, and, according to Neander, "the intermediate link between the Judaising and Gnostic sects," there would naturally be a greater incongruity and want of harmony in his system than in the later developments of Gnosticism.

Cerithium, the typical genus of the family *Cerithiadae*. One hundred and thirty-six recent species are known, and 460 fossil, the latter from the Trias onward till now.

Cerium (named by the discoverers after Ceres), a metal (Sym. Ce.; at. wt., 92); found with two other metals, lanthanum and didymium, in cerite. Powdered cerite is made into a thick paste with concentrated sulphuric acid, and heated nearly to redness. The mass is then treated with water, saturated with H_2S , filtered, acidified with HCl , and precipitated by oxalic acid. This precipitate heated in the air to redness gives a brown powder of the mixed oxides. Nitric acid dissolves the oxides of lanthanum and didymium, and leaves the oxides of cerium. The oxides of lanthanum and didymium are separated by the repeated crystallization of their sulphates. Cerium is obtained by reducing its chloride with sodium as a gray powder which decomposes water slowly. It dissolves in dilute acids with evolution of hydrogen. Cerous oxide, CeO , obtained by igniting the carbonate or oxalate, is a grayish-blue powder, which, in the air, oxidizes into ceroso-ceric oxide, Ce_2O_3 , a yellowish-white powder. The salts of the former are colorless, those of the latter brown-red or yellow.

Cernuschi, Henri (cher-nös'kē), a French economist, born in Milan, Italy, in 1821. He was graduated at Pavia (1842) and fled from Italy, owing to political proscription. He acquired a large fortune in Paris as a banker, and won fame by his economic writings. Among them are "Bi-metallism" and works in favor of silver. He died in Mentone, May 12, 1896.

Ceroxylon, a genus of South American palms; the wax palm.

Cerro Blanco, the highest mountain in New Mexico; summit 14,269 feet.

Cerro de Pasco, the capital of the Peruvian department of Junin, stands at an elevation of 14,276 feet, 138 miles N. E. of Lima. Near it are some of the richest silver mines on the continent. The climate is cheerless and inclement. Pop. 7,000, mostly Indians and half-breeds.

Cerro Gordo (ther'ō-gor'dō) [Sp. "Big Mountain"], a mountain-pass in Mexico, through which passes the National road

Ceruleum

from Vera Cruz to Jalapa and Mexico. It is celebrated as the scene of a victory by General Scott with 9,000 United States troops over an army of 13,000 Mexicans under Santa Ana, April 17-18, 1847. To intercept Scott on his march from Vera Cruz, the Mexicans took up a strong position in the pass and on the heights commanding it, but after two days' skirmishing Scott succeeded in dislodging and utterly routing them, with a total loss to himself of only 431 killed and wounded. This victory enabled Scott to take the town of Jalapa the following day.

Cerro Gordo de Potosi, a mountain in the Andes of Bolivia; S. W. of Potosi; 16,150 feet in height; remarkable for its deposits of silver.

Cerro Largo, a department in the N. E. of Uruguay, well watered, with large savannahs and forests. Area, 5,753 square miles; pop. (1901) 37,236, chiefly engaged in cattle-raising. Capital, Cerro Largo or Melo; pop. 5,000.

Cerros, or **Cedros Island**, an island belonging to Mexico, in the Pacific Ocean, off the W. coast of Lower California. It is for the most part mountainous and barren, but is thought to possess mineral wealth. Area, 12 square miles.

Certaldo, a town of Central Italy, 19 miles S. W. of Florence. It is noteworthy as the residence of Boccaccio, who was born and died here. His house is still standing, much as it was in the poet's time.

Certhidæ, or **Certhiadae**, a family of tenuirostral birds, with long, slender, and slightly arched bills, and short legs furnished with strong claws, which enable them to creep about upon the trunks and branches of trees. Sub-families: *Certhinae* (creepers proper), *Sittinae* (nut-hatches), *Troglodytinae* (wrens), *Dendrocolaptinae* (tree-creepers), *Synallaxinae*, and *Furnariinae*, or oven birds.

Certiorari, in law, a writ issuing out of a superior court to call up the records of an inferior court or remove a cause there depending, that it may be tried in the superior court. This writ is obtained upon the complaint of a party that he has not received justice, or that he cannot have an impartial trial in the inferior court.

Certosa di Pavia (chēr-tō'sa), a celebrated Italian monastery near Pavia, founded in 1836 by Galeazzo Visconti, Duke of Milan. The church is a splendid building.

Ceruleum, a blue pigment, consisting of stannate of protoxide of cobalt mixed with stannic acid and sulphate of lime.

Cervantes Saavedra, Miguel de, one of the greatest writers of modern times; born in Alcalá de Henares, Oct. 9, 1547. His parents removed from this place to Madrid when he was about seven years old. Their limited means made it desirable that he should fix on some professional study; but he followed his irresistible inclination to poetry which his teacher, Juan Lopez, encouraged. Elegies, ballads, sonnets, and a pastoral, "Filená," were the first productions of his poetical genius. Poverty compelled him to quit his country at the age of 22, to seek maintenance elsewhere; he went to Italy, where he became page to the Cardinal Giulio Acquaviva, in Rome. In 1570 he served under the papal commander, Marco Antonio Colonna, in the war against the Turks and African corsairs with distinguished courage. In the battle of Lepanto, in 1571, he lost his left hand. After this he joined the troops at Naples, in the service of the Spanish king. In 1575, while returning to this country, he was taken by the corsair Arnaut Mami, and sold in Algiers as a slave. He remained in slavery for seven years. Servitude, far from subduing his mind, served to strengthen his faculties. Vincente de los Rios and M. F. Navarrete, his chief biographers, relate the bold but unsuccessful plans which he formed to obtain his freedom. In 1580 his friends and relations ransomed him. At the beginning of the following year he arrived in Spain, and from this time lived in seclusion, entirely devoted to the muses.

He began his new poetical career with the pastoral novel "Galatea" (1584), in which he celebrated his mistress. Soon after the publication of this he married. Being thus obliged to look out for more lucrative labor he employed his poetical genius for the stage; and in the course of 10 years furnished about 30 dramas, among which his tragedy called "Numancia" is particularly valued. He did not appear again as an author till 1605, when he produced the first portion of that work, which has immortalized his name—"Don Quixote." All his attempts to better his condition were unsuccessful, and he lived contented with his genius and his poverty, and a modest though proud estimation of his merits. After an interval of some years, he again appeared before the public in 1613, with "Twelve Novels" (which may be placed by the side of Boccaccio's), and in 1614 his "Journey to Parnassus"—an attempt to improve the taste of his nation. In 1615 he published eight new dramas, with intermez-zos, which were indifferently received.

Envy and ill-will, in the meantime, assailed him, and endeavored to deprive the neglected author of his literary fame; for which the delay of the continuation of "Don Quixote" afforded the pretext. An unknown writer published, under the name

of Alonzo Fernandez de Avellaneda a continuation of this work, full of abuse of Cervantes. He felt the malice of the act painfully, but revenged himself in a noble manner by producing the continuation of his "Don Quixote" (1615), the last of his works which appeared during his lifetime; for his novel "Persiles and Sigismunda" was published after his death. He died April 23, 1616 (on the same day as Shakespeare), in Madrid, where he had resided during the last years of his life. He was buried without any ceremony, and no tombstone marks the spot where he rests.

Cervera y Topete, Pascual (ther-vā-rā-ē to-pā-tā), a Spanish naval officer; born in the province of Jerez, in 1833, of noble birth, his mother being a daughter of Count Topete y Valle, of Spain's royal family. He is a nephew of Admiral Topete, one of the most illustrious of Spain's naval officers and a man of great influence in the early part of the 19th century. Cervera was graduated at the Naval Academy of San Fernando; entered on active service in 1851; and was made first lieutenant in 1859; captain in 1868; and admiral subsequently. He was a prominent factor in the 10-years' war in Cuba, when he succeeded in blockading the ports and preventing the landing of filibusters; was sent to London, as a representative of Spain, to take part with other nations in a conference bearing on naval questions of international importance; and commanded the fleet sent against the American squadron operating in Cuban waters after the declaration of war in 1898. He took



ADMIRAL CERVERA.

refuge in the inner harbor of Santiago de Cuba, and when, on July 3, he attempted to escape, under imperative orders from his superiors, his entire fleet was destroyed by the squadron under the official command of Rear-Admiral Sampson and the actual command (in the temporary absence of that officer) of Rear-Admiral Schley. Ad-

Cervetri

miral Cervera and his surviving officers were sent to Annapolis, Md., as prisoners of war, and soon afterward were released and allowed to return to Spain. Cervera was a man of cultured and genial manners, of a kindly disposition and a gallant officer, for whom his captors felt the greatest admiration. He died April 3, 1909.

Cervetri (cher-vā-trē), a small place in Italy, in the province of Rome, where formerly stood the ancient Etruscan city of Cære. It has yielded many artistic and other objects of Etruscan manufacture.

Cervidæ, a family of mammals. Order, *Ruminantia*. The males of all the species and also the female of the reindeer have antlers, which are deciduous, this last character completely distinguishing them from the *Bovidæ* (Oxen). The antlers also are solid, thus discriminating them from the *Cavicornia*. The species are widely distributed and well known. But none are found in Africa S. of the Sahara or in Australia. Genera, *Cervus*, *Capriolus*, *Alce*, etc.

Cervin. See MATTERHORN.

Cervolle, or **Cervole**, **Armand de** (ser-vōl'), a famous French bandit chief, surnamed "The High Priest." He was taken prisoner with King John at the Battle of Poitiers (1356), and after being ransomed, plundered the S. of France with a band of troopers (*routiers*), and exacted tribute from Innocent VI. at Avignon. He served for a time under the Dauphin; pillaged Burgundy, Champagne, Alsace, and Lorraine; was made chamberlain to Charles V. in 1365; and was murdered in 1366.

Cervus, the genus of animals to which the stag belongs, forming the type of the deer family, *Cervidæ*.

Cesalpino, or **Cæsalpinus**, **Andrea** (chā-sal-pē-nō), an Italian botanist and physiologist, born in Tuscany in 1519. He studied and taught medicine and botany at the University of Pisa, and was physician to Pope Clement VIII. He was the author of a valuable work "On Plants," in which he classified plants by their parts of fructification. To this work Linnaeus, Jussieu, and other subsequent botanists were greatly indebted for their ideas of botanical classification. In his "Peripatetic Investigations" he propounded the theory of the circulation of the blood, which was afterward adopted and demonstrated by Harvey. He died in Rome, Feb. 23, 1603.

Cesari, **Giuseppi** (chā-zār'ē), [sometimes called ARPINO], an Italian painter, born at Arpino about 1568, was greatly honored by no less than five Popes. His works—in fresco and oil—display lively imagination, and great tact in execution. He died at Rome, July 3, 1640.

Cespedes

Cesarotti, **Melchior** (chā-sär-ōt'tē), an Italian poet and scholar, born in Padua, May 15, 1730. He held a professorship at Padua. His translation of "Ossian" (1763) was hailed as a work of genius. "A Course in Greek Literature" remains incomplete; but an "Essay on the Philosophy of Language Applied to the Italian Tongue" (1785), and on analogous theses, are perfect specimens of criticism; and his poetry, though now falling into secondary rank, is tasteful and ornate. He died in Solvaggiano, Nov. 3, 1808.

Cesena (chā-sā'na), a hill-town in the province of Forli, Central Italy, on the Emilian Way. Among its buildings are: A library founded (1452) by Domenico Malatesta Novello, which possesses 4,000 precious manuscripts; a Capuchin church containing one of the best of Guercino's paintings, and a noble cathedral. Productive sulphur mines are in the neighborhood; and the region has been noted ever since Roman times for the excellence of its wine. Cesena was the birthplace of Popes Pius VI. and VII. In 1357, under Maria Ordelaffi it made a famous defense against Alborno; but in 1377 it was barbarously pillaged by Robert of Genf. On March 30, 1815, Murat gained a victory here over the Austrians. Pop. (1901) 42,509.

Cesium, a monad metallic element; symbol, Cs.; at. wt., 133. It was discovered in 1860 by spectrum analysis in mineral waters and in several minerals, as mica, felspar, etc., also in the ashes of plants. It is separated by the greater insolubility of the double chloride with platinum. The hydrate is a strong base. Cesium carbonate can be separated from rubidium carbonate by its solubility in absolute alcohol. Cesium gives characteristic blue lines in its spectrum.

Cesnola, **Luiga Palma di** (ches-nō'lä), an American archæologist, born in Piedmont, Italy, June 29, 1832. He served in the Italian war with Austria and came to the United States in 1860, serving in the Civil War, and attaining the rank of Brigadier-General. He was United States Consul at Cyprus (1865-1877), where he made extensive archæological discoveries. In 1878 he became a trustee and director of the Metropolitan Museum of Art, in New York City, a post he held till death. In 1897 he was awarded a Congressional medal of honor for conspicuous military service. He was author of "Cyprus," "Cypriote Antiquities," and many similar works. He died Nov. 20, 1904.

Cespedes y Borges, **Carlos Manuel de** (thās-pā-thās-ē bor-gās), a noted Cuban insurgent, born in Bayamo, April 18, 1819. He studied at the University of Havana,

and later at Barcelona, Spain. Implicated in Prim's conspiracy, he was banished from Spain (1843), and returned to Cuba to practice law. As leader of the revolt of 1868, he was chosen by the insurgents President of the newly proclaimed republic. He was killed in a skirmish with the Spaniards, March 22, 1872.

Cespedes, Pablo de, a Spanish painter, sculptor, architect, poet, and man of letters, born at Cordova, in 1538, entered the University of Alcalá de Henares in 1556, and finally went to Rome, where he studied under Zuccherò and Michael Angelo, and became renowned both for frescoes and sculptures. In 1577 he obtained a prebend in the cathedral of Cordova, and from that time resided alternately in his native town and in Seville. His best pictures are in Cordova, Seville, Madrid, and several towns of Andalusia. He was the head of the then Andalusian school of painting, and numbered among his pupils some painters of distinction. He died in 1608.

Cestoid Worms, the cestoda, or intestinal worms of the class *Platyhelminthes*, consisting of tape worms and other creatures which resemble them in structure and habits. The number of different kinds is great. Their natural history is important in reference to the health of human beings and of the most valuable of domesticated animals. Cestoid worms in their most perfect state, when alone they possess the form from which their name is derived, are in reality compound animals, like many zoöphytes and ascidians. They do not, however, like these, subsist by food entering the system through mouths with which the individuals composing it are furnished; for the joints of a cestoid worm, the individuals composing the system or "colony" have no mouth; nor is there any mouth in what is, on various accounts, quite properly regarded as the head, but nutriment is obtained from the surrounding medium by endosmose—nourishing juices entering everywhere through the skin, as in the spongioles of the roots of plants, into the cellular tissues or parenchyma, of which the whole body consists. The head of a cestoid worm is furnished with hooks—different in different kinds—by which it affixes itself to the inner surface of the intestines of a vertebrate animal. When first it gets into this situation the body is very short, and has no joints; but they soon begin to appear as transverse striæ, and, gradually increasing in size, become in most of the kinds very distinct, and at last separate from the system in which they were produced, and are carried away out of the intestines of the animal which contained them. The only cestoid worms which infest the human

species are *bothriocephalus latus*, and tape worms, *tænia solium*.

Cetacea, aquatic mammals which depart in many important anatomical points from the other members of the class, their structure being so modified as to render them unfit for terrestrial life. The whalebone whales, the toothed whales, as the porpoise, narwhal, etc., and the extinct zeuglodon, represent the leading divisions of the group. The body is fish-like in form, the head passing gradually into the trunk which tapers posteriorly and ends in a bilobate caudal fin which is placed horizontally, not as in the fishes, vertically. The posterior limbs are wanting, and the anterior are converted into broad paddles or flippers, consisting of a continuous sheath of the thick integument, within which are present representatives of all the bones usually found in the fore limb of mammals, but they are not movably articulated, so that the paddle moves like a solid oar. The fish-like aspect is further increased by the presence of a dorsal fin, as in the dolphin and finner whale (see accompanying plate, fig. 7, 13); but this is a simple fold of integument, and does not contain, as in fishes, any bony spines. The vertebræ of the neck, seven in number are united more or less to each other, so that, as in the bottle-nosed whale, they form a single solid piece. The right whale (fig. 11) and its allies have no teeth in the adult state, their place being taken by the triangular plates of baleen or whalebone which are developed on transverse ridges of the palate. The frayed edges of these plates slope obliquely downward and outward from the middle of the roof of the mouth, so that when the mouth is shut there is a triangular space in the middle, the floor of which is formed by the enormous tongue. The water taken into the mouth is sifted by the frayed edges of the plates; it is driven out sideways between the plates and the tongue sweeps backward to the gullet any animals that have been caught in the fringes. But the fetal whales possess minute teeth, which are very soon lost. The porpoises, etc. (fig. 7-10), when they possess teeth in one or both jaws, have them numerous and conical in form; they have no milk predecessors. The stomach is divided into several chambers, but these are not, as in ruminants, connected directly with the gullet; they are rather appendages of the pyloric portion of the organ.

The arrangement of the respiratory and circulatory systems, which enable the *Cetacea* to remain for some time under water, are interesting. The nostrils open directly upward on the top of the head, and are closed by valvular folds of integument which are under the control of the animal.

When the animal comes to the surface to breathe it expels the air violently, and the vapor it contains becomes condensed into a cloud; if the expiration commences before the mouth of the spiracle or blow-hole is above the surface, a little water may be blown up like spray but no water from the mouth is thus discharged, for the soft palate firmly embraces during life the upper end of the larynx, so that the gullet is divided into two narrow passages, while the lungs have a continuous passage to the exterior. The blood-vessels, especially those of the thorax and spinal canal, break up into extensive plexuses or networks, in which a large amount of oxygenated blood is delayed, and thus the animal is enabled to remain under water, the necessity for changing the air in the lungs being diminished. The sub-orders of the *Cetacea* are as follows:

1. The toothed whales (*Denticete* or *Odontocete*). The family *Delphinida* comprises the grampus (*Orca*), with a very high dorsal fin; the *Beluga* or white fish, without dorsal fin and with teeth which fall out early, the food of the animal being chiefly cuttlefishes which it catches in open ocean; the *Phocaena* or porpoise, with sharp-edged teeth; this genus feeds on fish, and often gets stranded in pursuit of the shoals of mackerel and herring. The porpoise and also the grampus are seen in herds tumbling in such fashion as to suggest that they are performing somersaults. In reality, they alternately raise the head so as to bring the spiracle above the water for breathing, and allow it to sink again. The movements of a herd of these animals following each other in line, have had much to do with tales of the undulations of the sea-serpent. When they are in active pursuit of prey they swim straight forward with open mouth, the arrangement of the nostrils already described preventing the air-passages from being filled with water. The bottle-nosed whales (*Globicephalus*), with 12 to 14 teeth in each half of the jaw, and the fish-eating dolphins, with more numerous teeth, are frequent visitors from the North Sea to British shores, the *Inia* of the Amazon estuary being their S. representative. The Ganges has a single genus and species, the susu (*Platanista Gangeticus*), with a narrow parallel-sided beak. The narwhal (*Monodon*) is the type of a distinct family, of which the females have two imperfectly developed tusks of equal size embedded in the upper jaw, while in the male one of them develops into the long spirally-twisted horn (fig. 9), the dense ivory of which is sought after for certain ornamental purposes; the skull is unsymmetrical, and the rest of the teeth drop out early. In the nearly allied family of the *Ziphioid* or *Hyperoödont* dolphins the elongated beak is solid, in some fossil species

very solid, and the lower jaw has only one or two functional teeth in either half, the remainder being absent, or remaining small and embedded in the hard gum. Members of this family are found in N. and S. oceans, and occur fossil in the crag deposits of England. The cachalot or sperm whale is the best known example of the *Physeters* or *Catodont* family; the head of which is very large, and forms as much as a third of the whole length. In the concavity of the forehead is lodged the spermaceti, for which the animal is sought after. This is a soft fat lodged in the cellular tissue, which quickly hardens on exposure to the air. The cachalot feeds on cuttlefishes, and it is probably from their tissues that the ambergris is derived, which is found, like the bezoar stones, in the alimentary canal. The family derives its name, *Catodont*, from the presence of teeth in the lower jaw only.

2. The *Mysticete*, or edentulous whales, form three groups, of one of which the Greenland or right whale (*Balaena mysticetus*) is the type. The whalebone plates, already described, are long and thin; there is no dorsal fin, but the paddles are very broad. Although this family contains the largest mammals, the length of some individuals exceeding 60 feet, the gullet is exceedingly narrow, and their food consists almost entirely of the small mollusca and crustacea found floating near the surface of the open ocean. The whales strain the water, often discolored by the large numbers of these small animals, and thus, the gape being above 10 feet long, secure with each mouthful a great mass of animal life. The disproportion of the mouth to the size of the brain-case is well seen in fig. 12. The rorqual (*Physalus boops*), the razor-back (*Physalus antiquorum*), the humpback (*Megaptera*), and the finner (*Balaenoptera*, fig. 13) differ from the right whales in having a dorsal fin usually near the posterior end of the body, and in having the paddles longer than broad. Members of this group are found both in the N. and S. seas.

3. The *Zeuglodonts* form a group that differ from these already described in having simple teeth in the position of the incisors of other mammals, and in having both above and below several molar teeth with sharp serrated margins like those of the seal, and with two roots; further, some of these have vertical successors. The fore limb had more free motion than that of other *Cetacea*, since the humerus has articular surfaces on its distal end. Thus the *Zeuglodonts* which are found fossil in the Miocene strata link the *Cetacea*, by the ziphioid whales, to the aquatic *Carnivora*, such as the seal.

The cetaceans above mentioned are frequently distinguished as carnivorous from the herbivorous cetaceans comprised in the

CETACEA, EDENTATA, &c.

FIG.

1. Skull of Camel.
2. Llama.
3. Giraffe.
4. Skull of Giraffe.
5. Manatee.
6. Skull of Dugong.
7. Dolphin.
8. Skull of Dolphin.
9. Narwhal.
10. Skull of Sperm Whale or Cachalot.
11. Greenland or Right Whale.
12. Skull of Greenland or Right Whale.
13. Finner Whale.
14. Short-tailed Manis.
15. Ant-eater.
16. Skull of Ant-eater.
17. Common Armadillo.
18. Skull of Common Armadillo.
19. Skull of Sloth.

1



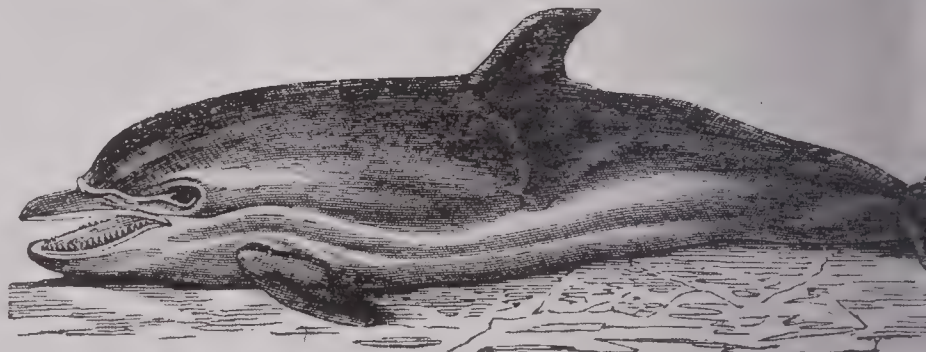
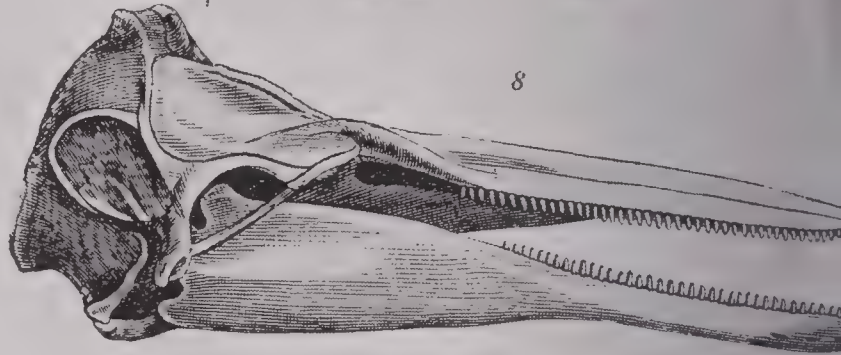
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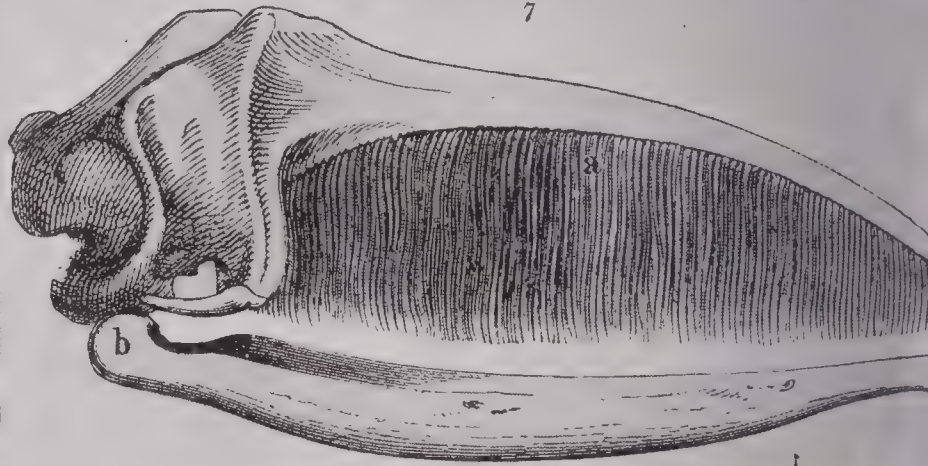
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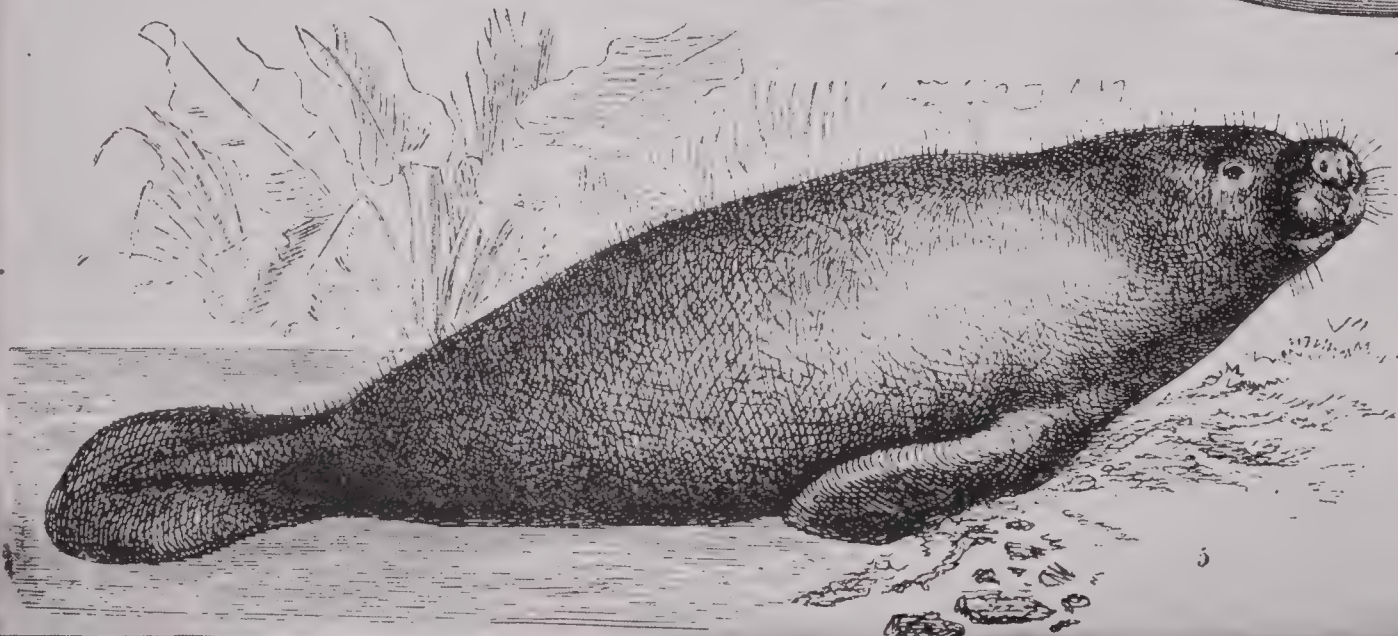
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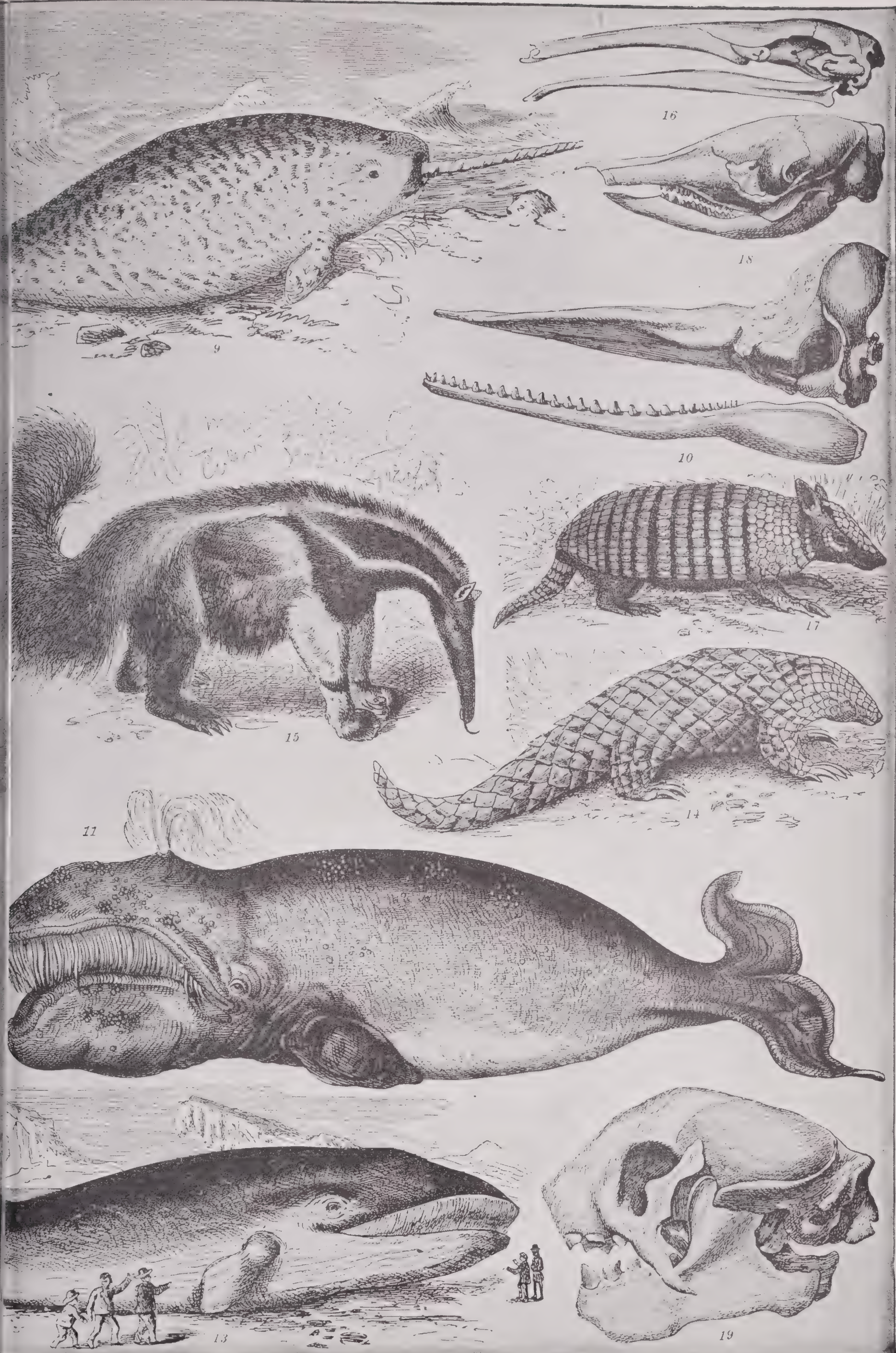


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group *Sirenia*. The combinations of the two under a single order has been objected to on the ground that the *Sirenia* rather approximate to the pachyderms. The two groups agree in the general fish-like form of the body, but this is less distinct in the *Sirenia*, in which (see fig. 5) the nostrils are terminal, the head distinct from the body, though the separation is not very strongly marked; the long paddles bear rudimentary nails, and the skin is provided with bristles. The small mouth, the fleshy muzzle, and the position of the teats, which are pectoral, not ventral as in the whales, may, it has been suggested, have had some share in the origin of the mermaid legends of earlier voyagers, the peculiarities of the *Sirenia* and of the eared seals being mixed up in the tradition. The distribution of this group is peculiar; the lamantin or manatee (*Manatus*) is found on the coasts of tropical Africa and South America, on opposite sides of the Atlantic; the dugong (*Halicore*) in the Indian Ocean, and on the Australian coast; *Rhytina* inhabited the shores of Bering Strait less than a century ago, but is now extinct. *Hali-therium* found fossil in Miocene strata, is the only member of the group which had hind limbs. The skull of the dugong (fig. 4) obviously differs greatly from that of the cetaceans, especially in the shorter and more massive jaws. The incisors of the upper jaw project in the male as two tusks, in the female they are also symmetrically developed, but remain concealed in the premaxilla; those of the lower jaw disappear very early in life. The symmetrical development of the tusks and the enlargement of the bones supporting them has much resemblance to what takes place in the elephant, and the kinship thus suggested to the pachyderms is confirmed by the character of the molar teeth. These are not simultaneously developed in the jaws, but the anterior simple are shed before the more complex posterior ones are in place, the succession from behind forward being such as prevails in the proboscidean family. The manatee advances a step in respect of its dentition; the crowns of the molars are covered with enamel; they have two or three transverse tuberculated ridges, those of the upper jaw have three, of the lower jaw two divergent roots. Some of the molars, however, have milk predecessors. In *Rhytina* horny ridges of the mucous surface above and below do the work of teeth which were not present. The stomach of the existing genera is divided into a cardiac and a pyloric cavity, as in *Cetacea*, and the pyloric is here also provided with cæcal appendages. Without giving a decided opinion on the question of classification, it seems advisable to bring the two groups into close proximity, since, even though the *Cetacea* leads towards the *Carnivora*, and

the *Sirenia* towards the *Ungulata* or hoofed quadrupeds, there are resemblances in structure and analogies in mode of life which justify us in regarding them as superficially at least, a natural assemblage.

Cetewayo (set-ē-wä'yō), a Kaffir chief or king, son of Panda, King of the Zulus. Disturbances as to the succession having arisen in Zululand, Theophilus Shepstone, representative of the Natal government, secured the recognition of Cetewayo as king in 1873. The latter, however, in spite of the obligations into which he had entered, proved a tyrannical ruler, and maintained a large army. A dispute which had arisen regarding lands on the frontier was settled by arbitration in favor of the Zulus; but on the refusal of Cetewayo to comply with the conditions imposed, war was declared against him by the British, and the king made prisoner soon after the battle of Ulundi (July, 1879). In 1882 he was conditionally restored to part of his dominions. In the following year he was driven from power by the chief Usibepu, and remained under the protection of the British until his death in 1884.

Cethegus, Caius Cornelius, one of the conspirators with Catiline. He was put to death in prison by order of the Senate, at the instigation of Cicero, in 68 B. C.

Cetiosaurus, or Ceteosaurus, a name given by Owen to a genus of fossil Saurians found in the oolitic and cretaceous formations. It belongs to the order *Deinosauria*. Only one species is known. Its height when standing on all fours must have been 10 feet, and its length 50, 60, or 70 feet. It was herbivorous.

Cetotolite, an ear-bone referred to some cetacean mammal. Specimens are found in the Red Crag, which is of Miocene age.

Cetus ("the Whale"), a large constellation lying on both sides of the equator, but mostly S. of it, one of Ptolemy's original 48. It is surrounded by Pisces, Aries, Taurus, Eridanus, Fornax, Sculptor, and Aquarius. It contains the remarkable variable star Omicron Ceti, or Mira.

Cetyl, an alcoholic radical supposed to exist in a series of compounds obtained from spermaceti.

Cette (set), an important seaport town of France, in the department of Hérault, built on a neck of land between the lagoon of Thau and the Mediterranean, 23 miles S. W. of Montpellier. The space inclosed by the piers and breakwater forming the harbor can accommodate about 400 vessels; and the harbor is defended by forts. A broad deep canal, lined with excellent quays, connects the port with the Lake of Thau, and so with the Canal du Midi and the Rhone, thus giving to Cette an extensive inland traffic; it has likewise an active foreign commerce.

Cettinje

The principal trade is in wine, brandy, salt, dried fruits, fish, dyestuffs, perfumery, and verdigris. Cette has shipbuilding yards, salt works, glass works, factories for the manufacture of syrups and grape sugar, etc. It is a resort for sea bathing, and has extensive fisheries. Colbert founded it in 1666. Pop. (1901) 33,065.

Cettinje (chet-ten'yā), the capital of the Kingdom of Montenegro; situated in a lofty mountain-valley, 19 miles E. of Cattaro, with which it is connected by a steep road. It contains the palace of the ruler, and a convent founded in 1478. Turkish invaders sacked and burnt the town in 1683, 1714, and 1785, but it was each time rebuilt. Many famous Montenegrin rulers lie buried here. Pop. about 4,500.

Ceuta (thā'yū-tā), a fortified port belonging to Spain, on the coast of Morocco, opposite Gibraltar. The town occupies the site of the Roman colony of *Ad Septem Fratres*, so called from the seven hills rising here in a group, of which the most prominent are Montes Almina and Hacho; on the latter, the ancient *Abyla* (one of the Pillars of Hercules), is a strong fort, and on the former, among beautiful gardens, lies the New Town. Ceuta contains a cathedral, a hospital, and convents, but is chiefly of importance as a military and convict station. The harbor is small, and exposed to the N., but has a lighthouse and some small trade. The mixed population number (1900) 13,269. The place was a flourishing mart under the Arabs, who corrupted its Roman name to Sebtah; there the first paper manufactory in the W. world is said to have been established by an Arab who had brought the industry from China. In 1415 it was captured by the Portuguese, and annexed to Portugal; it fell to Spain in 1580. It has resisted several sieges by the Moors (1694-1720 and 1732), and is still the most important of the four African Presidios. An attempt to strengthen the fortifications was abandoned (1899) upon representations from the British government to the cabinet at Madrid.

Cevennes (sev-en', ancient Cebenna), the chief mountain range in the S. of France. With its continuations and offsets, it forms the watershed between the river-systems of the Rhone and the Loire and Garonne. Its general direction is from N. E. to S. W., beginning at the S. extremity of the Lyonnais mountains, and extending under different local names as far as the Canal du Midi, which divides it from the N. slopes of the Pyrenees. The Cevennes extend for over 150 miles, through or into nine departments, the central mass lying in Lozère and Ardèche, where Mount Lozère attains 5,584 feet, and Mount Mézen (the

Ceylon

culminating point of the chain) 5,754 feet. The average height is from 3,000 to 4,000 feet. The mountains consist chiefly of Primary rocks, covered with Tertiary formations, which in many places are interrupted by volcanic rocks.

Ceylon (native Singhala, ancient Taprobane), an island belonging to Great Britain in the Indian Ocean, about 60 miles S. E. of the S. extremity of Hindustan, from which it is separated by the Gulf of Manaar and Palk's Strait. It lies between lat. 5° 56' and 9° 50' N., and between lon. 80° and 82° E., having the shape of a pear, with the broad end S. Length, about 270 miles N. to S.; average breadth, 100 miles; area, 25,364 square miles. The N. and N. W. coasts are flat and monotonous, those on the S. and E. bold and rocky, presenting a highly picturesque appearance, which is further heightened by the exuberant vegetation, the noble palm forests, the luxuriant corn fields, and the verdant slopes of the mountains enameled with bright flowers, herbs, and creeping plants, whose delicious perfume spreads far and wide. Many parts of the coast, both at its S. and N. extremities, are studded with small, rocky, and verdant islands, some of them overgrown with palms, and presenting a singularly beautiful appearance. At Trincomalee, on the N. E. coast, there is one of the finest natural harbors in the world; at Galle on the S. coast there is also a harbor; while the harbor at Colombo, the capital, is capable of admitting the largest vessels, and is now the regular calling-station for mail steamers to and from Calcutta, China, and Australia. Between the islands of Manaar on the N. W. coast of Ceylon and the island of Ramiseram on the coast of India, is a ridge of sand-banks called Adam's Bridge, which nearly connects Ceylon with the continent, being intersected only by three narrow shallow passages, the remainder being covered with two or three feet of water at full tide. These channels admit only very small vessels, but ships of some size can get through between Ramiseram and the mainland; and schemes for the passage of larger vessels have been projected, as also for a railway along Adam's Bridge.

Mountains, etc.—The mountainous regions of Ceylon are confined to the center of the S. and broader part of the island. They gradually diminish to hills of moderate elevation as they recede from the central mass, and are succeeded on the W. side by a flat tract extending to the coast. Their average elevation is somewhere about 2,000 feet, but there are several summits upward of 7,000 and 8,000 feet high. The highest summit is Pedrotallagalla (8,260), but Adam's Peak, reaching 7,420 feet, is the most remarkable from its conical form, the distance from which it is visible from

the sea, and from the sacred associations with which it is connected, the summit being the point from which Buddha, according to his followers, ascended to heaven, a gigantic footprint bearing testimony to the fact. Other summits are Tolapella (7,720) and Kirrigalpota (7,810). The forms of the mountains of Ceylon are singularly varied. They most frequently occur connected in chains, and terminate in round or peaked summits. Their sides are always steep and occasionally precipitous and rocky. There is no proportional correspondence between the heights of the mountains and the depths of the adjoining valleys, and often the valleys are extremely narrow. The deepest are in the heart of the mountains. Some are between 3,000 and 4,000 feet deep, and not over half a mile wide.

Rivers and Lakes.—The rivers of Ceylon, though numerous, especially on the S. and S. W. sides, are small, being merely mountain streams, navigable only by canoes, and that but for a short distance from their mouths. The Mahaveli-ganga, which rises near Adam's Peak, and falls into the sea by a number of branches near Trincomalee, is by far the most important. It has a course of 134 miles, and drains upward of 4,000 square miles. Timber grows on its banks in great abundance, consisting of halmalille, ebony, satin-wood, etc., which is floated down to the harbor during the freshets. Of the remaining rivers the Kalani-ganga, the Kala-ganga, and the Maha Oya reach the sea on the W. coast; and the Gintota-ganga at Galle. All the rivers are liable to be surcharged with rain during the monsoon, and to inundate the level country, while the heat of the sun on drying the country produces malaria. There are numerous extensive lagoons or backwaters round the coasts, but no lakes in the island worth noticing, the largest being only 4 miles broad. There are rills and streamlets rushing along in every direction among the mountains, so overhung with superabundant vegetation as to be frequently invisible.

Geology and Mineralogy.—Ceylon is mostly formed of ancient stratified rocks, but owing to the obliteration of fossil remains it is doubtful whether they have been deposited on the beds of seas or lakes. The mountains are composed of Primary and metamorphic rocks, the prevailing rock on the island being gneiss, though laterite (or "cabook") and a sort of dolomite also occur in considerable quantity. In the Nuwara-Eliya district and elsewhere there are large alluvial tracts. Basalt is found near Galle and Trincomalee, and at Pettigallakanda an ancient lava occurs. The soil is mostly formed from the disintegration of gneiss. The W. coast of the island is believed to be rising. Plumbago is

found in sufficient quantities to make it of commercial importance, anthracite is obtained, and among the metals occurring in the island are iron in fair quantity, manganese, gold, platinum, molybdenum, nickel, cobalt, copper, and tin. No coal has been found, but niter and salt occur (the latter is also a somewhat important article of manufacture). Gems of many kinds are abundant, particularly near Ratnapura. They are found either embedded in the rock or washed down in the alluvium of riverbeds, and include zircons, amethysts, cat's eyes, topazes, moonstones, garnets, spinel, sapphires, rubies, cinnamon stones, etc. There are hot springs at Bintenna, Trincomalee, and Puttalam.

Communications.—Ceylon is now well provided with roads. A highway has been made from Colombo to Nuwara-Eliya, 6,000 feet above the level of the sea. A continuous line, 769 miles in length, makes the entire circuit of the coast, and every town of importance is connected by roads with the two chief cities. The roads in general are good, being frequently macadamized, and in the neighborhood of the chief towns are adapted for carriages. During the monsoons, however, the roads in many parts are impassable from inundations. The formation and maintenance of roads, bridges, streets, and canals forms one of the chief items of expenditure of the government. Railway extension is also a government affair, and there are now nearly 300 miles in all, the main line being that between Colombo and Kandy (75 miles). In the early part of the 19th century there was not a single road in the country, merely a few pathways, the greater part of the island being then covered with impenetrable forests.

Climate.—Where the jungle has been cleared away and the land drained and cultivated, the country is perfectly healthy; where low wooded tracts, and flat marshy lands abound, covered with a rank, luxuriant vegetation, the climate is eminently insalubrious, showing, what is now pretty well understood, that mere heat has little to do with the unhealthiness of tropical climates. The heat is not so great as on the neighboring coast of India, the sea breezes moderating the temperature. At Colombo, on the W. side of the island, near the 7th parallel of N. lat., the mean daily variation of the temperature does not exceed 3°, and the annual range is from 76° to 86° 30' F. At Nuwara-Eliya (6,000 feet high) the annual range is from 32° to 80°. The E. part of the island being exposed to the N. E. monsoon has a hot and dry climate, resembling that of the coast of Coromandel; while the W. division, being open to the S. W. monsoon, has a temperature and humid climate like that of the Malabar coast. The quantity of rain that falls an-

nually in Ceylon is estimated at three times the quantity that falls in England, the rains being less frequent, but much heavier. The interruption which the course of the monsoons meet with from the mountain ranges of the island causes deluges of rain to fall on one side, while the other is parched with drought. At Kandy, in the interior, the average annual fall of rain is 85.3 inches; at Colombo, on the sea coast, 75 to 80 inches. The prevalent diseases are those of the liver and intestines, often accompanied by fever. Elephantiasis and other cutaneous complaints are common. The very fatal disease called beriberi (*Hydrops asthmaticus*) occasionally occurs, being almost peculiar to the island.

Animals.—Most of the animals found on the opposite continent are native to this island, excepting the royal tiger, which does not exist here. Elephants are numerous, especially in the N. and E. provinces, where they sometimes do great injury to the growing crops. The elephants of Ceylon are esteemed for their superior strength and docility. The eagerness with which they are hunted has greatly diminished their numbers. Since 1869 licenses for the capture and exportation of elephants must be obtained from the government. Bears, buffaloes, leopards, jackals, monkeys, and wild hogs, are numerous. There are several species of deer, of which the elk and fallow deer (properly the rusa or great axis and the spotted axis) are most abundant. Porcupines, bandicoots, squirrels (flying and other), bats, mongooses are to be found, as are also the pangolin or scaly ant-eater, and the loris or Ceylon sloth. Flying-foxes and rats are numerous. Pheasants, snipes, partridges, pigeons, peacocks, and a great variety of birds, of splendid plumage, are plentiful. Crocodiles, serpents, and reptiles of all sorts abound. Of the snake tribe, consisting of about 26 different species, six only are venomous. Among the insects are the leaf and stick insects, the ant-lion, the white ant, etc.

Vegetable Products.—In the luxuriance of its vegetable productions, Ceylon rivals the islands of the Indian Archipelago, and in some respects bears a strong resemblance to them; its most valuable products are tea, rice, coffee, cinnamon, and the cocoanut. Coffee used to be the chief cultivated crop, but disease has within recent years much reduced the produce. Cinnamon, called by the Singhalese *corundoo*, grows in the S. W., to which it is almost exclusively confined, requiring a sandy soil with a moist atmosphere. The trade in this spice was reserved as a government monopoly by the Dutch when they had possession of the island; all that was collected beyond the quantity which it was thought could be sold at a monopoly price being burned. This absurd system was followed by the En-

glish for some years after their conquest of Ceylon, but was abandoned in October, 1832, when the trade in cinnamon was declared free, subject to a duty on exportation. The cocoanut trees grow along the entire W. and S. coasts in countless numbers, each tree producing from 50 to 100 nuts in the year. Every part of this invaluable tree is capable of being turned to profitable account. The Palmyra palm, which grows principally in the N. part of the island, is of hardly less importance than the cocoanut, being productive in seasons of drought, when the crops fail. The jaggery palm, or *kittul* tree, is cultivated for the sake of its sap, which yields a coarse sugar; its pith furnishes a kind of sago; and its fruit is also eaten. The talipot palm also abounds, as do the jack and breadfruit trees, the fruit of which is used by the natives for food, both raw and cooked; the timber, also, of the jack tree, not being subject to be attacked by the white ant, is much used by the natives for making furniture, and in house-building. The Ceylon areca nut, celebrated for its superior qualities, is exported in large quantities. Tobacco is raised principally in the N. district, and is of excellent quality. Indigo grows wild, but is not sought after. The cardamon plant is abundant, but inferior to that of Malabar; fruits and culinary vegetables are produced, the latter in the elevated districts, in great variety and profusion. The island abounds with timber of various descriptions, including calamander, satin, rose, sapan, iron, jack, halmalille, and other beautiful woods adapted for cabinet work. Agriculture generally, and the cultivation of the more valuable native products of the island in particular, are improving. As already stated, coffee once was the chief crop but latterly the cultivation of tea, cinchona, and cacao has been carried to such an extent that the island has become less dependent on a single article of produce. Notwithstanding the acknowledged fertility of Ceylon, the capabilities of its soil where justice is done to it, and the efforts now in progress to develop these capabilities, by far the largest proportion of the island is still uncultivated. There are a few natives who possess considerable estates in land; but the law of inheritance has, for the most part, caused a minute subdivision of the soil, to a degree very unfavorable to its improvement. The British government claims the proprietorship of all the waste lands, which are now disposed of by public sale. Among works carried on by the government are irrigation works in suitable localities, including the cutting of channels, the construction of annicuts or dams, and the formation and repair of tanks. Some of the ancient works of this kind are of great magnitude. There is also a gov-

ernment forest department, part of the work of which is to provide fuel for the railways, and timber for government works.

Pearl-fishery, etc.—There has long been a pearl-fishery on the coast of Ceylon, carried on as a government monopoly. The fishery sometimes fails for years, there having been none, for instance, between 1837 and 1854, or between 1863 and 1874. Although the government still continued a strict surveillance over the banks, and occasionally subjected them to a careful examination, scarcely any trace of the pearl oyster was to be found. No cause has yet been discovered for this disappearance. When the pearl-fishery is in existence it is confined to the Gulf of Manaar, where the oyster banks extend for 60 or 70 miles along the coast S. of Manaar, and perhaps 10,000 people including 2,500 divers will assemble in the fishing season. The Ceylon pearls are whiter than those of Ormuz or the Arabian coast. The chank or conch fishery was at one time carried on to a great extent, employing about 600 divers, but has greatly declined owing to the little demand now made for them in Bengal, to which the greater part were sent. The chank is a sea-shell (*Voluta pyrum*), adapted for cutting into rings, these being formerly used in great numbers by the native women of Hindustan for bracelets and anklets.

Manufactures, Trade, etc.—The manufactures of Ceylon are very unimportant, with exception of arrack, which is distilled from the juice of the cocoanut tree. The spinning and weaving of cotton goods, generally of the coarsest kind, was at one time a considerable industry, but is now dying out. There are numerous oil mills for pressing the cocoanut kernels to express the oil. The Singhalese make good artisans, as is experienced at Colombo, where they are employed in making steam engines and other machinery. They are skillful in carpentry and wood-work, expert workers in gold and silver, and excel in the manufacture of lacquered ware. Salt is a government monopoly, being collected from shallow lagoons, which at certain seasons are overflowed by the sea, or it is manufactured in pans, the property of the government. The exports are chiefly tea, coffee, cinchona, cinnamon, cocoanut products, areca nuts, cacao, cardamoms, plumbago, tobacco. Tea has only begun to be exported in recent years, and the export has increased from 2,392,975 pounds in 1884, to more than 130,000,000 pounds. The total value of exports in 1899 (taking a rupee at 2s.) was £11,140,000; of the imports £10,150,000. The trade of Ceylon is chiefly carried on with Great Britain and India, the former of which received from the island in 1899 goods valued at £5,077,758, and sent thither goods to the value of £1,464,760. The chief article exported to Great Britain

is tea, the value of which in 1899 was £3,730,936, while in 1884 it was only £158,969. The only other exports thither worth mention are coffee, cocoanut oil, and plumbago. The principal articles of import from Great Britain are coals, cotton manufactures, apparel and haberdashery, iron and steel manufactures, machinery, etc. The imports from Great Britain of manufactured cotton goods in 1899 was £227,598, wrought and unwrought iron £138,807, and coals £195,005. From other countries are imported rice, dried fish, wheat, sugar, etc.

Government, etc.—Ceylon is one of the British crown colonies, its government being conducted by a governor and two councils, executive and legislative, of both of which the governor is president. The first is composed of six members, including the governor; the other of 17 members, including the members of the executive council, four other office-holders, and eight unofficial members selected by the governor as representative of the different classes and interests in the community. The powers of the councils are limited, being wholly subservient to the governor, who can carry into effect any law without their concurrence. All laws must be approved of by the Secretary of State for the Colonies before they can take effect. Any individual properly qualified may be appointed to the most responsible situation, without reference to service, nation, or religion, and native Singhalese have occupied some of the highest posts.

The island is divided into nine provinces—the Eastern, Western, Northern, Southern, Central, North Central, Northwestern, Sabaragamuwa, and Uva, and subdivided into districts. In each province is stationed a government agent. For the administration of justice there are in the civil and criminal departments a supreme court, established at Colombo; also a vice-admiralty court, and provincial courts, stationed in various districts; besides magistracies. There are municipalities or local boards in the towns, and there are also native village councils. The chief sources of revenue are the custom duties, railway receipts, land rents, and salt farms. Till Jan. 1, 1870, duties were levied on the chief articles of export; but these are now free. The revenue for 1898 was £2,513,866; expenditure, £2,284,385. There is a public debt which amounts to about £3,470,000; but the finances are in a very healthy condition, as the public debt of the colony has been mostly incurred for the construction of railways.

People.—The present population of Ceylon is composed of Singhalese, Cingalese, or Ceylonese, descendants of immigrants from Hindustan who entered the country in the 6th century B. C., Malabars or Tamils, originally from Southern India. Moors,

Malays, Veddahs, and a small proportion of Europeans and their descendants. The Singhalese inhabiting the coasts are a mild, timid race, obsequious to strangers, and hospitable and humane. Their stature is rather below the middle size; their limbs slender, but well shaped; eyes, dark, finely-cut features, hair long, smooth, and black, turned up and fixed with a tortoise-shell comb on the top of the head; color varying from brown to black, or rather from the lightest to the darkest tints of bronze. The Singhalese of the interior, or Kandian Singhalese, are a superior race, being stouter, handsomer, and of more manly and independent bearing, with a greater degree of intelligence. The Malabars of Ceylon are similar in all respects to those of the continent. The Mohammedans or Moors are an energetic and industrious people, and engross a large proportion of the commerce and traffic of the island. The Veddahs, a savage race, are supposed to be a portion of the aboriginal inhabitants of Ceylon. They inhabit the most secluded and inaccessible parts of the island, and subsist entirely on wild fruits and animals. A cloth round the loins is their only clothing; and their habitations, generally of small dimensions, are formed for security among the branches of large forest trees. They are a robust and hardy race, but extremely peaceable and inoffensive. The other inhabitants of the coast consist of Dutch, Portuguese, and English; some Malays or natives of the Eastern Archipelago, a few Chinese and Parsee traders, and a various population sprung from the intermixture of these races with each other. The descendants of the Dutch and other Europeans are known as *burghers*. The population is rapidly increasing. In 1832 it scarcely amounted to 1,000,000; while in 1881 it was 2,750,000. In 1901 the total was 3,578,333, including 2,331,045 Singhalese, 953,535 Tamils, 228,706 Moormen, and 9,509 Europeans. The increase is partly to be attributed to the number of coolies who come from India for employment on the plantations.

Religion, Language, Public Education, etc.—More than half the population are said to be Buddhists, and about 500,000 are of the Hindu religion. Buddhism chiefly prevails in the interior, and generally among the Singhalese of the sea-coasts. It is maintained and protected by the British government, agreeably to the treaty of 1815. On the W. and S. W. coast numbers of the Singhalese profess the Roman Catholic religion. There are a number of Episcopal clergy in the island, subordinate to the Bishop of Colombo; various other Protestant bodies have places of worship, but the Protestants are less than half the number of the Roman Catholics.

The Singhalese have a colloquial language peculiar to themselves, but their clas-

sic and sacred writings are either in Pali or Sanskrit. The Malabars use the Tamil. English is becoming more and more common, "and there is scarcely a roadside village in Ceylon now where the traveler could not find some persons to speak English, or interpret for him." The government has a department of public instruction, and good progress is being made in education throughout the island. On Jan. 1, 1891, there were 146,500 children participating in public instruction, a number of the schools being maintained or aided by the government. There are schools maintained also by the Church Missionary Society, by the Wesleyan, the American, and the Baptist Missionary Societies, besides a number of private and some regimental schools.

Antiquities, History, etc.—The Singhalese annals contain a historical record of events for 24 centuries; and their authenticity, as regards descriptions of ancient towns and buildings, and other works of art, is established by existing ruins, proving that the island had been, at a remote period, inhabited by a powerful and numerous people. The ancient capital Anuradhapura and its neighborhood contain many interesting and splendid relics of the ancient Singhalese civilization. Chosen as the capital in 437 B. C., it received fully a century later various relics of Guatama Buddha, and to contain these as well as other sacred articles many temples were erected. In the 1st century of our era the city occupied an area of 256 square miles, inclosed by 64 miles of walls. A remnant of the celebrated bo-tree, said to have sprung from that under which Gautama sat at the time when he became a Buddha, is still seen inclosed in the court of a temple. Here, too, is the so-called Brazen Palace, originally built in 142 B. C., and consisting of 40 rows of 40 pillars each. Dagobas, or shrines containing relics of Buddha, are very numerous. They are of brick, incrusting with a special preparation which takes on a fine white polish. One of the finest of these monuments is the Ruwanwellisaye, built about 140 B. C.; but the most beautiful of Ceylonese dagobas is the Toopharamaya, with many finely sculptured columns. Jaitawanaramaya, originally 315 feet in height, is now 269 feet high, and, like most of the ruins of the island, is overgrown by trees and brushwood. Among the most curious and notable of the ancient relics which invest Anuradhapura with such profound interest are the numerous tanks constructed at various dates between 200 B. C. and A. D. 300, and in the 12th century. Some of these are of enormous size, and several have been restored and applied to their original purpose of irrigation. From the 8th to the 13th century the capital was Pollanarrua, now Topare, near which also are found

many splendid ruins, including a fine rock temple. At Dambula, there is a celebrated cave temple, dating from the 1st century B. C.

Ceylon was known to the Greeks as Taprobane. In 543 B. C. it was conquered by Vijaya, a prince from the mainland of India, and for several centuries the island enjoyed great prosperity under the generally beneficent rule of his dynasty. The Hindu incomers brought with them the civilization of their own country, and great part of Ceylon became covered with towns and villages. Several of Vijaya's successors had to contend with invading Malabars, and these ultimately secured the sovereignty. A restoration of the line of Vijaya in the 11th and 12th centuries contributed to the return of something of the ancient grandeur of the island. Little was known regarding it in Europe until 1505, when the Portuguese established a regular intercourse with Ceylon, being encouraged thereto by a native king. The Portuguese were subsequently expelled by the Dutch in 1658, after a stubborn struggle of 20 years' duration. The Dutch soon opened up an extensive and profitable trade with Holland, and they constructed several canals to serve as means of communication between their various posts on the island. Their policy, however, though beneficial on the whole to the Singhalese as well as themselves, was essentially a selfish and exclusive one. British intercourse with the island began in 1763, and in 1795, owing to the war with France and Holland, Great Britain was induced to attempt an effective occupation of it. In that year Trincomalee, and in the following year Colombo, was captured; and by these victories all the Dutch forts were transferred to Great Britain. By the peace of Amiens (1802) the whole coast territory was formally ceded. The king of Kandy, who remained in possession of the central mountainous region, perpetrated such atrocities on his own people that many of their chiefs in 1815 entreated Great Britain to depose him. A short campaign was ended by the capture of the tyrant and his deportation as a prisoner to India, and since then the whole island has been under direct British rule. A serious rebellion in 1817 and minor ones in 1843 and 1848 have been the only breaks in the generally tranquil subsequent history of the colony. British rule has contributed very largely to the material advancement of the island by the construction of roads and railways, the extension of the Dutch canal system, the restoration of irrigation tanks, the bridging of rivers, and the development of its great natural resources. Two important events in its modern history have been the rise and decline of coffee-planting (say from 1837 onward), and the substitution of tea-planting about 1878) in its place. The de-

cline of coffee-planting, as is well known, has been caused by a leaf-fungus. The planting of cinchona, cacao, and rubber trees has also helped to add to the resources of Ceylon in recent times. In 1901 a considerable number of Boers, captured in the SOUTH AFRICAN WAR (*q. v.*), were sent to Ceylon.

The principal towns of the island are Colombo, Trincomalee, Kandy, Galle, Jaffna, and Kornegalle.

Chabas, Francois (shä-bä'), a French Egyptologist, born Jan. 2, 1817, in Briançon. Though at first engaged in commerce, he found time to become a learned linguist, but it was not till 1851 that he gave himself up to the study of hieroglyphics. The first results of his studies appeared in 1856, followed by a series of invaluable books and papers, elucidative chiefly of two important periods of ancient Egyptian history—the conquest of the country by the Hyksos, and the time of their expulsion. Among the more important of his many books are "The Shepherds in Egypt," "History of the Nineteenth Dynasty and especially of the Period of the Exodus," and "Studies of Historical Antiquity from Egyptian Sources." From 1873 to 1877 he edited *L'Egyptologie*. He died at Versailles, May 17, 1882.

Chablais (sha-blā), a district of France, in Savoy, S. of the Lake of Geneva. In the 11th century Chablais passed from the possession of the House of Burgundy to that of Savoy, and was finally ceded to France with the rest of Savoy in 1860.

Chaco. See GRAN CHACO.

Chacornac, Jean, a French astronomer, born in Lyons, June 21, 1823. He is principally known for his discoveries of asteroids, which came about in connection with his work on the formation of ecliptic charts of the stars, and for the charts just mentioned. His asteroid discoveries were six in number, and most of his work was done at the Paris Observatory under Leverrier. He died in Paris, Sept. 26, 1873.

Chad. See TCHAD.

Chadbourne, Paul Ansel, an American educator and writer, born in North Berwick, Me., Oct. 21, 1823. He was president of the Massachusetts Agricultural College at Amherst (1867 and 1882); of the University of Wisconsin (1867-1870); of Williams College (1872-1881). He wrote: "Natural Theology" (1867); "Instinct in Animals and Men" (1872); etc. He died in New York, Feb. 23, 1883.

Chaddock, Charles Gilbert, an American neurologist; born in Jonesville, Mich., Nov. 14, 1861; educated at the universities of Michigan and Munich; in hospitals at Paris; was assistant medical superintendent of the Northern Michigan Asylum in 1889-1892;

Chadd's Ford

Professor of the Diseases of the Nervous System at the University of St. Louis, Mo., from 1892; author of "Outline of Pschiatry" and contributions to medical and other publications.

Chadd's Ford, a town in Delaware county, Pa.; on Brandywine creek; 30 miles S. W. of Philadelphia. The battle of Brandywine was fought here, Sept. 11, 1777.

Chadwick, French Ensor, an American naval officer, born in Morgantown, W. Va., Feb. 29, 1844. He graduated at the United States Naval Academy in 1866, and became a captain in 1897. During the war with Spain he commanded the armored cruiser "New York," the flagship of the North Atlantic Squadron, and was chief-of-staff to Admiral Sampson.

Chadwick, George Whitfield, an American musician, born in Lowell, Mass., Nov. 13, 1854. He was graduated at the Leipsic Conservatory, and in 1897 became director of the New England Conservatory of Music. He has won distinction as a composer with "Tabasco," a comic opera; "Jubilee," a symphony; and "Columbian Ode," a chorus.

Chadwick, John White, an American writer and Unitarian clergyman, born in Marblehead, Mass., Oct. 19, 1840. His radical sermons attracted attention, and he was a liberal contributor to current literature and "Johnson's Universal Cyclopædia." Among his works are: "A Book of Poems" (1875); "The Bible of To-day" (1878); "Origin and Destiny" (1883); "A Daring Faith" (1885); "The Man Jesus"; "The Faith of Reason"; "Old and New Unitarian Belief"; and "The Power of an Endless Life." He died Dec. 11, 1904.

Chæronea, a city of Bœotia, in ancient Greece, near the Cephissus, on the borders of Phocis. Philip II., King of Macedon, defeated the united Bœotian and Athenian forces near this place, B. C. 338; and here, also, Sylla defeated the generals of Mithridates VI. B. C. 86. Plutarch was born here, A. D. 46. A few ruins of Chæronea are still existing.

Chætodermis, a genus of Cheliform fishes, in which the body is entirely covered with sharp prickles intermixed with soft ciliæ, or lobed appendages. Family *Balistidæ*, order *Plectognathes*.

Chætodontidae, a family of *Acanthopterygious* fishes, of great variety and beauty, distinguished from the perches chiefly by the operculum or gill-cover being without prickles. The snout projects, but the mouth is small, generally with bristle-like teeth; the body is compressed and the fins are covered with ctenoid scales. The Chætodonts are generally beautiful small fishes, bright colored, with vertical black bands. The

Chaffee

species mostly inhabit the warmer parts of the ocean. They are all deep-sea fishes.

Chafer, a term loosely applied to certain insects of the beetle order, especially such as themselves or their larvæ are injurious to plants.

Chaff-cutter, an agricultural instrument for chopping hay or straw into half-inch lengths to be used as food for animals. The economical advantage of the chaff-cutter does not depend on its rendering the chopped food more digestible; but on permitting it to be more thoroughly mixed with the more nutritive and palatable food, and preventing the animal from rejecting any part of it. By the use of the chaff-cutter animals are therefore induced to consume a much larger proportion of fodder with their food, which not only improves the condition of the stock, but saves time in feeding, thus allowing the animal more time for repose.



GEN. ADNA R. CHAFFEE.

Chaffee, Adna Romanza, an American military officer, born in Orwell, O., April 14, 1842. He received a public school education; entered the regular army as a private, July 22, 1861; became a captain, Oct. 12, 1867; and colonel of the 8th U. S. Cavalry, May 8, 1899. On May 4, 1898, he was commissioned Brigadier-General of volunteers for the war with Spain; on July 8, following, was promoted to Major-General; and on April 13, 1899, was honorably discharged under this commission. On the last mentioned date he was re-appointed a Brigadier-General of volunteers, and on July 19, 1900, the President, having selected him to command the American military forces in China, commissioned him a Major-General of volunteers. He reached Taku, China, on July 28, and led the American contingent of the allied force which entered Peking on Aug. 15, and rescued

the foreign legationers. General Chaffee made a brilliant record in the Apache Indian campaigns; commanded the troops which captured El Caney, in Cuba; and afterward was chief-of-staff to both Generals Brooke and Wood, when governor-general of Cuba. He has been widely known as a dashing cavalry officer, and his selection to command the American troops in China gave high satisfaction to his brother officers. On June 19, 1901, he was appointed military governor of the Philippines, and Jan. 7, 1904, became Chief of the General Staff.

Chaffinch, a European bird, so called because it delights in chaff, and is by some much admired for its song. This well-known and beautiful bird is locally called spink, beech-finch, pink, twink, skelly, shell-apple, horse-finch, scobby, and shilfa. It is the *Fringilla cœlebs* of ornithologists. It makes a beautiful nest, with four or five eggs, bluish-white, tinged with pink and with spots and streaks of purplish red.

Chagos Islands (chā'gōs), a group of islands in the Indian Ocean belonging to Great Britain; a S. extension of the Maldivé Islands. The largest, called Diego Garcia or Great Chagos, 100 miles S. of the main group, is about 15 miles long by 3 broad. They are scantily peopled, and the chief product is cocoa-nut oil.

Chagres, a town of the new Republic of Panama, on the N. coast of the Isthmus at the mouth of a river of the same name. It is a poor place, with a harbor for vessels drawing from 10 to 12 feet of water. The river of the same name rises about 10 miles N. E. of Panama, makes an immense bend round to the N. E., and enters the Caribbean Sea. Though toward its mouth it varies in depth from 16 to 30 feet, it is yet, by reason at once of its rapidity and its falls, but little available for navigation. The route of the projected Panama canal is by the valley of the Chagres for part of its course, and the canal would cross the river repeatedly.

Chaillé-Long, Charles (sha-yā'lon), an American explorer, born of French parentage, in Baltimore, Md., 1843. After serving in the Confederate army he went to Egypt, where he was appointed lieutenant-colonel by the Khedive (1870). Gordon made him chief-of-staff and sent him on a mission to King Mtesa of Uganda. He wrote: "The Three Prophets" (1886); "Central Africa" (1887); etc.

Chaillu, Paul du. See DU CHAILLU.

Chain, in surveying, is a measure consisting of 100 links, each 7.92 inches in length, and having a total length of 4 rods, or 66 feet. It is sometimes called Gunter's chain, from its inventor.

Chain Armor, coats and other pieces of mail, formed of hammered iron links, constituting a flexible garment which fitted to the person.

Chain Pump, a pump consisting in principle of an endless chain equipped with a number of valves or buckets moving round two wheels, one above and one below. The chain in its ascent passes through a tube closely fitting the valves or buckets, the water being discharged either from the top of the tube or from an orifice in it.

Chains, series of links interlocked with the adjacent ones, in such a manner as to form continuous and flexible lines. Chains are of two generally distinct kinds—short-link or unstudded (frequently called close-link) chain, and stud-link or stayed chain. The former usually embraces the smaller sizes of chain up to 1½ inches, and the latter comprises ships' cables and other heavy chains. Short-link chain is made in the following manner: The end of the bar from which the link is to be made is heated, then cut to gauge, and while still hot is bent into U-form; the free ends are then heated to a white heat and flattened or scarphed by a hammer, and in this state they are brought together and welded so as to form the other end of the link. The flattening or scarphing of the two ends and the closing of them being all done in one heat, the scarphed ends are again heated to welding point, and the link is placed in a suitable recess under a hollow-faced tool, worked mechanically, which strikes the roughened weld and ultimately finishes it off as smooth as the other end of the link. The result is the finished link, and when the first has been completed, another piece of iron is bent in the same way and threaded or rove through it, and another link formed and finished in the same manner as the first. In this way each successive link is added until the required length of chain is made.

The foregoing illustrates the way in which chains generally are made, but as a rule, links of chains of 1-inch diameter and over are welded at the side instead of at the end, and a stud or stay-pin is welded across from side to side of the link. Welding by electricity, winding the metal rod from which the links are made around a mandril, cutting the pieces by machinery and joining them by blows from powerful steam hammers, binding the links and testing the completed chains with hydraulic pressure, are all modern processes in the chain-making industry, but the great chains used in the shipbuilding trade are made much as they were many years ago. Chains which stand certain of the standard tests may be found totally unequal to meet certain others, and superior and inferior parts are often purposely mingled in one chain by dishonest

Chains

makers to cheapen production and defeat the system of testing. The iron used for very superior chains is selected not only for its tensile strength and welding properties, but for its ductility, as high tensile strength is not infrequently possessed by a hard, brittle iron, liable to snap upon the application of a sudden jerk, and therefore totally unsuited for chains. The system of testing cables followed by Lloyd's Register Society well exemplifies what should be adopted in the case of all chains. Every 15-fathom length is subject to a fair standard strain, sufficient to detect bad workmanship, by pulling asunder or opening any defective welds, yet not so severe as to injure the nature of the material by crystallizing it—a result invariably produced by overstraining. This standard test, however, not being the extreme limit of strain which the chain ought to bear in actual use at sea, a few links are required to be cut at random from any part of each 15-fathom length, and submitted to a so-called breaking strain of 50 per cent. in excess of the standard test. If these trial pieces are found to withstand this extra strain satisfactorily, they are then assumed to represent a fair average of the strength of that particular length to which they belong. This operation being gone through with satisfactory results in each length of cable, the whole is then passed, and certified accordingly. Any unsatisfactory lengths are condemned, marked, and sent back to the manufacturer.

The commercial article, as made in the United States, ranges from three-sixteenths of an inch to $1\frac{3}{4}$ inches, and no chains are put on the market unless they have been tested. Thus a 3-16-inch chain of 5 pounds average weight per foot is guaranteed to hold 700 pounds, and the better grades as high as 900 pounds. A 1-inch chain, which weighs about 10 pounds to the foot, will hold 24,000 pounds, and a chain with links of $1\frac{3}{4}$ inches, weighing 41 pounds to the foot, is supposed to resist 71,600 pounds, and the best quality of the same size chain is marked "proof 90,575 pounds."

Chain Shot, two balls connected either by a bar or chain, formerly used for cutting and destroying the spars and rigging of an enemy's ship. Invented by Admiral De Witt in 1666, this missile is now disused.

Chair of St. Peter, at Rome, a wooden chair overlaid with ivory work and gold, first mentioned by Ennodius in 500, in honor of which a feast was instituted by Paul IV. in 1558.

Chaise, a two-wheeled carriage for two persons, with a calash top, and usually drawn by one horse.

Chalcis

Chalazion ("hail"), a small, encysted tumor of the eyelids, colorless and transparent, and resembling a hailstone.

Chalcedon (kāl-sē'don), a Greek city of ancient Bithynia, opposite Byzantium (Constantinople), at the entrance of the Black Sea, about 2 miles S. of the modern Scutari. It was a flourishing town when it came into possession of the Romans, under the testament of Nicomedes, B. C. 74, as included in the kingdom of Bithynia. It was finally destroyed by the Turks, by whom it was taken, about 1075. In ecclesiastical history it is important as the place at which, in 451, Marcian held the general council for destroying the influence of Dioscuros and the Monophysites by formulating the belief in the existence of two natures in Christ.



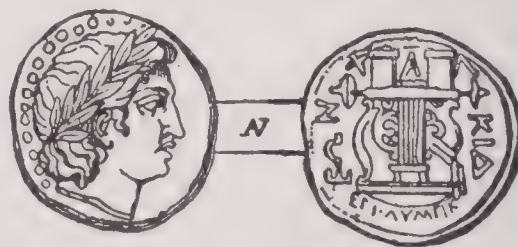
COIN OF
CHALCEDON.

Chalcedony, a cryptocrystalline variety of quartz, having the luster nearly of wax, and either transparent or translucent. Color, white, grayish, pale brown to dark brown or black; tendon-color common; sometimes delicate blue. Also of other shades, and then having other names. It is a true quartz with some disseminated opal-quartz. Composition: Silica, 98.87; sesquioxide of iron, 0.53; carbonate of lime, 0.62.

Chalcedonyx, the name applied to those agates in which opaque white chalcedony alternates with the translucent gray variety.

Chalchihuitl (kal-kē-whit'el), the Indian name of a green-colored stone, taken from a quarry near Santa Fé, N. M., and by some regarded as a species of turquoise, by others identified with jade. It was valued above gold by the ancient Mexicans, who fashioned it into beads and ornaments.

Chalcis (kal'sis), a Greek town, anciently the chief town of Eubœa, separated by the narrow strait of Euripus from the



COIN OF CHALCIS.

Bœotian coast, on the mainland of Greece, with which it was connected by a bridge. Chalcis, which is mentioned by Homer, early became one of the greatest of the Ionic cities, carrying on an extensive commerce, and planting numerous colonies in Syria, Macedonia, Italy, Sicily, and the islands of the Ægean Sea. It was subsequently a place of importance under the Romans

There is still a town on the site, consisting of an inner walled town and an outer suburb, and said to be one of the prettiest and most attractive of Greek provincial towns. A bridge, so constructed as to let vessels pass through, connects it with the mainland. Pop. 12,250.

Chalcis, a typical genus of a large family of hymenopterous insects, not unlike small wasps. The family (*Chalcididæ* or *Pteromalini*) has this great importance, that the larvæ of its members are parasitic in the eggs, larvæ, or pupæ of other insects, and as some of the latter are very destructive to plants, their parasites are animals to be thankful for. Thus forms so different as the cabbage butterfly and the destructive Hessian fly have their attendant *Pteromalini*. Many of the so-called gall-wasps (*Cynipidæ*) which cause many of the commonest galls—for instance, on the oak, or the curious bunches on rose and briar bushes—are preyed upon by *Chalcididæ*. Some of the hosts of these *Chalcididæ* are themselves parasitic, and thus we have parasites within parasites, or double parasitism, there being in this case no honor among thieves. Altogether over 2,000 species of *Chalcididæ* are known.

Chalcondylas, Demetrius (kal-kon'dilas), a Greek grammarian, born in Athens about 1424. On the taking of Constantinople by the Turks he went to Italy, was invited to Florence by Lorenzo de' Medici about 1479, and afterward by Ludovico Sforza to Milan, where he died in 1510. He did much to further the study of the Greek language and literature in the W. of Europe.

Chaldæa, in ancient geography the regions of Babylonia, or more generally Babylonia. The early history of Chaldæa as a separate kingdom is very uncertainly known. The Chaldæans were conquered by the Assyrians, with Babylon, and waged frequent wars with the latter power. When the Assyrian power began to wane, the Chaldæans, being a more warlike and powerful people than the Babylonians, became supreme; Chaldæa and Babylonia, by their conquests under Nebuchadnezzar, became one kingdom, and the names Chaldæa and Babylonia became synonymous terms.

Chaldæan Christians, a branch of the Nestorians, in communion with the Roman Church.

Chaldee Language, a name often given to the Aramean language, one of the principal varieties of the ancient Semitic. Chaldee literature is usually arranged in two divisions: the Biblical Chaldee, or those portions of the Old Testament which are written in Chaldee, namely, Daniel from ii: 4 to vii: 28; Ezra iv: 8 to vi: 18; and vii: 12-26; and Jeremiah x: 11; and the

Chaldee of the Targums and other later Jewish writings.

Chaldron, an old English measure of 36 bushels, used chiefly in measuring coal.

Chalet, the French-Swiss name for the wooden hut of the Swiss herdsmen on the mountains; but also extended to Swiss dwelling-houses generally, and to picturesque and ornate villas built in imitation of them.

Chaleurs Bay, or Bay of Chaleurs (shäl-er'), an inlet of the Gulf of St. Lawrence, between Quebec and New Brunswick. The French fleet was here defeated by the British in 1760. There are a number of islands in this bay, notably Shippegan, near its mouth. The navigation is good and the mackerel fishery is important. The Restigouche river flows into the bay, as do numerous other large streams. Length from E. to W. 90 miles, and greatest breadth 20 miles. The bay is a great resort of fishermen, as its waters teem with many varieties of the finny tribe, including salmon. The bay, whose original name was Ecketam Nemauchi, or Bay of Fish, forms a single great harbor, destitute of shoals and reefs, and forming a safe refuge from storms and dangerous currents, as well as affording exceptionally safe anchorage.

Chalice, a term generally applied to a communion cup for the wine in the Eucharist, often of artistic and highly ornamental character.

Chalk, a well-known earthy limestone, of an opaque white color, soft, and admitting no polish. It is an impure carbonate of lime, and is used as an absorbent and anti-acid, and for making marks for various purposes, as on the blackboard in schools, and by artisans and others. Black chalk is a soft variety of argillaceous slate. Brown chalk, a familiar name for umber. Red chalk, another name for ruddle. French chalk, steatite or soapstone, a soft magnesian mineral. Drawing chalks were originally restricted in colors to white, black, and red, but now chalks of every color are used, and are known by the name of crayons, commonly made of calcium sulphate and not the carbonate, as supposed. In geology chalk is the rock which forms the higher part of a series or group of strata, comprising rocks of different kinds, termed the cretaceous system.

Chalk, Red, an ochery-red clay-iron-ore, consisting of clay and much peroxide of iron. It is of brownish-red color, and somewhat slaty structure, the cross fracture earthy. The coarser varieties are used chiefly by carpenters for making marks on wood, and by tailors for marking on cloth; the finer, by painters. It occurs in thin

Chalking the Door

beds in clay-slate and gray wacke-slate in parts of Germany.

Chalking the Door, in Scotland a mode of warning tenants to remove from burghal tenements; long known and still in use. Its execution is a warrant under which decree of removal will be pronounced by the burgh-court, in virtue of which the tenant may be ejected on the expiration of a term of six days.

Challemel-Lacour, Paul Armand (shäl-mel'lä-kör'), a French statesman, born in Avranches, May 19, 1827. He was grad-



M. CHALLEMEL-LACOUR.

uated at the École Normale in 1849 and soon fell under the ban of political proscription. He was elected to the French Chambers, however, and served the Republic as senator, ambassador to Switzerland from 1874 to 1879, ambassador to England from 1880 to 1882, Minister of Foreign Affairs

and president of the Senate in 1888. He was elected to the French Academy in 1893. He died in Paris, Oct. 26, 1896.

Challenge, to jurors, is an objection either to the whole panel or array, that is, the whole body of jurors returned, or to the polls, that is, to the jurors individually, and it is either peremptory, that is, without assigning any reason, or for cause assigned.

Challenger Expedition, a circumnavigating scientific exploration of the open sea sent out by the British government in 1872-1876—earlier expeditions being those of the "Lightning" (1868) and "Porcupine" (1870). In 1872 the "Challenger," a corvette of 2,306 tons, was completely fitted out and furnished with every scientific appliance for examining the sea from surface to bottom—natural history work-room, chemical laboratory, aquarium, etc. The ship was given in charge to a naval surveying staff under Captain Nares, and to a scientific staff, with Professor (afterward Sir) Wyville Thomson at their head, for the purpose of sounding the depths, mapping the basins, and determining the physical and biological conditions of the Atlantic, the Southern and the Pacific Oceans. With this new commission the "Challenger" weighed anchor at Sheerness on Dec.

Challoner

7, 1872, and on the evening of May 24, 1876, she dropped anchor at Spithead, having in three and a half years cruised over 68,900 nautical miles, and made investigations at 362 stations, at each of which were determined the depth of channel, the bottom, surface, and intermediate temperatures, currents, and fauna, and the atmospheric and meteorological conditions. The route was by Madeira, the Canaries, the West Indies, Nova Scotia, Bermudas, Azores, Cape Verd, Fernando Noronha, Bahia, Tristan d'Acunha, Cape of Good Hope, Kerguelen, Melbourne, the Chinese Sea, Hong Kong, Japan, Valparaiso, Magellan's Strait, Monte Video, Vigo, and Portsmouth. Between the Admiralty Isles and Japan the "Challenger" made her deepest sounding, on March 23, 1875, 4,575 fathoms, then the deepest sounding on record except two. It is interesting to note here that the United States surveying ship "Nero," in an expedition extending from April 22, 1899, to Feb. 11, 1900, made the two deepest soundings on record, 5,160 and 5,269 fathoms, both in the Pacific Ocean.

Challis, James, an English astronomer, born in Braintree, Dec. 12, 1803. In 1836 he was elected Plumian Professor of Astronomy at Cambridge and Director of the Observatory. In 1861 he was succeeded in the latter position by Adams, but he retained the professorship of astronomy till his death. He is best known for his work upon the theory of astronomical instruments, and for his observations in connection with the discovery of the planet Neptune. He died in Cambridge, Dec. 3, 1882.

Challoner, Richard, an English Roman Catholic prelate, born in Lewes, Sussex, Sept. 29, 1691. Becoming a Roman Catholic, he was sent in 1704 to the English College at Douay, where he became a professor, and remained until 1730. In that year he was sent to labor in London, and there he served as a missionary priest till 1741, when he was raised to the episcopal dignity as Bishop of Debra and coadjutor of Bishop Petre, whom he succeeded as Vicar Apostolic of the London district in 1758. During the "No Popery" riots of 1780 he was secreted near Highgate, and died in London, Jan. 12, 1781. Of Challoner's numerous controversial treatises, the best known is his "Catholic Christian Instructed," an answer to Conyers Middleton's "Letters from Rome." His "Garden of the Soul" is still the most popular prayerbook with English Catholics, and his revision of the Douay version of the Bible (5 vols., 1750), is substantially the Bible used by them. Of his historical works the most valuable are his memoirs of missionary priests and other Catholics of both sexes who suffered death or imprisonment

in England on account of their religion, from the year 1577 till the end of the reign of Charles II. (2 vols., 1741), and his "British Saints" (2 vols., 1745), a collection of the lives of British and Irish saints.

Chalmers, Alexander (chä'mērz), a Scotch journalist, born in Aberdeen in 1759, where his father, the founder of the first Aberdeen newspaper, was a printer. About 1777 Chalmers went to London, was employed as journalist, and edited the "British Essayist," from the "Tatler" to the "Observer," published in 1803. He also issued an edition of Shakespeare, with notes, in 1809; and the works of the "English Poets" from Chaucer to Cowper, with Johnson's "Lives," and additional "Lives," in 1810. His most extensive work was the "General Biographical Dictionary," 32 vols., 1812-1817. He died in London in 1834.

Chalmers, George, a Scotch historian, born in Fochabers in 1742. In 1763 he came to America and settled in Baltimore, where he practiced law for several years. At the beginning of the Revolutionary War, he opposed the action of the colonists; not meeting with success, he returned to England. His writings are political, historical, and biographical. Among his works are: "Churchyard Chips Concerning Scotland," "Life of Daniel Defoe," and "Caledonia," an account of Scotland from the earliest period (1807-1824). He died in London, May 31, 1825.

Chalmers, George Paul, a Scotch painter, born in Montrose in 1833. He served as errand-boy to a surgeon, and apprentice to a ship-chandler; but he was resolved to become an artist, and in 1853 he went to Edinburgh and studied under Scott Lauder. His "Favorite Air," attracted attention in 1854, and in 1867 he was elected an A. R. S. A., in 1871 an R. S. A. His works are distinguished by admirable breadth, effective concentration of lighting, freedom of handling, and rich and powerful coloring. He executed some important portraits. His landscapes, mainly of his later years, include "End of the Harvest" (1873) and "Running Water" (1875). He is represented in the National Gallery of Scotland by "The Legend," a large, unfinished subject-picture, which, like "Prayer" (1871), has been etched by Rajon. He died in Edinburgh, Feb. 28, 1878.

Chalmers, Thomas, a Scotch clergyman, born in Anstruther Easter, Fife, in 1780. At the age of 12 he was sent from the parish school to the University of St. Andrews, and after studying there seven years, was licensed as a preacher in July, 1799. During the two following years he studied mathematics and chemistry in Edinburgh,

and then became assistant professor of mathematics at St. Andrews. In 1803 he was presented to the parish of Kilmany, in Fife, where he made a high reputation as a preacher. In 1804 he was defeated in an application for the chair of natural philosophy at St. Andrews, and again in 1805 for the same chair in Edinburgh University. In 1808 he published an "Inquiry into the Extent and Stability of National Resources." In 1813 his article on "Christianity" appeared in the "Edinburgh Encyclopædia," and shortly afterward his review of Cuvier's "Theory of the Earth," in the "Christian Instructor." His fame as a preacher had by this time extended itself throughout Scotland, and in 1815 he was inducted to the Tron Church of Glasgow. His astronomical discourses delivered there in the following winter produced a sensation not only in the city but throughout the country, 20,000 copies selling in the first year of their publication.

It was while pastor of this church that he developed his scheme for the reorganization of the parochial system with a view to more efficient work among the destitute and outcast classes, his influence leading to a considerable extension of the means of popular instruction, both religious and secular. In 1819 he was transferred from the Tron to St. John's, a church built and endowed expressly for him by the Town Council of Glasgow, but his health having been tried by overwork he accepted, in 1823, the chair of moral philosophy at St. Andrews. In 1827 he was elected to the divinity chair in the University of Edinburgh, an appointment which he continued to hold till the Disruption from the Scottish Church in 1843. In 1832 he published his "Political Economy," and shortly afterward his "Bridgewater Treatise on the Adaptation of External Nature to the Moral and Intellectual Constitution of Man." During this period he was occupied with the subject of Church extension on the voluntary principle, but it was in the great non-intrusion movement in the Scottish Church that his name became most prominent.

Throughout the whole contest to the Disruption in 1843, he acted as the leader of the party that then separated from the Establishment, and may be regarded as the founder of the Free Church of Scotland, of the first assembly of which he was moderator. Having vacated his professional chair in the Edinburgh University, he was appointed principal and primarius professor of divinity in the new college of the Free Church. In addition to his duties in these posts, he continued in Edinburgh his zealous labors for the elevation of the "home-heathen," giving a practical exemplification of his schemes by the establishment of a successful mission in the West

Port. He died in Morningside, May 31, 1847.

Chalons-sur-Marne (shäl-ô'sür-märn), the capital of the French department of Marne, on the Marne river, 107 miles E. of Paris. An old place, with timber houses and many spired churches, it has an interesting cathedral, dating chiefly from the 13th century, a handsome hôtel de ville (1772), and a fine public park, though the Germans cut down its immemorial elms for fuel. It still does a considerable trade in Champagne wine, but its manufacture of the worsted cloth known as "shalloon" (Chaucer's *chalons*) is a thing of the past, and the population has dwindled from 60,000 in the 13th century to 19,639 in 1891. Near Châlons, which takes its name from the Catalauni of Latin writers, the Romans and Goths in A. D. 451 defeated Attila and his host of Huns. In 1856 Napoleon III. formed the celebrated camp of Châlons, 16½ miles to the N. E. of the town. Hence, during the Franco-Prussian War, on the night of Aug. 21, 1870, MacMahon withdrew his troops, and next day the town was occupied by the Germans. Pop. (1901) 26,737.

Chalons-sur-Saône (-sôn), ancient Cabillonum, a town in the French department of Saône-et-Loire, 84½ miles N. of Lyons, at the point where the Saône is joined by the Canal du Centre, uniting it with the Loire. It has an extensive traffic with the central districts of France, with the Mediterranean and Atlantic. Pop. (1901) 29,058.

Chalybeate Waters, those which contain salts of iron in sufficient quantity to give them a special value in the treatment of cases of anæmia, etc. Iron or steel waters are not the only mineral waters in which some form of iron is found. Indeed in nearly all this ingredient exists, but in very many in such small quantity, while other ingredients are so conspicuous, that the character of the water can hardly be supposed to be affected by that metal. Those springs most successfully resorted to contain from one-third to nine-tenths of a grain of iron, in the form of carbonate, in 16 ounces. Some springs are classed as iron springs which contain barely one-fifth of a grain in 16 ounces of water. What are called pure iron springs are those which contain but a few grains of dissolved solids, a salt of iron existing to some appreciable amount; compound iron springs contain moderate quantities of other salts, such as Epsom and Glauber's salts, common salt, sulphate of lime, besides being rich in carbonic acid gas. The reason for the use of iron waters is that iron is a necessary ingredient of the blood, and in certain conditions promotes the formation of blood. Small doses only should be employed, as excess may irritate the stomach and bowels

and produce constipation. It has been found that iron springs are most useful in cases of poverty of blood quickly produced, for example, by loss of blood by bleeding from the nose, or from wounds, by drain occurring from the blood owing to diarrhœa, suppuration, and other profuse discharges, in cases of chlorosis in young girls, and in poverty of blood dependent on acute disease, in which cases they materially promote convalescence. Iron springs are also used in disorders of monthly illness, specially in its absence, in malarious conditions and poverty of blood due to residence in tropical countries, and in neuralgia, sterility, and impotency due to enfeebled conditions of general health. In such cases as these last the improvement is not so rapid, and is often best promoted by waters which, besides the iron, contain marked quantities of other ingredients like common salt. It is chiefly in the form of carbonate that the iron exists, and this is the best form for administration. The presence of carbonic acid gas in the water keeps the carbonate of iron in solution, and when the water stands, a yellowish rust is deposited. Iron springs are used for bathing, but it is not now believed that the iron produces any effect on the skin or is absorbed from the bath. Among the chief chalybeate springs are two at Harrogate, called the Muspratt and the Tewitt, the latter pure; a pure one at Tunbridge Wells; one at Bocklet, near the salt spring of Kissingen, containing much common salt and carbonic acid gas; those of Antogast, Freiersbach, Griesbach, Petersthal, and Rippoldsau, in the Black Forest region, at altitudes of from 1,280 to 1,886 feet; one at Orrezza, in Corsica, with much carbon dioxide and traces of arsenic; many at Spa; one at St. Moritz, Switzerland, situated at an elevation of 5,710 feet; one at Santa Catarina, Italy, 3 miles from Bormio, at a height of 5,600 feet; several very popular pure ones at Schwalbach in Nassau; one at Pyrmont, Waldeck; and one at Cheltenham, with a very high proportion of iron carbonate.

Chalybite (kal'i-bit), an ore of iron, a native anhydrous metacarbonate (Fe CO_3), existing abundantly under the name of spathic or sparry ore, or siderite. A siliceous or argillaceous variety called clay ironstone, occurring in the coal measures, is one of the most abundant and valuable ores of iron. Combined with carbonaceous matter it forms the black-band ironstone.

Chama, a genus of mollusks, the typical one of the family *Chamidæ*. The shell has foliaceous valves, the upper one the smaller, one valve attached to another body by the left umbo; the hinge tooth of the free valve is received between two teeth of the other. The chamas are found less than 50

Chamærops

fathoms deep in tropical seas, especially among coral reefs. Fifty recent species are known, and 40 fossil, the latter from the Greensand onward. The still existing *Chama gigas* sometimes weighs 300 pounds. The byssus by which it adheres to the rock is so tough that a hatchet is required to cut it through. One valve is sometimes used in churches as a baptismal font.

Chamærops (kam-i'-rops), a genus of plants belonging to the order *Palmaceæ*. The dwarf fan palm, so called from its low growth. It is the most northerly of the palm genera, and consists of 10 or 12 species. *C. humilis* extends as far N. as Nice, and the leaves of it are used for making hats, brooms, and baskets, and for thatching purposes. *C. fortunei*, a native of China, furnishes a coarse brown fiber used for hats and a waterproof cloth called So-e.

Chamalari or **Chamalhari**, a peak of the Himálaya Mountains, at the W. extremity of the boundary line between Bhutan and Tibet. Height, 23,929 feet.

Chamba, a hill-state of the Punjab district, British India, N. of the districts of Kangra and Gurdaspur. It is a mountainous tract, shut in on almost every side and traversed by two hill ranges. The crops consist of all kinds of grain and the supply of iron and slate is plentiful. The sanitarium of Dalhousie is in this district.

Chambal, a river in Rajputana, Central Provinces of British India, flows into the Jamna; length, 750 miles.

Chamber, a word used in many countries to designate a branch of government whose members assemble in a common apartment, as the chamber of deputies in France, or applied to bodies of various kinds meeting for various purposes. The imperial chamber (in German, *Reichskammergericht*) of the old German Empire was a court established at Wetzlar, near the Rhine, by Maximilian I. in 1495, to adjust the disputes between the different independent members of the German Empire, and also such as arose between them and the emperor. Chambers of Commerce are associations of the mercantile men of cities and towns for the purpose of protecting and furthering the interests of the commercial community.

Chamberlain, an officer charged with the direction and management of the private apartments of a monarch or nobleman. The lord-chamberlain or lord-great-chamberlain of Great Britain is the sixth officer of the crown. His functions, always important, have varied in different reigns. Among them are the dressing and attending on the king at his coronation; the care of the palace of Westminster (Houses of Parliament), and attending upon peers at their

Chamberlain

creation, etc. The office of lord-chamberlain of the household is quite distinct from that of the great-chamberlain, and is changed with the administration. This officer has the control of all parts of the household (except the ladies of the queen's bed-chamber) which are not under the direction of the lord-stewart, the groom of the stole, or the master of the horse. The king's (queen's) chaplains, physicians, surgeons, etc., as well as the royal tradesmen, are by his appointment; the companies of actors at the royal theaters are under his regulation, and he is also the licenser of plays. He has under him a vice-chamberlain.

Chamberlain, Alexander Francis, an Anglo-American anthropologist, born in Kenninghall, England, Jan. 12, 1866; was graduated at Toronto University in 1886, became a member of numerous learned societies and lecturer on anthropology at Clark University, Worcester, Mass. He has written "The Child and Childhood in Folk-Thought," and many essays on similar topics.

Chamberlain, Joseph, an English statesman, born in London in July, 1836. He was educated at University College School, and entered his father's screw factory at Birmingham, from which, however, he retired in 1874. He had by this time acquired considerable celebrity as a Radical politician. In 1868 he was appointed a member of the Birmingham town-council, was mayor of Birmingham from 1873 to 1876, and chairman of the Birmingham school-board from 1874 to 1876. After unsuccessfully contesting Sheffield against Mr. Roebuck in 1874, he was returned for Birmingham without opposition in June, 1876. He soon made his mark in Parliament, and on the return of the Liberals to power in 1880 he was appointed President of the Board of Trade, with a seat in the cabinet. To Mr. Chamberlain's exertions was due the passing of the Bankruptcy Bill, but his efforts to amend the Merchant Shipping Acts were unsuccessful. Meanwhile his influence was increasing rapidly outside the House; he came to be regarded as the leader of the extreme Radical party, and enunciated schemes for the regeneration of the masses which were based on the doctrines of the "restitution" of land and the "ransom" of property. During the last hours of Mr. Gladstone's government he was understood to be opposed to the renewal of the Irish Crimes Act; and during the general election of 1886 he was most severe in his strictures on the moderate Liberals, and produced an "unauthorized" programme (in opposition to that of Mr. Gladstone), which included the readjustment of taxation, free schools, and the creation of allot-

Chamberlain

ments by compulsory purchase. He was returned free of expense by the western division of Birmingham. On Feb. 1, 1886, he became president of the Local Government Board, but resigned on March 26, because of his strong objections to Mr. Gladstone's Home Rule measures for Ireland, and after the "Round Table" conference had failed to reunite the Liberal party he assumed an attitude of uncompromising hostility to his old leader's new policy, and was bitterly assailed by Home Rulers as a renegade. He became leader of the Liberal-Unionists when the Duke of Devonshire went to the Upper House. Lord Salisbury sent him to Washington as commissioner on the Canadian fishery dispute, and in 1895 he was made Colonial Secretary in the Unionist Cabinet. As such he had, besides sharing in responsibilities of his colleagues, to face the troubles in South Africa, and to cherish closer fellow-feeling with the Colonies, as by welcoming the colonial ministers and colonial troops to London at the Queen's "Diamond Jubilee" (1897), and by concessions to Canadian commercial autonomy. He carried the Australian Federation measure in Parliament (1900); faced opposition from within the Liberal party; and resigned the Secretaryship, Sept. 18, 1903. In 1888 he was married to Mary, daughter of William C. Endicott, Secretary of War in President Cleveland's first administration.

Chamberlain, Joshua Lawrence, an American army officer and educator. He was born in Bangor, Me., Sept. 8, 1828; graduated at Bowdoin College in 1852, and entered the volunteer service of the Union in 1862, was promoted to the rank of Brigadier-General by General Grant, for bravery at Petersburg, 1864; became a Major-General in 1865, and received the colors of Lee's army on its surrender. He was six times wounded. After the war he returned to the professorship at Bowdoin College which he had previously held. In 1867-1871 was governor of Maine, and in 1871-1883 was president of Bowdoin, resigning to engage in business in New York City.

Chambers, Charles Julius, an American journalist, born in Bellefontaine, O., Nov. 21, 1850. In 1870 he traveled through the West Indies, Europe, the United States, and Canada, as special correspondent of the "New York Herald." In 1876 he published an account of his few weeks of experience (incognito) in an insane institution, entitled, "A Mad World," which excited great interest. He is a contributor to various periodicals; also author of several novels: "On a Margin," "Lovers Four and Maidens Five," etc.

Chambers, Ephraim, a miscellaneous writer, and compiler of a popular "Dic-

Chambersburg

tionary of Arts and Sciences," born in Kendal, Westmoreland, in the latter part of the 17th century. During his apprenticeship to a mathematical instrument and globe-maker in London he formed the design of compiling a "Cyclopædia," and even wrote some of the articles for it behind his master's counter. The first edition was published in 1728. Several subsequent editions appeared previously to his death in 1740, and it was the basis of the cyclopædia of Dr. Abraham Rees.

Chambers, Robert, a Scotch prose-writer and publisher, born in Peebles, July 10, 1802. He and his brother began in poverty as small booksellers; issued penny leaflets of useful information for the people, written in a clear and simple though not infantile style, which became very popular, and at last took regular periodical form in "Chambers' Journal," and the great publishing-house which bears the name of both developed gradually. The "Chambers' Encyclopædia for the People" was the outgrowth of the "Journal," and edited by the brothers. Robert wrote also "Traditions of Edinburgh" and works on Scotch history, but his most noted book was the anonymous "Vestiges of Creation," for years an unequaled theologic-scientific sensation. He died in St. Andrews, March 17, 1871.

Chambers, Robert William, an American artist and novelist, born in Long Island, N. Y., 1865. His home is in New York. He has written: "The King in Yellow," "The Red Republic," "A King and a Few Dukes," "Cardigan," etc., and "With the Band," a volume of ballads.

Chambers, William, a Scotch prose-writer and editor, brother and partner of Robert, born in Peebles, April 16, 1800. He wrote "Things as They Are in America" (1854), "American Slavery and Color" (1857), "France, its History and Revolutions" (1871), "Stories of Old Families and Remarkable Persons" (1878). He also compiled a "Hand Book of American Literature" (1857). He died in Edinburgh, May 20, 1883.

Chambersburg, a borough and county-seat of Franklin county, Pa., on the Conecocheague and Falling Creeks and the Cumberland Valley and Western and the Philadelphia and Reading railroads, 52 miles W. S. W. of Harrisburg. In Early's raid in the Civil War General McCausland entered Chambersburg with Confederate cavalry, July 30, 1864, and demanded a tribute of \$200,000 gold; this not being paid the place was set on fire and two-thirds of it burned, causing a loss of \$1,000,000. It was soon rebuilt, chiefly of brick or stone, and is now the seat of Wilson College, for women, and has an academy, several churches, and

newspapers, public schools, manufactories, machine shops, two National banks, and an assessed property valuation of \$3,000,000. Pop. (1900) 8,864; (1910) 11,800.

Chambers of Commerce, bodies of merchants and traders associated for the purpose of promoting the interests of their own members, of the city to which the society belongs, and of the community generally, in so far as these have reference to trade and merchandise. Of the means by which these objects are sought to be accomplished the following may be mentioned as the most prominent: (1) by representing and urging on the Legislature the views of their members in mercantile affairs; (2) by aiding in the preparation of legislative measures having reference to trade; (3) by collecting statistics bearing upon the staple trade of the city; (4) in some places by acting as a sort of court of arbitration in mercantile questions; (5) by attaining by combination advantages in trade which might be beyond the reach of individual enterprise.

The first institution of the kind in the United States, the New York Chamber of Commerce, was organized in 1768 and incorporated by royal charter from King George III. in 1770. There are similar bodies in every city and town of consequence in the United States. The oldest Chamber of Commerce in Great Britain, that of Glasgow, dates from 1783. The value of such bodies became apparent and they sprang up rapidly throughout the civilized world. In mediæval Venice and in the Hanse towns they do not seem to have existed in the sense in which they are understood to-day.

The extension of the functions of Chambers of Commerce in the United States has been considerable in the decade between 1890 and 1900. The movement had its origin in Germany and grew out of the organized efforts of the last 20 years to foster the world commerce of the empire. The Chambers of Commerce in leading cities like Berlin and Hamburg undertook the commercial training of young men, with a view to their future advancement in mercantile life and the consular service. The result was the securing of a higher order of talent in such pursuits. The hint thus thrown out was promptly taken up in the United States. The New York Chamber of Commerce, in 1899, voted a fund for the endowment of a lecture course on Commerce at Columbia University; in Chicago a Chair of Commerce was established by that city's Chamber at the University of Chicago, and in August, 1900, a School of Commerce, Accounts and Finance was established by the University of New York. Students were assured in the event of a satisfactory course of study, that they

would be given posts in leading commercial establishments or appointed to consular offices so far as influence could attain that result. The movement is destined to mark a new era in the influence of chambers of commerce.

Chambéry (shon-bā-rē'), capital of the former duchy and present French department of Savoy, beautifully situated between two ridges of hills, amid gardens and country-seats, 370 miles S. E. of Paris. The scenery around, with the river Laisse flowing through the valley, is exceedingly fine. The town itself, however, is dull and uninteresting, with narrow and gloomy streets winding between high, well-built houses. Notable edifices are the small cathedral, the palace of justice, and the old castle of the Dukes of Savoy, restored early in the 19th century. Chambéry has manufactures of clocks, silk-gauze, soap, hats, paper, and a trade in silk, wine, coal, etc. Pop. (1901) 22,108. From 1525 to 1713 Chambéry was under the dominion of France, and again from the Revolution to 1815, when it was restored to the House of Savoy, but in 1860, by the cession of Savoy, it came again under the rule of France.

Chambeze (cham-bē'zē), the farthest head-stream of the Kongo, rises in the highlands S. of Tanganyika, about 9° 40' S. lat., and 33° 15' E. lon. Its tributaries are large, and form a considerable stream, which flows S. W. to Lake Bangweolo.

Chambly, Fort, a fort at the outlet of Lake Champlain at the time of the Revolutionary War. It was captured by the Colonists in 1775, and the colors of the 7th Regiment of British regulars was sent to the Continental Congress as trophies of the victory.

Chambord (shän-bör), a castle, park, and village, near Blois, department of Loir-et-Cher, in France. The splendid castle, in the Renaissance style, was mainly built by Francis I., being begun in 1526, and was completed under Louis XIV. In 1745 it was given by Louis XV. to Marshal Saxe, who died there in 1750. Napoleon gave it to Berthier, and in 1821 a company of Legitimists bought it and gave it to the Duke of Bordeaux, in the name of the people of France.

Chambord, Henri Charles Ferdinand Marie Dieudonne, Comte de, Duc de Bordeaux, the last representative of the elder branch of the French Bourbon dynasty, called by his partisans Henry V. of France; born in Paris, Sept. 29, 1820, seven months after the assassination of his father, Prince Charles Ferdinand d'Artois duke de Berry. Charles X., after the revolutionary outbreak of 1830, abdicated in his favor, but the young count was compelled to leave the country with the royal title unrecognized

Chambord

by the nation. He lived successively in Scotland, Austria, Italy, and London, keeping a species of court, and occasionally issuing manifestoes. In 1846 he married the Princess Maria-Theresa, eldest daughter of the Duke of Modena, and in 1851 inherited the domain of Frohsdorf, near Vienna, where for the most part he subsequently resided. While abstaining from violent attempts to seize the crown, he let slip no opportunity of urging his claims, especially after Sedan, but his belief in divine right, his devotion to the see of Rome, and his failure to recognize accomplished facts and modern tendencies, destroyed all chance of his succession. He died in Austria, Aug. 24, 1883.

Chambray, Georges, Marquis de (shām-brā'), a French soldier and military writer, born in Paris, 1783, served in the Napoleonic wars, was in the fatal Russian campaign, and during his active service saw much fighting. "The History of the Expedition to Russia in 1812" (3d ed. 1839) is widely known. He died in 1848.

Chambre Ardente (shāmbr' är-dänt'), the name given in France to a court of law, hung with black and lighted with torches, instituted by Francis I. for the purpose of trying and burning heretics; and also to the extraordinary commissions established under Louis XIV. for the examination of poisoners, and under the regent duke of Orleans for the punishment of public officers charged with certain offenses against the revenues, as also of those who were guilty of fraud in the matter of Law's bank.

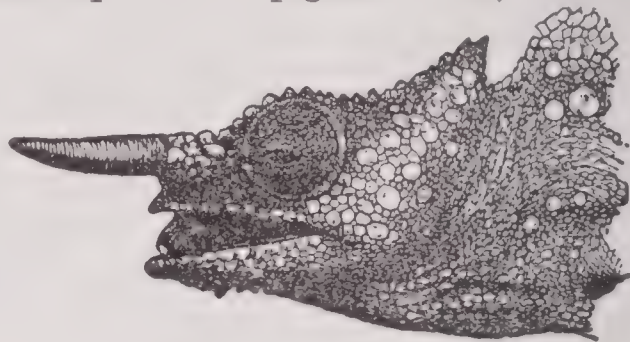
Chambre des Comptes (-da cōnt'), a great court established in France, prior to the Revolution, for various purposes; as for the registration of edicts, ordinances, letters patent, treaties of peace, etc. The sovereign Chambre des Comptes was held at Paris; there were also inferior courts in 10 provincial cities.

Chambre Introuvable (shām'br an-trōv-ä'bl), "the chamber the like of which is not to be found again," the term applied to the French Chamber of Deputies which met after the second return of Louis XVIII., and which by its fanatic loyalty threatened to again plunge France into anarchy and commotion.

Chameleon, a genus of reptiles belonging to the *Saurian* or lizard-like order, a native of parts of Asia and Africa. The very remarkable power which these animals possess of changing their color, and at pleasure producing a succession of rich and beautifully varied tints over the whole body, at a very early period called the attention of observers to their habits. Its skin is composed of a sort of small, scaly

Chamfort

grains, and under ordinary circumstances is of a greenish gray color. The eyes are capable of moving independently of each other, taking different directions at the same moment. The lungs are vesicular, and so large that, when inflated to the utmost, the whole body becomes almost transparent. With the different degrees of inflation the surface undergoes changes of color, owing to the changes of dimension and shape in the pigment cells, which are



HEAD OF CHAMELEON.

distributed in two layers beneath the skin, the upper containing yellowish, the deeper containing black or dark brown pigment. The only part moved with celerity is the tongue, which, when extended, is as long as the body. This organ is clothed at its extremity with a viscid, gluey mucus, and is darted out for the purpose of capturing insects, on which the animal subsists. As they feed but seldom, and are frequently seen inhaling the air, to inflate their bodies as above mentioned, ancient observers concluded that they fed altogether on air; but closer attention to their habits has shown that they require a diet rather more substantial. It has but five cervical vertebræ. The hind as well as fore toes are five; trunk mounted high on the legs, forming an exception to the majority of reptiles.

Several species of chameleon are known, and are natives of Africa, Madagascar, Southern Asia, and the Molucca Islands. They pass their lives altogether upon trees, feeding upon small insects, for which their construction shows them to be perfectly adapted. Aristotle gave a perfect description of the chameleon in the 11th chapter of his second book on the history of animals. Various poets and fabulists have at different periods contributed to its celebrity, and by inaccurate or fanciful representations have rendered it far more of a prodigy than nature ever designed it to be.

Chameleon, a southern constellation containing nine stars, lies within the Antarctic Polar Circle.

Chamfort, Sebastien-Roch Nicolas (shan-för'), a French revolutionist, born in Auvergne in 1741. By his success as dramatist, critic, and conversationalist he obtained a place in the French Academy, a pension, and a post at court. An intimate friend of Mirabeau, he threw himself heartily into the revolution, was secretary to the

club of the Jacobins, was one of the first of the storming party in the attack on the Bastille, and having been employed by Roland in the "National Library," published the first "Historical Pictures of the Revolution." His cynical wit could not, however, restrain itself, and he was denounced and threatened with imprisonment. Rather than undergo it he inflicted fatal injuries upon himself, dying in 1794.

Chamisso, Adelbert de (shä-mis'ō), a German poet; born at the castle of Boncourt, in Champagne, France, Jan. 30, 1781. His family being driven to Berlin by the Revolution, he became, from 1796 to 1798, page to the queen-mother, and afterward entered the Prussian service, where he remained till 1808. He revisited France; but shortly after returned to Prussia, and devoted himself to the study of natural science at Berlin. In 1815 he accompanied as naturalist an expedition for the discovery of the North-west Passage, and on his return took up his residence at Berlin, where he was appointed superintendent of the botanic garden. He wrote several works on natural history and botany, and an account of his voyage, but his reputation as a naturalist has been somewhat eclipsed by that which he acquired as a poet. In 1804-1806, in concert with Varnhagen von Ense, he published a collection of poems, under the name of the "Muses' Almanac," and in 1813 appeared his famous tale, "Peter Schlemihl, or the Shadowless Man," the plot suggested by a casual question or Fouqué's. Many of his ballads and songs are masterpieces in their way and still maintain their popularity. He died in Berlin in 1838.

Chamois (*Antilope rupicapra*), a well-known species of the antelope found only in high, mountainous regions, where they feed in small flocks or families, on the highest cliffs affording vegetation, which are almost inaccessible to man. The chamois are exceedingly shy, and have very acute senses, so that it is only by great patience and skill that the hunter can come sufficiently near to shoot them. They are so swift, and leap with so much vigor and with such sureness of foot, as to render it impossible to overtake them in a fair chase. Hence the hunters of the Alps in pursuit of this favorite game, and owing to the occurrence of sudden fogs, storms, avalanches, and various accidents, may always be regarded as placing their lives in great jeopardy. Chamois are found among the mountains of the Caucasian range, and among the heights of the Himalaya, in greater abundance than in the Alps and Pyrenees, where they are so closely pursued. The chamois is about 3 feet in length, and 2 feet high; its head resembles that of the domestic goat.

Chamois Leather, a leather made from the skin of the chamois (*Rupicapra tragus*), but the skins of sheep, goats, deer, calves, and the split hides of other animals, are used for making this kind of leather; the superior kinds of which are called chamois, and the inferior, wash-leather. The skins are unhaired in a lime-vat, and scraped on a beam in the ordinary way. The lime is removed in a bath by lactic or acetic acid, and the skins are then frizzed. This process consists in rubbing the skins with pumice or the blunt end of a round knife, until the grain is removed, the skin softened, and reduced to an even thickness throughout. The skins are then pressed to expel water, fulled by wooden hammers, spread, treated with oil—fish-oil being preferable—rolled up and again fulled, to distribute the oil throughout the bundle. They are then taken out, unfolded, dried, re-oiled, and again rolled and fulled. These processes are repeated till the effect is fully accomplished, heat being applied during the latter portion, by means of suspending the skins in a store-room. Superfluous oil is removed by a short steeping in a dilute alkaline lye; the skins are then wrung, dried, suppld by stretching, and polished by rolling.

Chamomile or Camomile (kam'ō-mīl; *Anthēmis nobilis*), a well-known plant belonging to the natural order *Compositæ*. It is perennial, and has slender, trailing, hairy, and branched stems. The flower is white, with a yellow center. Both leaves and flowers are bitter and aromatic. The fragrance is due to the presence of an es-



CHAMOIS.

sential oil, called oil of chamomile, of a light blue color when first extracted, and used in the preparation of certain medicines. Both the leaves and the flowers are employed in fomentations and poultices, and also in the form of an infusion as a stimulant or anti-spasmodic. It is cultivated in gardens in the United States, and

Chamomile

also found wild. Wild Chamomile (*Matricaria chamomilla*) is now out of use in England, but its medicinal properties re-



CHAMOMILE.

semble those of common chamomile, and it is still used in some parts of Europe.

Chamoreril, a lake with apparently no outlet, in Middle Tibet, on a plateau 15,000 feet above the sea, between the upper waters of the Sutlej and the Indus. It is surrounded by mountains some 5,000 feet in height, from which it receives much water. Its length of 15 miles and width of $2\frac{1}{2}$ are pretty constant. It freezes only in winter on account of its great depth.

Chamouni, or **Chamonix** (sha-mo-nē), a celebrated valley in France, department Haute-Savoie, in the Pennine Alps, over 3,000 feet above sea-level. It is about 12 miles long, by 1 to 6 miles broad, its E. side formed by Mount Blanc and other lofty mountains of the same range, and it is traversed by the Arve. The mountains on the E. side are always snow-clad, and from these proceed numerous glaciers, such as the Glacier des Bossons and the Mer de Glace. The village of Chamouni (pop. 1,500) is much frequented by tourists, and is one of the points from which they visit Mount Blanc.

Champac, or **Chumpaka** (*Michelia Champaca*), an Indian tree (order *Magnoliaceæ*) possessing great beauty both of foliage and flowers, and venerated both by Brahmanists and Buddhists. Images of Buddha are made of its wood. Its yellow flowers and their sweet, oppressive perfume are much celebrated in the poetry of the Hindus. The timber of this and other species is useful and fragrant, and the bark and root are employed in native medicine.

Champagne (shām-pän'), an old province in the N. E. of France, bounded on the N. by Belgium, on the E. by Lorraine, on the S. by Burgundy, and on the W. by

Champagne

Ile-de-France and Picardy. It is now embraced in the departments of Ardennes, Marne, Haute-Marne, and Aube, and parts of Yonne, Aisne, and Seine-et-Marne. It is a rolling country of calcareous formation, and from the vineyards on its hills are produced the famous wines of Champagne. It formed part of ancient Gaul, became known as Campania in the 6th century, and was ruled by independent native counts from the 10th century until 1284, when it was united to the crown of France by the marriage of Joanna, heiress of Navarre and Champagne, to Philip IV. (the Fair). It was formally incorporated with France in 1361. During the 12th and 13th centuries its court was an important literary center, and the language employed there (*langue d'oïl*) became that of the court of France. At this epoch lived the celebrated chroniclers Villehardouin and De Joinville, and the poets Chrestien de Troyes and Count Thibaut IV. On account of its frontier situation and natural confirmation Champagne has been the scene of many military operations, notably during the campaigns of 1792 and 1814, and in the Franco-Prussian War.

Champagne (from Champagne, in France, where it was originally made), a kind of brisk, sparkling wine. Champagnes are divided into four categories: Sparkling Granot, Ordinary Sparkling, Half Sparkling and Tisane de Champagne, or they may be classed as still, sparkling, and semi-sparkling. They are either sweet or dry, according to the extent to which fermentation has been carried. In the manufacture of champagne black grapes of the first quality are usually employed. The breakage of the bottles in these sparkling wines amounts frequently to 30 per cent. Much of the champagne sold is spurious, being manufactured from a cheap white wine sweetened with sugar, and colored. Sometimes it consists entirely of wine made from gooseberries or rhubarb sweetened, and charged with carbonic-acid gas. As in all other products of the grape, California has taken a preëminent position, so in regard to the manufacture of effervescent wines, the California article being pronounced by unprejudiced judges fully equal to the best French product.

Champagny, **Jean Baptiste Nompere de** (shām-pän'-yē), 1st Duc de Cadore, a French naval officer, diplomatist and politician, born in Roanne, Aug. 4, 1756. He entered the navy in 1780, was a member of the States-General, National, and Constituent Assemblies; thrown in prison in 1793, released after the 9th Thermidor (1794), and became Councillor of State. He was employed by Napoleon as ambassador to Vienna, and as Minister of the Interior

Champaign

and of Foreign Affairs, and he negotiated the marriage with Marie Louise. After Napoleon's downfall he transferred his allegiance to the Bourbons, under whom he became a peer. He died in Paris, July 3, 1834.

Champaign, a city in Champaign county, Ill., on the Illinois Central, the Cleveland, Cincinnati, Chicago and St. Louis, and other railroads, 48 miles S. E. of Bloomington. It is the trade center of the richest agricultural county in the State, is the seat of the University of Illinois, and of the Burnham Athenæum and Hospital, and has two National banks, several daily and weekly newspapers, and an assessed property valuation of \$1,500,000. Pop. (1900) 9,098; (1910) 12,421.

Champaran, a district in the province of Behar, in the N. W. of Bengal, India, S. of Nepal and E. of Oudh. The surface is mostly a fertile plain which produces rice, grains, sugar, opium, indigo, etc. Gold is washed down by the rivers from the mountains of Nepal. The climate is very unhealthy. Area, 3,531 square miles; pop., 1,440,815; capital, Motihari.

Champ de Mars (shän-de-märs'), a large, rectangular public place in Paris, on the left bank of the Seine, about 3,300 feet long and 1,600 feet wide. Its name is derived both from the ancient Roman *Campus Martius*, and from the annual field meetings held by the ancient Franks for warlike or legislative purposes. These meetings were held originally in the month of March, whence their name. They were transferred by Pepin in the 8th century to the month of May, after which they were known as the Champs de Mai. At the outbreak of the French Revolution the public square known as the Champ de Mars was constructed by the united efforts of all classes of Paris, and on July 14, 1790, the first anniversary of the taking of the Bastille, was held a grand pageant and festival at which universal pledges of "Liberty, Equality, and Fraternity" were exchanged. This spot was the scene of a bloody massacre July 17, 1791, of the "Festival of the Supreme Being," organized by Robespierre in 1794, the pageant called the Field of May of Napoleon in 1815, and the universal expositions of 1867, 1878, 1889, and 1900. It is now used chiefly as a parade-ground. In its center is the Eiffel Tower.

Champerty, the purchase of an interest in a thing in dispute, with the object of maintaining and taking part in the litigation, or assisting another to carry on a suit under an agreement to receive part of the sum or thing to be recovered.

Champfleury (shon-fle-rē') pseudonym of Jules Fleury-Husson, a French novelist,

Champion

born at Laon, Sept. 10, 1821. His story of "The Faience Violin" was a masterpiece of realistic description. He wrote an autobiographical novel of his youthful years in "The Confessions of Sylvius" (1849), continuing the story in "The Adventures of Mariette" (1856). But his "Burghers of Molinchart" (1855), a satiric delineation of the provincial bourgeoisie, made him famous. He is a pronounced "realist." Among his later novels, "The Tourangeau Girls" (1864), and "The Little Rose," are most worthy of mention. He compiled a "General History of Caricature" (5 vols., 1865-1885), with a supplementary volume, "Secret Museum of Caricature" (1888), and several other works on the arts of design and ceramics. He died at Sèvres, Dec. 5, 1889.

Champier, Symphorien (shon-pyā'), a French historian, born in St. Symphorien-le-Loise, Lyonnais. Famed as a physician, with powerful friends at court and an ample fortune, he took delight in literature and the society of literary men, himself writing a series of poems for "Virtuous Ladies" (1503), in four divisions, entitled "The Flower of Dames," "The Rule of Love," "The Prophecies of the Sibyls," and "The Book of True Love," respectively. His best history is an account of "Princes and Battles" (1502). He died at Lyons, about 1540.

Champion, one who combats or fights; specifically, in the Middle Ages, a person who took up the cause and fought in the place of another, who, from age, infirmity, or other cause, might be thus represented. Single combat was one of the ways frequently adopted to decide the right of a cause; and women, children, or aged persons were allowed to appear by a representative. At one time the champions formed a particular class, were compelled to wear a particular dress, and were looked upon as disreputable, being ready, for hire, to take up any quarrel. At a later period, however, during the ages of chivalry, the champion was a knight, who entered the lists on behalf of an injured lady, a child, or one incapable of self-defense. The office of Champion of the Crown of England is of great antiquity. He appeared at Westminster Hall at the coronation, between the courses of the royal banquet, in complete armor; his challenge was proclaimed by the herald three times, waging battle with any person who should deny or gainsay the title of the king; and the champion threw down his gauntlet. This office was performed at the coronation of George IV., in 1821. The word is also applied to one who earns, or claims, the preëminence in feats of physical prowess, or skill, as in prize-fighting, wrestling, rowing, etc.; one bold

Champion Hills

in contest; as, the Champion of the prize-ring.

Champion Hills, a place in Hinds county, Miss., near Vicksburg, where, on May 16, 1863, a battle was fought between the Union army under General Grant and the Confederate under General Pemberton. The Confederate army was defeated and retreated to Big Black river, with a considerable loss of men and guns.

Champlain, Lake, a picturesque body of water occupying a basin between the Green and Adirondack mountains, on the border of the States of Vermont and New York. Its length is about 125 miles, and its maximum depth is 280 feet. The waters find an outlet at the N. end, by the Richelieu or Sorel river, which empties into the St. Lawrence. Since the construction of the Champlain canal (1818-1823), which connects it with the Hudson river, the lake has become a very important medium of commerce between Canada and the United States. During the wars between the United States and Great Britain, this lake was the scene of numerous military operations. On Oct. 13, 1776, Benedict Arnold engaged a vastly superior British force, and made a daring escape. On Sept. 11, 1814, the American Commodore McDonough gained a most brilliant victory over the British fleet, near Plattsburg. The 300th anniversary of the discovery of the lake was celebrated in July, 1909, the governments of the United States, England, France, Canada, New York, and Vermont participating.

Champlain, Samuel de, a French navigator, colonizer, and soldier, born at Brouage, Saintonge, about 1570. In early life he served in the army of Henri IV., as quartermaster of cavalry, but in January, 1599, as commander of the ship "St. Julien," sailed to the West Indies, Mexico, and Panama. On his return (1601) he prepared a record of this cruise, with charts, etc. In March, 1603, he sailed for North America in the ship of Pontgrave, and explored, by boat, the St. Lawrence river up to the Falls of St. Louis, and down to Gaspé. Returning to France he published his "The Savages." In May, 1604, he sailed with De Monts along the shores of Nova Scotia, wintered on the island of St. Croix, and founded a colony at Port Royal. From 1604 to 1606 he made careful surveys and charts of the coast as far as Cape Cod. He revisited France in 1607, but sailed again in 1608, and founded Quebec, which, owing to the development of its fur-trade, rapidly increased in size. In 1609 he accompanied an Algonquin and Huron expedition against the Iroquois, and thereby discovered Lake Champlain, on the borders of which the Iroquois were defeated. From September, 1609, to March, 1610, he was engaged in

Champollion

bringing over French mechanics for his colony. He became lieutenant-governor of New France (Oct. 8, 1612); fortified Quebec (1620); but was compelled (1629) to surrender to an English fleet, and was taken to England. Released in 1632, he sailed again for New France, with three well-equipped vessels, and spent his last years in the government and development of the French colonies. He died in Quebec, Dec. 25, 1635.

Champlin, John Denison, an American author, born in Stonington, Conn., Jan. 29, 1834. He was graduated at Yale in 1856, and was admitted to the bar in 1859. In 1864 he became associate editor of the "Standard," at Bridgeport, Conn. He afterward published "The Sentinel" (1865-1869) at Litchfield, Conn., and became associate editor of the "American Encyclopædia" (1875). He is author of "Young Folks' Cyclopædia of Common Things" (1879); "Young Folks' Cyclopædia of Persons and Places" (1880); "Young Folks' Catechism of Common Things" (1880); "Young Folks' Astronomy" (1881); "Young Folks' History of the War for the Union" (1881); "Chronicle of the Coach" (1886); and other works.

Champney, Elizabeth (Williams), an American novelist, born in Springfield, O., in 1850. Many of her books were illustrated by her husband, J. W. Champney. Among them are the Vassar Girls' Series, "Three Vassar Girls Abroad," "In England," "In South America," etc.; "In the Sky-Parlor"; "All Around a Palette"; "Rosemary and Rue"; "The Bubbling Teapot"; "Bourbon Lilies"; "Sebia's Tangled Web"; and many other interesting stories.

Champney, James Wells, an American artist, born in Boston, Mass., July 16, 1843. He studied in Europe under Edouard Frere, and in 1882 became a member of the National Academy. He excelled in genre pictures and portraits and exhibited oil paintings at the Columbian World's Fair (1893) and at the Paris (1900) Exposition. He died May 1, 1903.

Champollion, Jean Francois (shan-pôl-yôn'), a French scholar, celebrated for his discoveries in the department of Egyptian hieroglyphics, born in Figeac, Dec. 23, 1790. At an early age he devoted himself to the study of Hebrew, Arabic, Coptic, etc., and in 1809 became Professor of History at Grenoble. He soon, however, retired to Paris, where, with the aid of the trilingual inscription of the Rosetta Stone and the suggestions thrown out by Dr. Thomas Young, he at length discovered the key to the graphic system of the Egyptians, the three elements of which—figurative, ideographic, and alphabetic—he expounded before the

Institute in a series of memoirs in 1823. These were published in 1824 at the expense of the state, under the title of "Hieroglyphic System of the Ancient Egyptians." In 1826 Charles X. appointed him to superintend the department of Egyptian antiquities in the Louvre; in 1828 he went as director of a scientific expedition to Egypt; and in 1831 the chair of Egyptian archæology was created for him in the Collège de France. He died in Paris, March 4, 1832.

Champollion-Figeac, Jacques Joseph (shan-pōl-yōn'fē-zhak'), a French Egyptologist, the elder brother of the preceding, born at Figeac in 1778. His principal works are: "Antiquities of Grenoble" (1807); "Universal Paleography"; "Annals of the Lagides" (1819); "Elementary Treatise on Archæology" (1843); "Egyptian Demotic Writings" (1843); "Ancient Egypt" (1850). He died in 1867.

Champs-Elysees (shôn'-zā-lē-zā'), [Fr. "Elysian Fields"], a place of public resort in Paris, which consists of an avenue and the gardens surrounding it. These extend from the Place de la Concorde to the Place de l'Etoile, a distance of 1¼ miles. It became the property of the crown in 1616 and was ceded to the city in 1828.

Chanca, Dr. (believed to have been **Diego Alvarez Chanca**), a Spanish physician, born in Seville, who became a companion of Columbus on his second voyage in 1493. One of the principal authorities for this voyage is the letter which he wrote to the Catholic college at Seville, giving an account of his journey. No record has been kept of his subsequent life.

Chance, in its original and strict meaning, may be defined as that which determines the course of events, in the absence of law, ordinary causation, or Providence. Strictly speaking, it is an idea which few men would now be disposed to admit as corresponding to anything which really exists; the religious mind excluding it as inconsistent with the belief in the divine government, and the philosophical mind rejecting it as inconsistent with a recognition of universal laws of causation. As a word, however, it has always been, and always will be popularly accepted; and its use is correct so far as we overlook, or choose for the moment to throw out of view, the more universal connection of events, and regard them as their emergence, on a superficial view, appears to be determined. It is clear that chance, being only legitimate as an expression in popular parlance, is a term which is much too indefinite to admit of any kind of measurement.

Chancel, the E. end of a church, in which the altar is placed. It was formerly, and

is even now in places, divided from the body of the church by a screen or lattice-work, and is raised by steps above the level of the body of the church.

Chancellor, in ancient times a petty officer stationed at the fence of bars or lattice-work in a law-court, to introduce such functionaries as were entitled to pass inside. The Emperor Carinus, the immediate predecessor of Diocletian, gave great offense by making such a cancellarius prefect in Rome. When the eastern empire was founded the office with its powers greatly augmented was continued.

From the Romans, the title and office passed to the Church, and therefore every bishop of the Catholic Church has, to this day, his chancellor, the principal judge of his consistory. When the modern kingdoms of Europe were established upon the ruins of the empire, almost every State preserved its chancellor, with different jurisdictions and dignities, according to their different constitutions. In all he seems to have had a supervision of all charters, letters, and such other instruments of the crown, as were authenticated in the most solemn manner; and when seals came into use, he had the custody of the public seal. An officer bearing this title is to be found in most countries of Europe, and is generally invested with extensive authority. The title and office of chancellor came to the United States from England. Many of our State constitutions provide for the appointment of this officer, who is by them, and by the laws of the several States, invested with power as they provide. His principal duty is to preside over a court of chancery.

The Lord Chancellor of England was originally the king's chief secretary, to whom petitions were referred, whence he was called *referendarius*. This title subsequently gave place to chancellor, which first occurs, according to Selden, in English history about A. D. 920. Being generally an ecclesiastic, he became keeper of the king's conscience. Having to express the sovereign's views in cases appealed to him from the courts of law, he gradually acquired a great legal standing himself, and finally developed into the potent personage now denominated the Lord Chancellor, or more fully the Lord High Chancellor. He is now the highest judicial functionary in the kingdom; he is keeper of the great seal; he presides in the House of Lords, of which he is prolocutor; he is a cabinet minister and privy councillor; presides in what was the Court of Chancery (once spelled *chanclery*), but is now the Chancery Division of the Supreme Court; appoints all justices of the peace throughout the kingdom; is the general guardian of all infants, idiots, and lunatics; visitor of the hospitals and

colleges of royal foundation; and patron of all livings under a specified value. He goes out with the ministry of which he is a member.

The Chancellor of the Exchequer of England is, properly, the under-treasurer of the exchequer, the head treasurership being held, not by an individual, but by the Lords Commissioners of the Treasury. The chancellor has, however, a very powerful voice in connection with the exchequer. He must be in the House of Commons, and may be its leader, and also Prime Minister.

The Chancellor of the German Empire is an officer, the extent of whose power and influence has never been (to outside understanding, at least) exactly defined. In modern Germany since the unification of the German Empire the office has been made illustrious by its association with the name of Bismarck, the first to hold that position under the new régime. In general terms it may be stated that the German Chancellor is an executive of very great powers, being at once the adviser and prime minister of the Emperor. He combines the functions of one of the American department secretaries with those of the promoter and originator of political policy.

Chancellor, Richard, an English sea-man, who seems to have been brought up in the household of the father of Sir Philip Sidney, and was chosen in 1553 as captain of the "Bonaventure" and "pilot-general" of Sir Hugh Willoughby's expedition in search of a N. E. Passage to India. The ships were parted in a storm off the Lofoden Islands, and Chancellor, after waiting seven days at Vardöhus, the rendezvous that had been agreed upon, proceeded alone into the White Sea, and traveled thence overland to the court at Moscow, where he was very hospitably treated, and was able to conclude a treaty giving freedom of trade to English ships. His interesting account of Russia was published in Hakluyt's "Navigations." Next spring Chancellor rejoined his ship and returned to England, where his hopeful reports led to the establishment soon after of the Muscovy Company. In the summer of 1555 he made a second voyage in the "Bonaventure" to the White Sea, and was at Moscow once more in the succeeding winter. In July, 1556, he set sail on his voyage homeward, but on Nov. 10 was lost in the wreck of his ship in Aberdour bay off the Aberdeenshire coast.

Chancellorsville, Battle of, one of the great battles of the American Civil War, fought at Chancellorsville, Va., May 2 and 3, 1863. Gen. Joseph Hooker commanded the Federal force, and Gen. Robert E. Lee the Confederate force. Although Hooker's army was superior in numbers, being about 130,000 against 60,000 of the Confederates,

the advantage at the end of the battle lay with the latter. During a flank movement the 11th corps of the Federal army, under Gen. O. O. Howard, was surprised and thrown into a panic near nightfall of the first day. The flank movement extended so far that the bullets of the Confederates were turned upon their own troops, and by their fire "Stonewall" Jackson was mortally wounded. The Federal loss was 18,000, the Confederate loss 13,000.

Chance-medley, in law, homicide happening either in self-defense, on a sudden quarrel, or in the commission of an unlawful act without any deliberate intention of doing mischief.

Chancery, in law, a court having special defined power. The English Court of Chancery was the highest court of judicature next to the House of Lords. The Lord Chancellor presided in this court, having under him the Lords Justices and Vice-Chancellors, who act for him in separate courts, and the Master of the Rolls, who had the keeping of all the rolls and records of the Court of Chancery, and also presided in a court of his own. The Court of Chancery was a court of equity. Under the Judicature Act of 1873 the powers and jurisdiction of the Court of Chancery were transferred to the High Court of Justice, and it now exists as the chancery division of that court.

In the United States it is a court having equity jurisdiction. American courts of equity are, in some instances, distinct from those of law; in others, the same tribunals exercise the jurisdiction both of courts of law and equity, though their forms of proceeding are different in their two capacities. The Supreme Court of the United States, and the Circuit Courts, are invested with general equity powers, and act either as courts of law or equity.

Chanderi or Chandhairee (chan-dā'rē), a town in Central India, Scindia's Dominions, in a hilly and jungly tract, 103 miles S. of Gwalior, formerly of considerable extent and splendor, but now an insignificant place. There is a fort which figures much in the wars of the Mogul dynasty.

Chandler, Richard, an English archæologist was born at Elson, Hants, in 1738, and educated at Winchester and at Queen's and Magdalen Colleges, Oxford. His first important work was "*Marmora Oxoniensia*" (1763), an elaborate description of the Oxford marbles. He afterward traveled through Greece and Asia Minor, with Revett, architect, and Pars, a painter, at the expense of the Dilettanti Society, to examine and describe the antiquities. The materials collected were given to the world in the following publications: "*Ionian Antiquities*" (1769), "*Ancient Inscriptions*" (1774), "*Travels in Asia Minor*"

(1775), and "Travels in Greece" (1776). Chandler was made D. D. in 1773, and afterwards held preferments in Hants and at Tilehurst, near Reading, in Berks, where he died, Feb. 9, 1810.

Chandler, Seth C., an American astronomer, born in Boston, Mass., Sept. 17, 1846; well known for his investigations and observations of the phenomena of variable stars, the computation of comet orbits, and, in connection with J. Ritchie, Jr., of Boston, for devising a system of astronomical code-telegrams for the announcement of astronomical discoveries. He also invented the Almucantar, and published a very complete treatise on the method of its use. He is an authority on the subject of variable stars, of which he has published a complete catalogue.

Chandler, William Eaton, an American politician, born in Concord, N. H., Dec. 28, 1835. He was graduated at Harvard Law School in 1855, entered the New Hampshire Legislature in 1862, became Judge Advocate General of the Navy Department in 1865, and Secretary of the Navy in 1882, serving three years. In 1887-1901 he was a United States Senator from New Hampshire.

Chandos, a great English family, descended from a follower of William the Conqueror, the last representative in the direct male line being Sir John Chandos (died 1428), whose sister married one Giles Brydges. Their descendant, Sir John Brydges, was lieutenant of the Tower under Queen Mary, and was created Baron Chandos in 1554. James Brydges (1673-1744), eighth Lord Chandos, sat in Parliament for Hereford from 1698 to 1714, and was created Duke of Chandos in 1719. The lucrative post of paymaster of the forces abroad (1707-1712) supplied means for building a palace at Canons, near Edgeware, which cost £200,000, but was torn down at the duke's death. Here Handel lived two years, wrote anthems for the chapel service, and produced "Esther." In 1796 the title passed by marriage to the family of Grenville, the present dukes of Buckingham and Chandos.

Changarnier, Nicholas Anne Theodule (shän-gär-nyä'), a French general, born in Autun, April 26, 1793; was educated at Saint-Cyr, and went in 1830 to Algeria, where for 18 years he saw all the active service there was to be seen. On the proclamation of the Republic in 1848 he acted as provisional governor-general of Algeria, but returned to Paris to take command of the garrisons of Paris and of the National Guard. He did much to check the outbreaks of the anarchist party during 1849. In the Legislative Assembly he held a sort of neutral position between the Orleanists and the Legitimists, while opposing the

Bonapartist party. At the *coup d'état* in December, 1851, after being imprisoned in Ham, he went into exile till the Franco-Prussian war, when he offered his services to Napoleon III. He was in Metz with Bazaine, and, on its capitulation, retired to Brussels. He returned to France in 1871, entered the Assembly, and assisted M. Thiers in reorganizing the army. He died at Versailles, Feb. 14, 1877.

Chang-Chow-Foo, or **Chang-Chau**, a city of China, about 36 miles S. W. of Amoy, which is its port. It lies in a valley in the province of Fu-Chien, and is surrounded by hills and intersected by a river. It is the center of the Fu-Chien silk industry, but has not been declared a treaty port; hence no commercial statistics of the place are available, nor do trading ships put in here. Pop. est. 1,000,000.

Changeling, a child left or taken in the place of another. It was at one time a common superstition that young children were liable to be stolen or changed by fairies before being baptized; and hence they were carefully watched till that ceremony was over. It was thought that the fairies were always anxious to change their own starveling elves for the more robust children of men. The children so left were called changelings, and were known by their greater backwardness in growth or learning; hence, stunted or idiotic children were regarded as changelings.

Chang-Sha, a city of China, capital of the Province of Hu-Nan, on the Hang-Kiang, a tributary of the Yang-tse-Kiang. Chang-Sha is now a treaty port, and has an important native trade carried on in small boats. A telegraph station is projected and in 1900 surveys were completed for a railway. Pop. (1905) est. 230,000.

Chank-shells, a name given in the East Indies to certain varieties of the shell *Voluta gravis*, fished up by divers in the Gulf of Manaar, on the N. W. coast of Ceylon. There are two kinds, payel and patty, one red and the other white; the latter is of little value. These shells are imported into India, where they are sawn into rings of various sizes, and worn on the arms, legs, fingers, and toes by the Hindus. A third species, opening to the right, is (as in most spiral shells), rare, and very highly valued. The demand for these shells, caused by the religious rites of the Hindus, was so great that 60,000 rix-dollars (\$21,000) per annum were received by the Government for the right of fishing for them. Now the fishery is open and free to all.

Chanler, Mrs. John Armstrong ("Amélie Rives"). See TROUBETSKOY.

Chanler, William Astor, an American explorer, born in Newport, R. I., June 11,

Channeling-machine

1867. He studied at Harvard, but left the university to make explorations in Africa. He was elected to the New York Legislature in 1897, and to Congress in 1898 as a Democrat. He served in the war with Spain and was commended in General Shafter's reports. He has written "Through Jungle and Desert" and "Travels in Eastern Africa," etc.

Channeling-machine, a machine for cutting the channels in boot-soles, to allow the thread to bury itself in the leather and be protected from immediate wear. It consists of a knife, which makes an oblique cut in the sole to a gauged depth and regulated as to distance from the sole-edge by a guide.

In stone working the term is applied to a machine having a series of jumpers or chisels which make a groove across the face of a block in the quarry, or detached. It has a gang of cutters operated by direct-acting steam cylinder. The cutters have direct motion from the piston. The valve is reversed at the blow of the cutters; or, in case of no blow being given, it is reversed before the cylinder bottom is touched by the piston. The cutter bar is adjustable on the cylinder bar to suit the depth of groove cut. The whole mechanism is mounted on vertically adjustable rollers, and the feed device is operated from the cross-head.

Channel Islands, a group of islands in the English Channel, off the W. coast of department La Manche, in France. They belong to Great Britain, and consist of Jersey, Guernsey, Alderney, and Sark, with some dependent islets. They are almost exempt from taxation, and their inhabitants enjoy besides all the privileges of British subjects. The government is in the hands of bodies called the "states," some members of which are named by the crown, while others are chosen by the people, and others sit *ex officio*. The islands have been fortified at great expense. They form the only remains of the Norman provinces once subject to England. Area, 75 square miles, pop. (1901) 95,841.

Channels, or **Chain-wales**, in marine architecture, broad and thick planks projecting horizontally from the ship's outside, abreast of the masts. They are meant to keep the shrouds clear of the gunwale.

Channing, William Ellery an American preacher and writer; born in Newport, R. I., April 7, 1780; studied at Harvard College, at first with a view to the medical profession, but soon abandoned the idea, and turned his attention to theology. His early views are said to have been evangelical, but by 1819 became Unitarian, although he disliked controversy and declared that he sought only a "more effectual manifestation of Christian Truth." His first

Chantibun

appointment as a preacher was in 1803, when he obtained the charge of a congregation in Federal street, Boston. His hearers, at first few in number, rapidly increased by the fame of his eloquence, and soon required the accommodation of a new and much larger church. He had long possessed a distinguished reputation in the United States before he was much known in England; but two papers, one a review of Milton's "Treatise of Christian Doctrine," and the other of Scott's "Life of Napoleon," being separately republished in London, under the title of "Remarks on the Character and Writings of John Milton," and "Remarks on the Life and Character of Napoleon Bonaparte," attracted attention and led to the republication of his collected writings in a variety of forms. Some of his writings have been translated into French and German. They consist chiefly of sermons, reviews, and miscellaneous tracts, on such subjects as war, temperance, education, and slavery. He died in Burlington, Vt., Oct. 2, 1842.

Channing, William Ellery, An American poet; nephew of William E. Channing, the elder; born in Boston, Mass., June 10, 1818; author of "Poems," "The Woodman," "Near Home," "The Wanderer," "Conversations in Rome," and "Thoreau, the Poet-Naturalist." He died Dec. 23, 1901.

Channing, William Henry, an American Unitarian clergyman and biographer; nephew of W. E. Channing, the elder; born in Boston, May 25, 1810. Settling in England, he succeeded James Martineau as pastor at Liverpool. His daughter married Sir Edwin Arnold. His principal work was "Memoir of William Ellery Channing" (3 vols., 1848). He died in London, Dec. 23, 1884.

Chansons de geste (shänsôn' de zhest'), the romances of the Middle Ages sung or recited by wandering minstrels. Their number in French is very large; in English they are not so numerous and most of them are translations of a French original.

Chant, a species of melody used in cathedrals and churches, between an air and a recitative, to which the psalms of the day, the canticles, etc., are sung.

Changeable Chant, a single or double chant which can be sung either in the major or minor mode without other alteration than the substitution of the minor third and sixth of the scale for those of the corresponding major.

Chantibun, or **Chantabon**, an important commercial port of Siam, near the mouth of the Chantibun river, in the Gulf of Siam, occupied by the French as security for the fulfillment of the treaty of 1893. Pop., 30,000.

Chantilly

Chantilly, a town of France, in the department of Oise, 25 miles N. N. E. of Paris; on the Nonnette; celebrated for its splendid chateau, built for the Duc d'Aumale in 1876. It stands on the site of an older chateau which first became important under Anne de Montmorency. In 1632 it passed to the house of Condé, but the greater part was demolished at the Revolution. The last Prince of Condé bequeathed the domain to the Duc d'Aumale in 1830. The present building and domain, including fine grounds and gardens, an extensive forest, etc., were presented by the duke to the French Institute in 1886. The chateau contains a valuable library and a precious collection of works of art. The place was formerly celebrated for its manufacture of lace ("Chantilly lace"). It is a great horse-racing and training center. Pop. (1901) 4,791.

Chantilly, or Ox Hill, Battle of, a battle fought at Chantilly and Ox Hill, Fairfax co., Va., Sept. 1, 1862, between a part of Pope's Federal army, under Generals Jesse L. Reno, Isaac T. Stevens, and Philip Kearney, and two Confederate divisions under "Stonewall" Jackson. At Ox Hill, three miles E. of Chantilly, Jackson formed his line on the night of Aug. 31, taking advantage of a ridge favorable to infantry and artillery. At midnight Stevens was sent with about 3,000 men to hold Jackson in check so that the Federal army could be disposed for the defense of Fairfax Court-House, which Lee was threatening with intent to get between Pope and Washington. Stevens fell upon Jackson's skirmish-line and drove it back, repulsed a regiment advanced by Jackson, and moved with an assaulting column of 2,000 men, but was met with a destructive fire and repulsed. Led by Stevens, the Federals again pushed forward, but although Kearny and others came to their support, they failed to drive the Confederates, who had cover in a body of woods, and the battle ended without decisive gains to either side. The Federals lost about 800, and the Confederates about 700. Stevens was killed while carrying the colors of a regiment to rally his men, and Kearny while reconnoitering in front of the enemy.

Chantrey, Sir Francis, an English sculptor; born near Sheffield, April 7, 1781; was the son of a well-to-do carpenter. Even in boyhood his chief amusement was in drawing and modeling figures, and he was apprenticed in 1797 to a carver and gilder. In 1802 he commenced work for himself at Sheffield. After studying at the Royal Academy in London he settled in the metropolis. In 1816 he was chosen an associate and in 1818 a member of the Royal Academy. He was knighted in 1835. His most celebrated works are the "Sleeping

Chapala

Children," in Litchfield Cathedral; the statue of Lady Louisa Russell, in Woburn Abbey; the bronze statue of William Pitt, in Hanover Square, London; a statue of Washington, in the State House, Boston; and statues of Horner, Canning, Sir J. Malcolm, etc., in Westminster Abbey. His best works are his busts, but his full-length figures and equestrian statues betray an insufficient acquaintance with anatomy. He died Nov. 25, 1842.

Chantry, a church or chapel endowed for the maintenance of one or more priests, for the purpose of singing daily masses for the souls of the endowers, and such others as they may appoint. Also the endowment for the performance of masses for the soul of the donor, or others.

Chanzy Antoine Eugene Alfred, (shän-zé), a French general, born in Neuart (Ardennes), March 18, 1823; entered the artillery as a private, received a commission in the Zouaves in 1841, and served almost uninterruptedly in Africa till 1870. After the revolution of Sept. 4, the Government of National Defense appointed him a General of division; in December he was placed at the head of the second Army of the Loire, and resisted the invaders inch by inch with a stubborn valor that won the respect of the Germans and the confidence of his countrymen, and which found a fitting close in the great six days' conflict about Le Mans. He was elected to the National Assembly, and narrowly escaped being shot by the Communists in 1871. In 1873-1879 he was Governor-General of Algeria. Chosen a life Senator in 1875, he was put forward for the presidency in 1879. He was ambassador at St. Petersburg in 1879-1881, and afterwards commanded the 6th Army Corps at Châlons, where he died suddenly, Jan. 4, 1883.

Chao-Chau, a city of China, on the Han-Kiang, in the Province of Kwang-tung, 195 miles N. E. of Hong-Kong. Although not a treaty port, Chao-Chau has a harbor for ordinary vessels of commerce. The nearest telegraph station is at Swatu, 20 miles away. Pop. est. (1900) 200,000.

Chaos, in the ancient cosmogonies, signified that vacant infinite space out of which sprang all things that exist. Some poets make it the single original source of all; others mention along with it Gæa, Tartaros, and Eros. By some also only the rough outlines of heaven and earth were supposed to have proceeded from Chaos, while the organization and perfecting of all things was the work of Eros.

Chapala, a lake in Mexico, on the high plateau of Jalisco, surrounded by steep, bare mountains. It has an estimated area of 1,300 square miles, contains many islands, and is traversed by the Rio Grande de Santiago.

Chapbooks, a species of cheap literature which preceded the popular periodicals of the present day. They usually consisted of coarsely printed publications, and were so called because they were prepared by the chapmen or peddlers, who hawked them from district to district. They included lives of heroes and wonderful personages, tales of roguery and broad humor, witch and ghost stories, etc.

Chapel, a place of worship, formerly distinguished from a church by the publicity of the worship to be performed; churches being for general use, and chapels (or little churches) for the special use of private individuals or particular households. From these the use of the term in Europe has been extended so as to include all religious edifices not of the established faith. There are also, in the Protestant as in the Roman Catholic churches, chapels of ease to parish churches, built for the accommodation of worshipers in populous or extensive parishes. In Roman Catholic churches, portions of the main building, dedicated to particular saints, in honor of whom a service is there performed, are called chapels. The word is also applied to an association of union workmen in a printing-office for the purpose of promoting and enforcing order among themselves.

Chapelain, Jean (shäp-lan'), a French poet and critic, born in Paris, Dec. 5, 1595. By his own unaided efforts he acquired a knowledge of Greek and Latin, Italian and Spanish. He won the favor of Cardinal Richelieu by his preface to Marini's notorious poem "Adone," and was a leading founder of the French Academy, whose first meetings were held at his house. Through court influence he rose to be a recognized law-giver of literature. He published in 1756 the first installment, 12 cantos, of a great epic, "The Maid of Orleans," on which he had been at work 20 years. But the critics, headed by Boileau, were so unfavorable that though of the first installment six editions were sold in 18 months, no publisher could be found for the sequel. He died in Paris, Feb. 24, 1674.

Chapelle, Placide Louis (shäp-el'), an American clergyman, born in Mende, France, Aug. 28, 1842. He came to the United States in 1859, and was graduated at St. Mary's College, and was ordained a Roman Catholic priest in 1865. For five years he was a missionary, and from 1870 to 1891 held pastorates in Baltimore and Washington. He was made coadjutor archbishop of Santa Fé in 1891; archbishop in 1894; and archbishop of New Orleans in 1897. The following year he was appointed by the Pope Apostolic Delegate to Cuba, Porto Rico, and the Philippines. In the latter archipelago he warmly espoused the

cause of the friars, resisting the demand for their expulsion. He died Aug. 9, 1905.

Chaperon, a hood or cap worn by Knights of the Garter. Such a hood was at one time in general use, but was latterly appropriated to doctors and licentiates in colleges. A person who acts as a guide and protector to a lady at public places is called a chaperon, probably from this particular piece of dress having been used on such occasions. The name was also applied to devices which were placed on the heads of horses at pompous funerals.

Chapin, John R., an American illustrator, born in Providence, R. I., in 1823. He received a common school education and studied law, but took up art. He was a pioneer in periodical illustration in the United States. In 1853 he became art manager of the "United States Magazine" and in 1861 for Harper Brothers. In 1863 he made the designs for the bills for the National currency. He died Nov. 12, 1904.

Chaplain, literally a person who is appointed to a chapel, as a clergyman not having a parish or similar charge, but connected with a court, the household of a nobleman, an army, a prison, a ship, or the like. Chaplains in the United States army rank as captains of infantry; in the navy they have the rank of lieutenant, commander and captain, according to length of their service.

Chapleau, Sir Joseph Adolphe (shäp-lō'), a Canadian statesman; born in St. Therese de Blainville, Quebec, Nov. 9, 1840. He studied law and distinguished himself at the bar. He was chosen leader of the Quebec Conservatives and formed a cabinet in 1879, remaining Premier of Quebec till appointed Secretary of State for the Dominion in 1883. He was Lieutenant-Governor of Quebec in 1893-1898. He died in Montreal, June 13, 1898.

Chapman, George, an English poet; the earliest, and perhaps the best, translator of Homer; born probably in Hitching Hill in Hertfordshire, at which place he is known to have for some time resided, in 1557. He was educated at Oxford, and in 1576 went to London, where he made the friendship of Shakespeare, Spenser, Marlowe, and other writers of the time. The first of his works, so far as is known, was the "Shadow of Night," a poem published in 1594. His translation of the "Iliad," in rhyming lines of 14 syllables each, was published in three separate portions, in 1598, 1600 and 1603. It has been highly commended by such poets as Pope, Keats, and Coleridge, as also by Lamb. Keats' sonnet, "On First Looking into Chapman's Homer" ("Then felt I like some watcher of the skies," etc.), is well known.

In 1614 appeared his celebrated translation of the "Odyssey" which was in the same meter as the "Iliad," followed in the same year by that of the "Battle of the Frogs and Mice" and the Homeric hymns. He wrote numerous plays. The earliest of these was "The Blind Beggar of Alexandria," a comedy, 1598. He was associated with Jonson and Marston in writing the comedy of "Eastward Ho!" Among his tragedies are "Bussy d'Ambois," "Cæsar and Pompey," "Revenge for Honor." He died in London in 1634.

Chapone, Hester (shä-pōn'), an English story-writer and poet, born in Northamptonshire, Oct. 27, 1727. She wrote: "Ode to Peace"; "Fidelia," a story; "Miscellanies in Prose and Verse"; and other works. She died in 1801.

Cha-Poo, or Cha-Pu, a seaport town of China, in the Province of Cheh-Chiang (or Che-Kiang), on the N. side of Hang-Chau Bay, 35 miles from Ning-Po. Although not a treaty port, it carries on a considerable commerce with Japan. Its European trade is conducted through the treaty port of Ning-Po, and is largely in green tea. Its imports are ginseng (from the United States) and manufactured goods. The native industries are sedge hats and mats, fishing, and silk making. Pop. (1900, est.), 80,000. Merchant vessels do not touch at Cha-poo ordinarily, although Chinese and Japanese junks put in regularly.

Chappell, William, an English author; born Nov. 20, 1809. Most of his life he lived in London, where he was for some years a member of a great music publishing house. His first work of importance was "A Collection of National English Airs, consisting of Ancient Song, Ballad, and Dance Tunes" (2 vols., 1838-1840). He took a principal part in the foundation in 1840 of the Musical Antiquarian Society and the Percy Society, and published the first volume of a "History of Music" in 1874. He died in London, Aug. 20, 1888.

Chaptal, Jean Antoine, Comte de Chanteloup (shäp-täl'), a French chemist, born in 1756. Having succeeded to the fortune of a rich uncle, he instituted several establishments for the manufacture of chemical products. He improved the processes for the production of mineral acids, alum, soda, white lead, etc.; discovered a new method for dyeing Turkey red, and also naturalized barilla in the S. of France. He was afterward appointed Professor of Chemistry in the school of medicine at Paris, and named by Napoleon Minister of the Interior. In 1816 he was elected member of the Institute. He died in 1832.

Chapter, one of the chief divisions of a book. As the rules and statutes of ecclesiastical establishments were arranged in

chapters, so also the assembly of the members of a religious order, and of canons, was called a chapter. The orders of knights used this expression for the meetings of their members, and some societies and corporations call their assemblies chapters.

Chapter-house, the building attached to a cathedral or religious house in which the chapter meets for the transaction of business. They are of different forms, but are often polygonal in plan. Sometimes they were the burying-place of clerical dignitaries.

Chapuis, Auguste Paul Jean Baptiste (chap-wē'), a French musician, born in Dampierre-sur-Saône, April 20, 1862. Since 1895 he has been inspector-general of musical instruction in the Paris schools. He has composed "Tancred," a lyric drama, and much successful church music.

Chapultepec, (*Nahuatl*, "hill of the grasshoppers"), a rocky elevation about 3 miles S. W. of the City of Mexico. From this point at an early day water was brought in an aqueduct to the city, but no buildings were placed on it until about 1785, when the Viceroy of Mexico, Galvez, began the erection of a palace in the form of a fort, or castle, and intended for a stronghold as well as a residence. It was left unfinished until after the revolution. When the Republic was formed part of the building was used for a military school and the National Astronomical Observatory was erected on the hill. During the war with the United States, Gen. Pillow stormed the castle, Sept. 13, 1847. The Emperor Maximilian made Chapultepec his principal palace, and it is now occupied by the President, the portions used by the school and observatory, however, being still reserved for them. There is a beautiful park surrounding the hill, which is a favorite resort for the residents of the city.

Char, Fredrich Ernst (Fritz), a German composer, born in Cleve-on-Rhein, May 3, 1865. He is a noted opera conductor, and wrote the celebrated romantic opera, "The Rogue of Bergen" (*Der Schelm von Bergen*), besides sonatas and cantatas.

Char, or Charr (*Salmo umbla*), a European fresh-water fish of the salmon genus, found plentifully in the deeper lakes of England, Wales, and Ireland, more rarely in those of Scotland. The chars inhabit the colder regions of deep waters, where the temperature is less liable to vary. The body somewhat resembles that of a trout, but is longer and more slender, as well as more brilliant in coloring, with crimson, rose, and white spots; weight sometimes 2 pounds, but generally under 1 pound. Char is much esteemed for the table.

Chara

Chara, a name of a plant mentioned by Cæsar, the root of which was used by the Roman soldiers for food. In botany, a genus of *Algals*, the typical one of the order *Characeæ*. The species are found in ponds. The axis is coated with tubes, and a large quantity of calcareous matter is deposited upon them. The branches are given off in whorls. *C. vulgaris*, Common or Stinking C. or Stonewort, is a native of Europe, and a perennial, as also is *C. hispida*, the Prickly Stonewort. In paleontology the word relates to the nucules, known to paleontologists under the name of *Gyrogonites*, and found for the first time in the fresh-water beds of the Jurassic (Oölitic) formations. They are the minute spiral seed-vessels or sporangia of these plants.

Characeæ, a small natural order of acrogens consisting of two or, at the most, three genera. The species are all aquatic, and are found in almost all parts of the world, but most commonly in temperate countries. They are monœcious and diœcious, the two kinds of fruit being often seated close to each other. The male fruit is globose, brick-red, with the surface divided into eight equal *ascæ*, consisting of tubes radiating from a common center. They emit a smell resembling that of sulphuretted hydrogen.

Charade, a species of enigma, or riddle, the subject of which is a name or word that is proposed for solution from an enigmatical description of its several syllables taken separately as so many individual words, and then from a similar description of the whole name or word. A charade can only be called complete when the different enigmas which it contains are brought into a proper relation to each other, and, as a whole, unite in an epigrammatic point. The following is a good example, from the French: "My first makes use of my second to eat my whole;" the first being chien, a dog; the second dent, a tooth; and the whole chiendent, dog's grass.

Charadriidæ, or **Charadriadæ**, the Plovers, a family of wading birds, tribe *Presirostres*. They have long, slender legs, with the toes united by a small membrane, the hinder one very small and elevated, or wanting. Genera: *Charadrius* (Plover), *Vanellus* (Lapwing), *Glareola* (Pratincole), *Himantopus* (Longshank), *Hæmatopus* (Oyster-catcher), and *Ædicnemus* (Thick-knee).

Charadrius, a genus of birds, plovers, belonging to the order *Grallatores* (Waders). They feed on worms and molluscous animals. The eggs of the Lapwing are considered a great delicacy, and are frequently to be seen in shops, where they are sold as plover's eggs.

Chardin

Charcoal, an impure variety of carbon, prepared from vegetable substances or bones. Wood charcoal consists of wood burned with but little access of air. Billets of wood are built into a heap, which is covered with earth or sand. The heap is fired at openings left near the bottom of the pile, and the gases escape at small openings above. For making fine charcoal, such as that of willow, used in the manufacture of gunpowder, the wood is burned in iron cylinders or rather retorts, in which a process of destructive distillation removes the volatile hydrocarbons, pyroligneous acid, etc. By this more perfect means the process is accurately regulated. Charcoal is used in the arts as—a fuel; a polishing powder; a table on which pieces of metal are secured in position to be soldered by the blowpipe; a filter; a defecator and decolorizer of solutions and water; an absorbent of gases and aqueous vapors; a nonconducting packing in ice-houses, safes, and refrigerators; an ingredient in gunpowder and fire-works; in the galvanic battery and the electric light.

Animal charcoal is used largely in sugar-refining, and as a disinfectant and filtering medium, is prepared by calcining bones in closed vessels. These are either retorts, similar to those in which coal is distilled for the production of illuminating gas, or they are earthenware pots, piled up in kilns and fired. Charges of 50 pounds of bones to a pot will require 16 hours of firing. The bones are then ground between fluted rollers, the dust removed, and the granulated material used for charging the filters of the sugar refiner. The material is used for removing color, feculences, and fermenting ingredients from the syrup.

Charcot, Jean Martin (shär-kō'), a French physician, born in Paris, Nov. 29, 1825. His specialty was in the treatment of nervous and mental diseases, and he performed many curious and successful experiments in hypnotism and mental suggestion, in the Salpêtrière where he founded a clinic for the treatment of nervous diseases in 1880. He published several works treating of these subjects. He died Aug. 16, 1893.

Chard, the leaves of artichoke covered with straw in order to blanch them and make them less bitter. Beet chards, the leaf stalks and midribs of a variety of white beet in which these parts are greatly developed, dressed for the table.

Chardin, Sir John (shär-dän'), a French traveler and merchant, born in Paris, in 1643. He twice visited Persia, remaining several years each time, between 1664 and 1677. On his return, being a Protestant by birth, he was compelled to seek refuge in England, where he settled as a jeweler to

the court and nobility, and was knighted by Charles II. In 1683 appeared a folio volume of his travels, which has been verified by subsequent travelers, and translated into many foreign languages. He died in 1713.

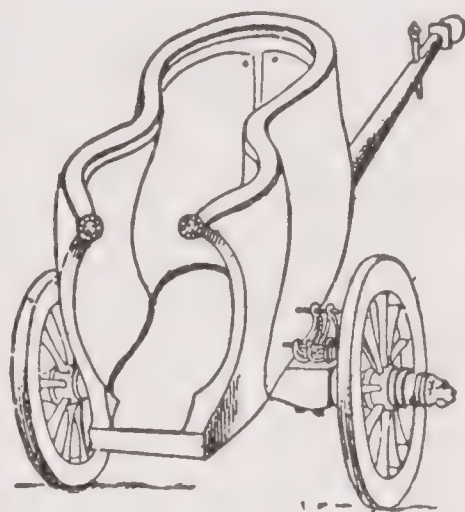
Charente (shä-ränt'), a river in western France, rising in the department of Haute-Vienne, and falling into the sea about 8 miles below Rochefort, opposite to the isle of Oleron, after a course of about 200 miles. It gives its name to two departments — CHARENTE, an inland department, formed chiefly out of the ancient province of Angoumois and traversed by the river Charente; area, 2,305 square miles; capital, Angoulême. Soil generally thin, dry, and arid; one-third devoted to tillage, a third to vineyards, and the remaining meadows, woods, and waste lands. The wines are of inferior quality, but they yield the best brandy in Europe, the celebrated cognac brandy being made in Cognac and other districts. Pop. (1906) 351,733. CHARENTE-INFERIEURE (an-fä-ri-eur), "Lower Charente," a maritime province of Angoumois and Poitou; area, 2,791 square miles. Surface in general flat, soil chalky and sandy, fertile, and well cultivated; a considerable portion planted with vines; salt marshes along the coast. The pastures are good, and well stocked with cattle, horses, and sheep. The wine is of common quality, and chiefly used for making brandy. Oysters and sardines abound on the coast. Salt and brandy are the only articles manufactured to any great extent. Capital, La Rochelle (pop. 1901, 31,559). Pop. (1906) 453,793.

Chares (kä-rēz), a Rhodian sculptor, born in Lindus, Rhodes; lived about 290–280 B. C. He was a pupil of Lysippus and the sculptor of the Colossus of Rhodes, one of the "seven wonders of the world." It was a representative of the Rhodian sun god, made of brass, said by some authorities to be 126 feet and by others 105 feet high. It required 12 years to complete it, and cost \$147,000. It was built in commemoration of the successful defense of Rhodes against Demetrius Poliorcetes in 303 B. C.

Charge, in heraldry, signifies the various figures depicted on the escutcheon. In gunnery Charge signifies the quantity of powder used at one discharge of a gun. Charge, in military tactics, is the rapid advance of infantry or cavalry against an enemy, with the object of breaking his lines by the momentum of the attack. Infantry generally advance to about 100 yards and fire, then gradually quicken their pace into the Charge-step, and dash at the enemy's lines. Cavalry charge in echelon or column against infantry, which is usually formed in squares to receive them.

Charge d'Affaires (shär-zhā' däf-fär'), a representative of a country at a less important foreign court, inferior to an ambassador, or a minister, to whom is intrusted all matters of diplomacy. Also the officer to whom the charge of an embassy is intrusted during the temporary absence of the ambassador or minister-plenipotentiary.

Charge of the Light Brigade, The, or "Death charge of the 600 at Balaklava." Oct. 25, 1854, a remarkable military movement made by the 13th Light Dragoons, the 17th Lancers, the 11th Hussars, commanded by Lord Cardigan, the 8th Hussars, and the 4th Light Dragoons. The Russians were advancing in great strength to cut off the Turkish force from the British. Lord Raglan sent an order to Lord Lucan to advance, and Lord Lucan, not understanding what was intended, applied to Captain Nolan, who brought the message and Nolan replied: "There, my Lord, is your enemy." Lucan then gave orders to Lord Cardigan to attack, and the 600 men rode forward into the jaws of death. In 20 minutes 12 officers were killed and 11 wounded; 147 men were killed and 110 wounded, and 325 horses were slain. The blunder must be shared by Lord Lucan, General Airey, and Captain Nolan. However, never victory was more glorious to the devoted men than this useless charge. "It was magnificent, but it was not war." When Lord Cardigan rallied the scattered remnants, and said: "My men, some one has blundered," they replied: "Never mind, my Lord, we are ready to charge again, if it is your Lordship's command."



RACING CHARIOT.

Chariclea, the daughter of Hydaspes, a perfect beauty.

Charing-Cross, the titular center of London, so named from a cross which stood until 1647 at the village of Charing in memory of Eleanor, wife of Edward I. It is now a triangular piece of roadway at Trafalgar Square.

Chariot, in ancient times a kind of carriage used either for pleasure or in war. According to the Greeks, it was invented by Minerva; while Vergil ascribes the hon-

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or to Erichthonius, a mystical king of Athens, who is said to have appeared at the Panathenaic festival, founded by him, in a car drawn by four horses. The ancient Chariot had only two wheels, which revolved upon the axle, as in modern carriages. The pole was fixed at its lower extremity to the axle, and at the other end was attached to the yoke, either by a pin or by ropes. The Greeks and Romans seem never to have used more than one pole, but the Lydians had carriages with two or three. In general the Chariot was drawn by two horses. Such was the Roman *biga*, but we also read of a *triga*, or three-horse Chariot, and a *quadriga*, or four-horse one.

Charity, one of the three great theological virtues, consisting of love to God and our neighbors, or the habit and disposition of loving God with all our heart and our neighbor as ourselves. In a narrower sense, it signifies kindness, good-will, and forbearance toward mankind in general, and in a still lower sense, the giving of alms and the alms itself. This love to our neighbors, which is one of the greatest and noblest of Christian virtues, is not of a blind, indiscriminating character. Organized Charity is the system of poor-relief carried out by bodies of a quasi-public character, such as the Charities Organization Society in New York. Bequests and gifts to charitable institutions or for charitable purposes must be used in strict conformity with the expressed terms of the instrument of conveyance. Property of charitable institutions is usually exempt from taxation in all the States, though in some of them the institutions must be founded by legislative charter to secure this exemption. The government of private charities is usually in the hands of a superintendent and board of directors, elected by patrons; and that of public charities in a board of commissioners (usually called visitors) and superintendent appointed by the governor of the State or executive of the municipality to which the charity belongs. In rare cases these officials are elected by the people.

Charity, Sisters of. See SISTERS OF CHARITY.

Charivari (shär-ē-vär'-ē), an imitative word, having its origin in slang, describing a mock serenade of discordant music with such accompaniments as tin kettles, shouting, whistling, groaning, hissing, and screaming, and the like, meant for the annoyance and insult of an obnoxious person. The etymology of Charivari is obscure; the Germans translate it by *Katzenmusik*, to which in English cat's-concert, and the American Callithumpian concert, correspond. In France, during the Middle Ages, a Charivari was generally raised

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against persons contracting second nuptials, in which case the widow was specially assailed. On these occasions the participators in it, who were masked, accompanied their hubbub by the singing of satirical and indecent verses, and would not cease till the wedding couple had purchased their peace by ransom.

Charlemagne (shar-lē-mān'), Charles the Great, King of the Franks, and subsequently Emperor of the West, was born in 742, probably at Aix-la-Chapelle. His father was Pepin the Short, King of the Franks, son of Charles Martel. On the decease of his father, in 768, he was crowned king, and divided the kingdom of the Franks with his younger brother Carloman, at whose death in 771 Charlemagne made himself master of the whole empire, which embraced besides France, a large part of Germany. His first great enterprise was the conquest of the Saxons, a heathen nation living between the Weser and the Elbe, which he undertook in 772; but it was not till 803 that they were finally subdued, and brought to embrace Christianity. While he was combating the Saxons, Pope Adrian implored his assistance against Desiderius, king of the Lombards. Charlemagne immediately marched with his army to Italy, took Pavia, overthrew Desiderius, and was crowned King of Lombardy with the iron crown. In 778 he repaired to Spain to assist a Moorish prince, and while returning his troops were surprised in the valley of Roncesvalles by the Biscayans, and the rear-guard defeated; Roland, one of the most famous warriors of those times, fell in the battle. As his power increased, he meditated more seriously the accomplishment of the plan of his ancestor, Charles Martel, to restore the Western Empire. Having gone to Italy to assist the Pope, on Christmas day 800 he was crowned and proclaimed Cæsar and Augustus by Leo III. His son Pepin, who had



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been made King of Italy, died in 810, and his death was followed the next year by that of Charles, his eldest son. Thus of his legitimate sons one only remained, Louis, King of Aquitania, whom Charlemagne adopted as his colleague in 813. He died Jan. 28, 814, in the 47th year of his reign, and was buried at Aix-la-Chapelle, his favorite and usual place of residence. Charlemagne was a friend of learning, and deserves the name of restorer of the sciences and teacher of his people. He attracted by his liberality the most distinguished scholars to his court (among others, Alcuin, from England), and established an academy in his palace at Aix-la-Chapelle, the sittings of which he attended with all the scientific and literary men of his court.

He invited teachers of language and mathematics from Italy to the principal cities of the empire, and founded schools of theology and the liberal sciences in the monasteries. He strove to cultivate his mind by intercourse with scholars; and to the time of his death this intercourse remained his favorite recreation. His mother-tongue was a form of German, but he spoke several languages readily, especially the Latin, and was naturally eloquent. He sought to improve the liturgy and church music, and attempted unsuccessfully to introduce uniformity of measures and weights. He built a light-house at Boulogne, constructed several ports, encouraged agriculture, and enacted wise laws. He convened councils and parliaments, published capitularies, wrote many letters (some of which are still extant), a grammar, and several Latin poems. His empire comprehended France, most of Catalonia, Navarre, and Aragon; the Netherlands, Germany as far as the Elbe, Saale, and Eider, Upper and Middle Italy, Istria, and a part of Sclavonia. In private life Charlemagne was exceedingly amiable; a good father and generous friend. In dress and habits he was plain and economical. His only excess was his love of the other sex. In person he was strong and of great stature. He was succeeded by his son Louis (le Débonnaire).

Charleroi (shär-ler-wä'), a fortified and important manufacturing town of Belgium, in the province of Hainault, on the navigable river Sambre, 33 miles S. of Brussels. The town is the center of the large coal-basin of Charleroi, and its chief manufactures are iron, glass, fire-arms, cutlery, slates, woollens, leather, tobacco, sugar, soap, rope, etc. The fortress of Charleroi was built in 1666 and named after Charles II. of Spain. The town has sustained several memorable sieges, and been possessed by the Spaniards, Austrians, and French. Pop. (1906) 27,029.

Charles, the name of a number of European sovereigns and princes noted in the order of their respective countries, viz.:

Charles I., surnamed LE CHAUVÉ, or the Bald, King of France; son of Louis le Débonnaire by his second wife Judith; born in Frankfort-on-the-Main, June 13, 823. He was invested by his father with the kingdoms of Alemania, Burgundy, Provence, and Septimania, and subsequently with that of Aquitaine. On Louis' death in 840 Charles found himself confronted with two enemies—his half-brother Lothaire, who, as eldest son, claimed the whole of the Frank empire of Charlemagne, and his nephew Pepin who asserted, in right of his father a preferable claim to the sovereignty of Aquitaine. After considerable bloodshed, a treaty was entered into between Charles and Lothaire at Verdun, by which the former received as his share of the dominion of Charlemagne all those territories comprehended between the ocean on the one part, and the Meuse, the Scheldt, the Saône, the Rhone, and the Mediterranean, on the other. His struggle with Pepin was long and obstinate, and in 844 he was obliged to recognize him as King of Southern Aquitaine. In 875, by the death of his nephew, the Emperor Louis II., he gained possession of the imperial crown, and thereby provoked the hostility of his brother, Louis the German, who ravaged the territory of Champagne, and otherwise committed great havoc in his dominions. In 877 he went to Italy on a crusade against the Saracens, to which he had been summoned by the Pope, but died when crossing Mount Cenis. He was succeeded on the French throne by his son, Louis the Stammerer.

Charles II., surnamed LE GROS, or the Fat, King of France; also known as Charles III., Emperor of Germany; born about 832. He was the son of Louis the German, and the grandson of Louis le Débonnaire, and was recognized as Emperor of Germany by the Pope. In 885 he ascended the French throne, to the prejudice of his cousin, Charles the Simple, whose youth prevented him from asserting his rights; but in 887 was deposed, and the following year died miserably at the abbey of Richenau, in Suabia, strangled, as is asserted, by his servants.

Charles III., surnamed THE SIMPLE, King of France; the posthumous son of Louis the Stammerer; born Sept. 17, 879. On his father's death France was divided between Charles' two brothers Louis III. and Carloman, and an aristocratic oligarchy. On the death of his brothers he ought in right to have ascended the throne, but his extreme youth prevented his claims being recognized, and his cousin, Charles the Fat, was proclaimed king in 885. On the depo-

sition of the latter in 887 Count Eudes of Paris succeeded in obtaining the crown; but a combination being formed in favor of Charles, Eudes found himself so hard pressed as to be obliged to cede to the former the whole of the North of France; and his death three years afterward, in 898, left Charles undisputed king of the whole country. The reign of Charles is chiefly noted for the piratical incursions of the Northmen, or Normans, who ravaged the coasts of France, sailed up the principal rivers, and spread such dismay and confusion, that, to conciliate them and put an end to their devastations, he agreed to cede to their chief Rollo the territory of Normandy, to be held as a fief of the French crown. Latterly also Charles' tranquillity was much disturbed by the turbulence of some of his great vassals, who broke into open rebellion, declared the throne forfeited, and proclaimed as king Robert, brother of Count Eudes. Through the treachery of Herbert, Count of Vermandois, Charles was inveigled into the town and imprisoned in the fortress of Peronne. From this he was only liberated a short time before his death in 929. By his second wife, Ogiva of England, he was the father of Louis d'outre-Mer, whom a reaction in favor of the Carolingian dynasty placed on the throne in 936.

Charles IV., surnamed **LE BEL**, or the Handsome, King of France; third son of Philippe le Bel; born in 1294; and in virtue of the Salic law ascended the throne in 1322, to the exclusion of the daughters of Philip the Long. He reigned six years, and died in 1328, without male issue, and was the last of the direct line descended from Hugh Capet. Isabella his sister married Edward II. of England, and was materially aided by Charles in fitting out, along with her paramour Mortimer, the expedition which resulted in the dethronement of her husband.

Charles V., surnamed **THE WISE**, King of France; the son of King John and Bona of Luxemburg; born in Vincennes, Jan. 21, 1337. While Duke of Normandy, and during the captivity of his father in England, after the battle of Poitiers, he took the title of lieutenant of the kingdom. At this period France was in a miserable condition, the result partly of the continued wars which she had to maintain with England, and partly also of the unlimited violence and oppression exercised over the lower orders by the nobility. The vices and extravagance of the court were also extreme, and the demands of the States-general for reform, headed by Stephen Marcel, provost of the merchants of Paris, were loudly and persistently urged. This assembly was supported in its claims by Charles the Bad, King of Navarre, who, as grandson of Louis le Hutin, maintained a preferable right to the crown. By artfully temporizing Charles

contrived to detach the leading orders from the cause of the States, and having brought about indirectly the assassination of Marcel, succeeded in crushing their party. Meantime his father, John, still continued in captivity in England till liberated by the treaty of Brétigny in 1360. Four years afterward he died, leaving Charles as his successor to the French crown. The reign of the latter presents a series of combined hostilities and intrigues carried on with the view of establishing his power and extending his dominions. In these he was so far successful as to keep at bay the King of Navarre and deprive the English of a great part of their possessions in France. He died Sept. 16, 1380. The magnanimity and wisdom of Charles have been greatly commended by some writers, and if we make due allowance for the times in which he lived, the high character which these have assigned him may not appear overcharged. That in his public administration, however, he was guilty of various acts of perfidy and cruelty cannot be disputed. He possessed some literary tastes, and was the founder of the Bibliothèque Royale. A less beneficial act was the erection of the Bastille, for the purpose of overawing the Parisians, whose outbreaks he had found reason to dread.

Charles VI., surnamed **THE SILLY**, King of France; son of the foregoing; born in Paris, December 3, 1368. When his father died he was not 12 years old, and the contending pretensions of his uncles, the Dukes of Anjou, Berry, Burgundy, and Bourbon, rendered his minority a scene of unbounded turbulence and license. In 1385 he was married at Amiens to Isabella of Bavaria, who was then only 14 years of age. In 1388 he declared himself independent of guardians, and took the reins of government into his own hands. His mild and amiable, though somewhat dissipated character, had already secured for him a considerable share of popularity, when he was overtaken by a fearful calamity, the loss of his reason — a condition in which, with a few lucid intervals, he remained to the end of his days. The origin of this was constitutional, aggravated by a fright and a severe accident. Perhaps at no period in her history was France the scene of greater disasters and miseries than during the reign of this unhappy prince. The rival factions of the Burgundians and the Armagnacs, the former headed by the Duke of Burgundy, the latter by the Duke of Orleans with whom Queen Isabella had formed a criminal connection, kept up constantly throughout the country the horrors of a most rancorous civil war; while brigandage and every kind of violence prevailed to the most fearful extent. Such a conjunction afforded the most favorable opportunity for an invader; and accordingly, in 1415, Henry V. of England crossed over to Normandy with a numerous

army, took Harfleur by storm, and signally defeated the French forces in the battle of Agincourt. Improving these advantages he advanced into the country, gained possession of the capital, and compelled the crazy king to sign the treaty of Troyes, by which the daughter of Catharine was given in marriage to Henry, and the latter acknowledged successor to the French crown after Charles' death. Neither monarch long survived this celebrated action, both dying within a few months of each other, Henry on Aug. 31, and Charles on Oct. 21, 1422.

Charles VII., King of France; born in Paris, Feb. 22, 1403, and though only the fifth son of Charles VI. and Isabella of Bavaria, became, by the successive deaths of his elder brothers, dauphin and heir-presumptive to the crown. That he should ever succeed to it was then extremely problematical, as Henry V. of England was pursuing his career of conquest, and shortly afterward, by the treaty of Troyes, secured to himself the hand of Charles' sister Catharine, and the succession to the French throne after her father's death. In the treacherous murder of the Duke of Burgundy at the bridge of Montereau Charles was actively implicated. On the King of England's death in 1422 his son Henry VI. was proclaimed King of France at Paris. The war with the national party, represented by the Orleanist faction, with the dauphin at their head, was maintained for several years by the English, under the command of the Duke of Bedford. So successfully did the latter conduct operations that Charles was brought to the verge of despair, and almost reduced to abandon the struggle as hopeless, when his fortunes were retrieved by one of the most singular incidents recorded in history. This was the arrival in his camp of the maid of Orleans, who by the enthusiasm which she inspired first turned the tide of success against the English. The fresh spirit thus infused into the breasts of the French was heightened by mismanagement on the part of the English, whose military operations were conducted with greatly diminished efficiency after the death of the Duke of Bedford, while discord and confusion prevailed in the home councils. Through the intervention of the Earl of Suffolk a marriage was concluded between the young King Henry VI. and Margaret of Anjou, niece of Charles VII.'s queen. In the treaty entered into on this occasion the territory of Maine was secretly surrendered to France, and subsequently, on hostilities being resumed between the two countries, the troops of Charles conquered the whole of Guienne, and finally expelled the English from all their possessions in France except Calais. The last years of Charles' reign were embittered by domestic broils, in which his son and successor Louis XI. took a prominent part against his father. So hemmed in at

last was the latter by the emissaries of the dauphin that he conceived the idea of Louis having formed a deliberate plan to poison him; and so firmly was this notion rooted in his mind that he could only with the greatest difficulty be induced to take any food. It was too late, however, to remedy the mischief occasioned by this protracted abstinence, and he died at the castle of Mehun, near Bourges, on July 22, 1461. A romantic interest has been thrown round Charles VII. by his early reverses and the reëstablishment of French nationality, which he effected mainly through the heroism inspired by the maid of Orleans. His share in the treacherous murder of the Duke of Burgundy, and base abandonment to her fate of Joan of Arc, are stains on his memory which cannot be effaced.

Charles VIII., King of France; son of Louis XI.; born in Amboise, June 30, 1470; and succeeded his father in 1483, his sister Anne de Beaujeu acting as regent till he attained the age of 20. In 1491 he married Anne, the heiress of Brittany, and thereby annexed that important duchy to the French crown. By so doing, however, he both broke faith with the daughter of Maximilian, King of the Romans, to whom he had been espoused, and also robbed Maximilian of his bride, a marriage by proxy having been already concluded between him and Anne. The leading incident of Charles VIII.'s reign is his Italian expedition and conquest of the kingdom of Naples, having been instigated thereto by Ludovico Sforza, the usurping Duke of Milan. The title pretended to Naples was asserted in virtue of the rights to that sovereignty transmitted by the house of Anjou to the royal family of France. The whole of Charles' expedition reads like a page from one of the old chivalrous romances. With an army of 30,000 men, unprovided either with money or stores, he suddenly crossed the Alps, advanced rapidly S., and meeting with scarcely any obstruction, arrived before the walls and gained possession of Naples. This conquest, however, he did not retain for many months. Having left 5,000 men to guard his new acquisition he returned to France, and had scarcely reached it when the arms of Gonsalvo de Cordova effected the reannexation of Naples to Spain. The expedition of Charles VIII. left thus hardly a trace upon the country, but is memorable as the commencement of that series of French incursions into Italy which, under his successors, deluged that fair land with bloodshed. He was meditating a renewed descent into Italy when he died in Amboise on April 7, 1498. He left no children, and was succeeded by his relative the Duke of Orleans under the title of Louis XII.

Charles IX., King of France; son of Henry II. and Catherine de' Medici; born in St. Germain-en-Laye in 1550; ascended

the throne at the age of 10 years, after the death of his brother Francis II. No regency was appointed, and it was deemed sufficient to write to the Parliament, through the young prince, that he had requested his mother to undertake the administration of the public affairs. The Parliament acquiesced in this resolution, to avoid exciting new contests between the Guises and the princes of the blood. Catharine consented that the King of Navarre should be appointed governor-general of the realm, as she was too well aware of the weakness of his character to fear him. In order to gratify her ambition, she resolved to throw everything into confusion. The Guises soon saw that they must oppose a Catholic league to the political associations of the Calvinists. The cruel persecutions against the Huguenots now broke out. The Duke of Guise, who obtained possession of the person of the young king, was shot by an assassin before Orleans, in February, 1563. In his last moments he advised the king and the queen-mother to negotiate with the parties. This advice was followed; a treaty was signed March 19, and Havre was taken from the English July 27. The king, who was the same year declared of age, visited the provinces in company with his mother. At Bayonne he had a meeting with his sister Isabella, the wife of Philip II. of Spain. This excited such suspicions in the Calvinists that they took up arms, and immediately formed the plan of attacking the king on his return to Paris. Being warned in season he escaped the danger; but this plot could not fail to arouse the hatred of Charles, who was proud by nature, and more to be pitied than blamed for his too great confidence in his artful mother. After the battle of St. Denis, 1567, in which the constable of Montmorenci lost his life, Catharine entered into negotiations for peace. But the Calvinists reserved a part of the places which they were to have surrendered, and continued to keep up a communication with England and the German princes. A new civil war soon broke out. Notwithstanding the jealousy of Charles Catharine placed the Duke of Anjou at the head of the royal army. The Prince of Condé having been shot in the battle of Jarnac in 1569, and Admiral Coligny having been defeated at Montcontour in the same year, the king concluded peace, in 1570, on terms which were so favorable to the Calvinists that they seem even to have suspected treachery under them. The heads of that party did not therefore all appear at court when Charles celebrated his marriage with Elizabeth, the daughter of Maximilian II. By degrees this distrust disappeared, and the marriage of the young King of Navarre (afterward Henry IV.) with Margaret, sister of Charles X., seemed to banish every suspicion. This marriage took place Aug.

18, 1572. On the 22d the first attempt was made on the life of Coligny, and on the 24th began that massacre known under the name of the massacre of St. Bartholomew, from having taken place on the night of the festival of that saint. Civil war broke out for the fourth time, and Catharine now became aware of the errors of her policy. Charles could no longer conceal his aversion to her, and was on the point of assuming himself the reins of government, when he died, childless, in 1574. He was succeeded by his brother Henry III. Charles was impetuous and ambitious; had his character sapped by the infamous policy of his mother, who surrounded him with temptations of the most effectual kind; yet possessed in some measure a taste for literature and art, and a good-natured kind of condescension, which covers many royal faults.

Charles X., Comte d'Artois, King of France; born in Versailles in 1757; grandson of Louis XV., the youngest son of the dauphin, and brother of Louis XVI. He spent a dissipated youth, and when the revolutionary period commenced took a decided part in opposing every tendency to change and innovation. He left France in 1789, after the first popular insurrection and destruction of the Bastille, and at Pilnitz attended the congress of princes, for the purpose of opposing the spread of revolutionary principles. After Louis XVI. had accepted the constitution of 1791, he invited him to return to France, but he refused, and the legislative assembly, after stopping his allowance on the civil list, confiscated his property in 1792. He afterward assumed the command of a body of emigrants, and acted in concert with the Austrian and Prussian armies on the Rhine. At a later period he made a descent on the coast of Brittany, but despairing of success, retreated to Great Britain, and resided for several years in the palace of Holyrood at Edinburgh. After the downfall of Napoleon he entered France with the title of lieutenant-general of the kingdom, and issued a judicious proclamation, promising the reign of law and an entire oblivion of the past. In 1824 he succeeded his brother, Louis XVIII., under the title of Charles X., and gained a momentary popularity by the abolition of the censorship of the press, but measures of a very different description soon followed, and the spirit of disaffection was so widely spread that a collision with the popular party became inevitable. Charles X. endeavored to gain the start by what is called a *coup d'état*, and issued his celebrated ordinances, but victory declared against him, and he was ignominiously driven from the throne in 1830. After formally abdicating in favor of his grandson, the Duke de Bordeaux, he revisited England, resumed his residence for a short time at Holyrood, and finally settled at Göritz in Styria, where he died of cholera in 1836.

Charles I.

Charles I., King of Germany. See CHARLEMAGNE.

Charles II., King of Germany. See CHARLES I. of France.

Charles III., surnamed LE GROS, King of Germany. See CHARLES II. of France.

Charles IV., Emperor of Germany; of the house of Luxemburg; born in 1316. The quarrels of the Emperor Louis the Bavarian with the King of Bohemia, the father of Charles, the choice of the latter, in the room of the emperor, excommunicated by Clement VI., and the victory which Louis, far his superior in power and talents, obtained over his rival, we have not room to relate. After the death of Louis, Oct. 21, 1347, Charles of Luxemburg, who inherited the kingdom of Bohemia, and had been chosen emperor in 1346 by five electors, hoped to occupy the imperial throne without opposition. But the princes of the empire regarded him as a servant of the Pope. Ten years had not yet elapsed since Germany, at the Diet of Rense, had adopted the most energetic measures against the claims of the holy see. The election of Charles IV. was the first infringement of the celebrated constitution of 1338. In consequence the Archbishop of Mentz, whom Clement IV. had deposed, the electors of Brandenburg and the palatinate, the Duke of Saxe-Lauenburg, who arrogated a vote in the election, assembled at Lahnstein, declared the choice of Charles to be void, and elected Edward III. of England; but this monarch, then at war with France, made use of the offer of the electors so far only as to secure the neutrality of the King of Bohemia, and rejected the proffered crown. Equally fruitless was the choice of Frederick the Severe, landgrave of Meissen; on which the enemies of Charles elected the virtuous and heroic Count Gunther of Schwarzburg, whom Charles is said to have poisoned. Those who surrounded Gunther in his last moments extorted from him an abdication, for which they were munificently paid by Charles.

He now used every effort to appease his enemies. He married the daughter of the Elector of the Palatinate, gave Tyrol as a fief to the Elector of Brandenburg, and was unanimously elected emperor, and consecrated at Aix-la-Chapelle. But no sooner was he crowned than he took possession of the imperial insignia, and conveyed them to Bohemia. He persuaded the Elector of the Palatinate to subject a great portion of the upper palatinate to the feudal court of Bohemia. This tribunal, which he regarded as the most proper instrument for the subjugation of Germany, was enlarged in its jurisdiction more and more. In 1354 the emperor went to Italy to be crowned by the Pope; but this favor he purchased on terms which made him an object of ridicule

Charles IV.

and contempt. He engaged to appear without any armed force. Having been consecrated King of Italy at Milan, he confirmed the Visconti in the possession of all the usurpations of which he had promised to deprive them. He also annulled all the acts of his grandfather, Henry VII., against Florence, and by a treaty concluded at Padua resigned the latter city, with Verona and Vicenza, to Venice. He refused the request of some Romans to claim the city, as belonging to him in the name of the empire, and in a treaty renounced all sovereignty over Rome, the States of the Church, Ferrara, Naples, Sicily, Sardinia, and Corsica, and even took an oath not to return to Italy without the consent of the Pope. Despised by the Guelphs, detested by the Ghibellines, Charles returned to Germany, where he issued the celebrated golden bull, which, till modern times, continued a fundamental law of the German empire. He thus acquired some claims to the public gratitude: but these were soon effaced by the general indignation excited by the proposal made with his consent by the papal nuncio to introduce a tax equal to the tithe of all ecclesiastical revenues, for the benefit of the holy see. All the members of the Diet opposed it; and Charles, in his anxiety to conciliate the princes of the empire, announced that he would propose to the assembly a reform of the German clergy. The Pope, enraged at this proposal of the emperor, exhorted the electors to depose him. Charles immediately relapsed into his accustomed submissiveness, and not only abandoned all his reforms, but even confirmed in 1359 all the privileges of the clergy, all their present and future possessions, and made them independent of the secular power.

Such vacillating conduct subjected him to the contempt of both parties, of which he received a proof before the close of the same Diet, which was held at Mentz. Several princes had by degrees obtained possession of many territories formerly fiefs of the empire. Charles attempted to reunite them with the empire; but the dissatisfaction which was manifested at the attempt frustrated this plan, and he indemnified himself by selling to the King of Poland the rights of sovereignty, which had been hitherto exercised by the German emperors, over some of his provinces. Under such an emperor Germany could not enjoy internal tranquillity. Bands of robbers plundered the country in all quarters. The emperor left the princes and cities to protect themselves by mutual alliances. The state of Italy was no less melancholy. Tuscany was suffering the evils of anarchy; Lombardy was distracted by civil wars, and the Visconti had made themselves masters of the Milanese. The emperor, true to his principle of sanctioning power wher-

ever found, appointed these usurpers his vicars-general in Lombardy. Emboldened by this, Barnabas Visconti threatened to subject all Italy to his yoke. Pope Urban V., having requested Charles to concert measures of resistance with him, hastened from Avignon to Rome, concluded several alliances, levied troops, and waited for the emperor, who actually appeared with a considerable force.

Charles took advantage of the Pope's situation to persuade him to crown his fourth wife, Elizabeth of Pomerania, at Rome, and, in return, entered into the most positive engagements with Urban. Notwithstanding this he again engaged in negotiations with the Visconti, and sold them a formal confirmation of all their usurpations. In like manner, during his residence in Italy, he sold States and cities to the highest bidder, or, if they themselves offered most, made them independent republics. With great treasures he returned to Germany. Gregory XI. having given his consent that his son Wenceslaus should be elected King of the Romans, he employed his ill-gotten wealth to purchase the votes of the electors, who were irritated at the conduct of the Pope, and, moreover, distributed among them the domains of the empire on the Rhine, and several free imperial cities. Thus he attained his object. To maintain their rights against the arbitrary measures of the emperor, the imperial cities in Suabia formed the "Suabian league," which Charles opposed in vain. The empire was nearly ruined when Charles died in Prague in 1378. To his eldest son, Wenceslaus, he left Bohemia and Silesia; to the second, Sigismund, the electorate of Brandenburg; and to the third, Lusatia. His reign is remarkable for the improvement and prosperity of Bohemia, for the founding of the Universities of Prague and Vienna, for a terrible persecution of the Jews, and as the period when the sale of letters of nobility commenced in Germany.

Charles V., Emperor of Germany and King of Spain (in the latter capacity he is called Charles I.); the eldest son of Philip, Archduke of Austria, and of Joanna, the daughter of Ferdinand and Isabella of Spain; born in Ghent, Feb. 24, 1500. Philip was the son of the Emperor Maximilian and Mary, daughter of Charles the Bold, last Duke of Burgundy. Charles' birth gave him claim to the fairest countries of Europe. He was educated in the Netherlands under the care of William of Croy, lord of Chièvres. Charles preferred military exercises to study. Chièvres, without diverting him from his favorite occupations, taught him history, formed him for affairs of State, and gave him that gravity of manner which he retained through life. After the death of Ferdinand his grandfather, in 1516, Charles assumed the title of King of Spain.

The management of this kingdom was intrusted to the celebrated Cardinal Ximenes, who by his genius prepared the way for the glorious reign of Charles V. In 1519 Charles, on the death of Maximilian, was elected emperor. He left Spain to take possession of his new dignity, for which he had to contend with Francis I., King of France. His coronation took place at Aix-la-Chapelle with extraordinary splendor. The elective capitulation signed by his ambassadors he ratified without hesitation. Its leading features were the reservations made by the electors securing themselves against foreign influence. The emperor was not to begin any war without their consent; no language but the German or Latin was to be used in the administration of the affairs of the empire; and the rich commercial confederacies of merchants, whose wealth had enabled them to act according to their own will, were to be abolished by the emperor, assisted by the advice of the members of the empire. The association aimed at was the powerful Hanseatic League, whose influence had excited the electors' jealousy.

The progress of the Reformation in Germany demanded the care of the new emperor, who held a Diet at Worms. Luther, who appeared at this Diet with a safe conduct from Charles, defended his cause with energy and boldness. The emperor kept silent; but after Luther's departure a severe edict appeared against him in the name of Charles, who thought it his interest to declare himself the defender of the Roman Church. The claims which Francis I. had advanced to the empire, and those which he still preferred to Italy, the Netherlands, and Navarre, made war inevitable. Charles prepared for it by an alliance with the Pope. Hostilities broke out in 1521. The French, victorious beyond the Pyrenees, were unsuccessful in the Netherlands. A Congress held in Calais only increased the irritation, and gave Henry VIII., King of England, a pretext for declaring himself for Charles, whose party daily acquired strength. A serious insurrection in Spain was happily subdued. The defeat of Bonivet in the Milanese, and the accession of the Constable of Bourbon, indemnified Charles V. for his want of success in Provence. Francis, who was besieging Pavia, was defeated by the imperial forces and taken prisoner in 1525. On this occasion Charles feigned the moderation of a Christian hero. Without improving his advantages he remained inactive in Spain. But he thought to attain his object in another way. He proposed to Francis I. such hard conditions that this unfortunate prince swore that he would die in captivity rather than accede to them. Meanwhile he was carried to Spain, and treated with respect. Charles, however, did not visit him till

he was informed that the life of his prisoner was in danger. The interview was brief, Charles promised his captive a speedy release. The treaty of Madrid was finally concluded in January, 1526.

The power of Charles now became a source of uneasiness to most other princes of Europe. Pope Clement VII. placed himself at the head of a league of the principal States of Italy against the emperor, but their ill-directed efforts were productive of new misfortunes. Rome was taken by storm by the troops of the Constable of Bourbon, sacked, and the Pope himself made prisoner. Charles V. publicly disavowed the proceedings of the Constable, went into mourning with his court, and carried his hypocrisy so far as to order prayers for the deliverance of the Pope. On restoring the holy father to liberty he demanded a ransom of 400,000 crowns of gold, but was satisfied with a quarter of that sum. He also released, for 2,000,000, the French princes who had been given to him as hostages. Henry VIII. of England now allied himself with the French monarch against Charles, who accused Francis of having broken his word. The war terminated in 1529 by the treaty of Cambray, of which the conditions were favorable to the emperor. Charles soon after left Spain, and was crowned in Bologna as King of Lombardy and Roman Emperor. In 1530 he seemed desirous, at the Diet of Augsburg, to reconcile the various parties; but not succeeding, he issued a decree against the Protestants, which they met by the Schmalkaldic League. He also published, in 1532, a law of criminal procedure. Notwithstanding his undertakings in favor of the Catholic religion, Charles always practised moderation toward the Protestants whenever his interest left room for toleration. Nor did the Protestant princes hesitate to furnish their contingents when he was assembling an army against the Turks.

Having compelled Solyman to retreat, he undertook, in 1535, an expedition against Tunis, reinstated the dey, and released 20,000 Christian slaves. This success added to his character somewhat of the chivalric, which gave him still more influence in Christendom, and promoted his political projects. His invasions of Provence and Picardy met with small success. A truce was concluded in 1537, and in 1538 prolonged for 10 years. The two monarchs had an interview, in which they spoke only of mutual respect and esteem. Soon after Charles, on leaving Spain, where he had annihilated the old constitution of the Cortes, wished to pass through France to the Netherlands. He spent six days with Francis I. in Paris, where the two princes appeared together in all public places like brothers. Courtiers were not wanting who advised the King of France to detain his guest until he had an-

nulled the treaty of Madrid; but Francis was satisfied with promises, which Charles very soon forgot. Having quelled the disturbances in the Netherlands, Charles resolved, in 1541, to crown his reputation by the conquest of Algiers. He embarked in the stormy season, and lost a part of his fleet and army without gaining any advantage. After his return his refusal to invest the King of France with the territory of Milan involved him in a new war, in which the King of England embraced his part. The army of Charles was defeated at Cerisola; but, on the other hand, he penetrated to the heart of Champagne. The disturbances caused in Germany by the Reformation induced the emperor to accede to the peace of Crespy in 1545.

The policy of Charles was to reconcile the two parties, and with this view he alternately threatened and courted the Protestants. After some show of negotiation the Protestant princes raised the standard of war. The emperor declared in 1546 the heads of the league under the ban of the empire, excited divisions among the confederates, collected an army in haste, and obtained several advantages over his enemies. John Frederick, the Elector of Saxony, was taken prisoner in the battle of Mülberg in 1547. Charles received him sternly, and gave him over to a court-martial consisting of Italians and Spaniards, under the presidency of Alva, which condemned him to death. The elector saved his life only by renouncing his electorate and his hereditary estates, but he remained a prisoner. Meanwhile the emperor appeared somewhat more moderately inclined toward the vanquished party. On coming to Wittenberg he expressed surprise that the exercise of the Lutheran worship had been discontinued. He visited the grave of Luther, and said, "I do not war with the dead; let him rest in peace; he is already before his Judge." The Landgrave of Hesse-Cassel, one of the heads of the Protestants, was compelled to sue for mercy. Notwithstanding his promise Charles deprived him of his freedom. After having dissolved the League of Schmalkalden the emperor again occupied himself with the plan of uniting all religious parties, and for this purpose issued the "Interim," which was as fruitless as the measures proposed by him at the Diet of Augsburg. Neither was he successful in securing the imperial crown to his son. Discord still agitated public sentiment, and a new war broke out against him. Maurice of Saxony, whom he had invested with the electoral dignity, formed a league, which was joined by Henry II., King of France, the successor of Francis. The preparations had been made with the greatest secrecy. Charles was at Innsbruck superintending the deliberations of the Council of Trent, and meditating great

plans against France and Turkey. He was expecting the aid of Maurice when this prince threw off the mask, appeared suddenly at the head of an army, and invaded the Tyrol in 1552 while Henry II. entered Lorraine. Charles was very nearly surprised in Innsbruck in the middle of a stormy night. Tormented by the gout, he escaped alone in a litter by difficult roads. Maurice abandoned the imperial castle to plunder, the Council of Trent was dissolved, and the Protestants dictated the conditions of the treaty of Passau in 1552. Charles was not more successful in Lorraine. He was unable to recover Metz, defended by the Duke of Guise. In Italy he lost Sienna by a revolt. He withdrew to Brussels, where, hard pressed by his enemies, and suffering much from gout, he became gloomy and dejected, and for several months concealed himself from the sight of every one, so that the report of his death was spread through Europe. His last exertions were directed against France, which constantly repelled his assaults. The Diet of Augsburg in 1555 confirmed the treaty of Passau, and gave the Protestants equal rights with the Catholics.

Charles saw all his plans frustrated and the number of his enemies increasing. He resolved to transfer his hereditary States to his son Philip. Having convened the Estates of the Low Countries at Louvain, in 1555, he explained to them the grounds of his resolution, asserted that he had sacrificed himself for the interests of religion and of his subjects, but that his strength was inadequate to further exertion, and that he should devote to God the remainder of his days. He then turned to Philip, who had thrown himself on his knees, and kissed the hand of his father; reminded him of his duties, and made him swear to labor incessantly for the good of the people. He then gave him his blessing, embraced him, and sank back exhausted on his chair. At that time Charles conferred on Philip the sovereignty of the Netherlands alone. On Jan. 15, 1556, he conferred upon him, in like manner, the Spanish throne, reserving for himself merely a pension of 100,000 ducats. The remaining time that he spent in the Netherlands he employed in reconciling his son with France, and effected the conclusion of a truce. Having made an unsuccessful attempt to induce his brother Ferdinand to transfer the imperial crown to the head of his son, he sent a solemn embassy to Germany to announce to the electors his abdication; after which he embarked at Zealand, and landed on the coast of Biscay. He had selected for his residence the monastery of St. Justus, near Plasencia in Estremadura, and here he exchanged sovereignty, dominion, and pomp for the quiet and solitude of a cloister. His amusements were confined to short rides,

to the cultivation of a garden, and to mechanical labors. It is said that he made wooden clocks, and being unable to make two clocks go exactly alike, was reminded of the folly of his efforts to bring a number of men to the same sentiments. He attended religious services twice every day, read books of devotion, and by degrees fell into such dejection that his faculties seemed almost impaired. He renounced the most innocent pleasures, and observed the rules of the monastic life in all their rigor. In order to perform an extraordinary act of piety, he resolved to celebrate his own obsequies. Wrapped in a shroud, and surrounded by his retinue, he laid himself in a coffin, which was placed in the middle of the church. The funeral service was performed, and the monarch mingled his voice with those of the clergy who prayed for him. After the last sprinkling all withdrew, and the doors were closed. He remained some time in the coffin, then rose and returned to his cell, where he spent the night in meditation. This is the usual account, but its accuracy is questioned by Sir Wm. Stirling Maxwell in his "Cloister Life of Charles V." Some say it hastened his death, which took place Sept. 21, 1558.

Charles had a noble air and refined manners. He spoke little, and smiled seldom. Firm of purpose; slow to decide; prompt to execute; equally rich in resources and sagacious in the choice of them; gifted with a cool judgment, and always master of himself. Circumstances developed his genius and made him great. Although he did not scruple to break his promises, he imposed, by the semblance of magnanimity and sincerity, even on those who had already experienced his perfidy. An acute judge of men, he knew how to use them for his purposes. In misfortune he appears greater than in prosperity. He protected and encouraged the arts and sciences, and is said to have picked up a brush which had fallen from the hand of Titian with the words, "Titian is worthy of being served by an emperor." By his wife Eleonora, daughter of Emanuel, King of Portugal, he had one son, afterward Philip II., and two daughters. He had also several natural children.

Charles V. is one of the most remarkable characters in history. He exhibited no talents in his youth, and in after life, when his armies in Italy were winning battle after battle, he remained quietly in Spain, apparently not much interested in these victories; but even in his early youth his motto was, "not yet" (*nondum*). It was not till his 30th year that he showed himself active and independent; but from this time to his abdication he was throughout a monarch. No minister had a decided influence over him. He was indefatigable in business, weighing the reasons on both sides of every case with great minuteness. Granvella was

the only person who possessed his entire confidence. Wherever he was he imitated the customs of the country, and won the favor of every people except the Germans. Among them he was not liked, owing to the want of the frankness which they expected in their emperor. Charles was slow in punishing as well as in rewarding; but when he did punish, it was with severity; when he rewarded, it was with munificence.

Charles VI., second son of the Emperor Leopold I.; born Oct. 1, 1685. His father destined him for the Spanish throne. The last prince of the house of Hapsburg, Charles II., disregarding the house of Austria, whose right to the Spanish throne was undoubted, according to the law of inheritance by descent, had by his will made Philip, Duke of Anjou, second grandson of Louis XIV., heir of the Spanish monarchy. Accordingly, on the death of Charles II., Nov. 1, 1700, Philip took possession of the vacant kingdom. England and Holland united against him, and this alliance was soon joined by the German empire, Portugal, and Savoy. Charles was proclaimed King of Spain at Vienna, in 1703, and proceeded by way of Holland to England, from whence, in January, 1704, he set sail with 12,000 men for Spain, which was almost wholly occupied by the French, and landed in Catalonia. He succeeded in making himself master of Barcelona; but he was soon besieged there by his rival Philip V. The French had already taken Mont Jouy, preparations were making for an assault on the city, and it seemed as if Charles could not escape being captured. Nevertheless, at the head of a garrison of hardly 2,000 men, he made the most obstinate resistance, till the long-expected English fleet appeared, which put to flight the 12 French ships that blockaded the harbor and landed a body of troops, which compelled the French speedily to raise the siege. This event was followed by alternate reverses and successes. Twice Charles reached Madrid, and twice was he driven from the city. The first time, in 1706, he caused himself to be proclaimed king in the capital, under the name of Charles III. He had been a second time compelled to flee to the walls of Barcelona, when he was informed of the death of his brother Joseph I. According to the will of Leopold, this event placed the double crown of Charles V. on his head; to his claims on Spain it added the more certain possession of the Austrian dominions. But the allies did not like to see so much power united in the same hands.

Charles repaired to Germany by way of Italy, and on his arrival learned that, at Eugene's suggestion, he had also been elected emperor. His coronation took place at Frankfort, in December, 1711; and in the following year he received, at Presburg, the

crown of Hungary. At the same time he still retained the empty title of King of Spain. He now prosecuted, under the conduct of Eugene, the Spanish War of Succession, which his brother had carried on with so much success in the Netherlands; but Marlborough's disgrace, and the retreat of the English army, having resulted in a defeat at Denain, the allies concluded a peace with France at Utrecht in 1713, in spite of all the efforts of the emperor to prevent it. He was obliged, in the following year, to sign the treaty of Rastadt. This treaty secured him in the possession of Milan, Mantua, Sardinia, and the Netherlands. Soon after, in June, 1715, the Turks declared war against Venice. The emperor undertook the defense of this republic. His brave armies, led by Eugene, achieved decisive victories at Peterwardein and Belgrade. But as the Spaniards menaced Italy, Charles concluded, in 1718, the peace of Passarowicz, by which he obtained Belgrade, the N. of Servia, and Temeswar. Cardinal Alberoni, who was at the head of the cabinet of Madrid, involved Austria, by his schemes, in a new war. But the quadruple alliance, concluded at London in 1718, terminated the war, and led to Alberoni's dismissal in 1720.

To secure his dominions to his daughter, Maria Theresa, in default of male heirs, Charles strove to induce the various powers to guarantee the pragmatic sanction, which settled the succession in her favor. He succeeded by degrees in gaining the concurrence of all the European powers. The emperor availed himself of a short period of peace to establish various institutions for the benefit of commerce. He visited in person the coasts of Istria, where he caused roads and harbors to be constructed, and vessels to be built. His plans respecting the Indian trade in the Netherlands had not the same success, and he was compelled to sacrifice them to the pretensions of the maritime powers. The reign of this prince, by nature a lover of peace, was marked with perpetual agitations. The succession to the Polish throne, after the death of Augustus II., in 1733, disturbed the peace of Europe. Charles, with Russia, supported the son of this prince; but France and Spain declared themselves for Stanislaus Leczinsky. From this arose a bloody war, which terminated in 1735 in the loss of the Two Sicilies, and a part of the duchy of Milan. Austria received Tuscany in exchange for Lorraine, and obtained Parma. Hardly had Charles finished this war, when his alliance with Russia involved him anew in a war with the Turks. In 1737 his troops, under Field-Marshal Seckendorf, invaded Servia without any declaration of war, and occupied Nissa. But the Turks renewed their attacks with a continually augmented force, and obliged the emperor.

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after three unsuccessful campaigns, to cede to them by the peace of Belgrade, in 1739, Walachia and the Austrian part of Servia, with Belgrade. Charles died Oct. 20, 1740, at a time when he was employed in the improvement of his distracted finances, and almost in the act of completing the pragmatic sanction, by causing the Grand-Duke of Tuscany, his son-in-law, to be chosen King of the Romans.

Charles VII. (properly CHARLES ALBERT), King of the Romans; born in Brussels, in 1697; was the son of Maximilian Emanuel, Elector of Bavaria, then governor of the Spanish Netherlands. His youth was spent at the imperial court, and in the war against the Turks he commanded the army of auxiliaries sent by his father. In 1722 he married the daughter of Joseph I., having previously renounced all rights which this marriage might give him to the succession to the throne of Austria. In 1726 he succeeded his father as Elector of Bavaria. He was one of the princes who protested against the pragmatic sanction, guaranteed in 1732 by the Diet of Ratisbon, and in consequence concluded a defensive alliance with Saxony. After the death of Charles VI., in 1740, he refused to acknowledge Maria Theresa as his heiress, founding his own claims to the succession on a testament of Ferdinand I. He was supported by the King of France with a considerable force. In 1741 he was recognized at Linz as Archduke of Austria. The obstacles thrown in his way by Cardinal Fleury, who wished not to dismember the Austrian monarchy, as well as the want of artillery and ammunition, prevented him from getting possession of Vienna. On the other hand he took Prague, where he was crowned and proclaimed King of Bohemia. In 1742 he was unanimously elected King of the Romans: he made a solemn entry into Frankfort, and was crowned by his brother, the Elector of Cologne. But fortune soon deserted him. The armies of Maria Theresa reconquered all Upper Austria, and overwhelmed Bavaria. It was necessary to abandon Bohemia. Charles fled to Frankfort, and convoked a Diet, when an attack of the King of Prussia on Maria Theresa allowed him to return to Munich in 1744, in which city he died in January, 1745, exhausted by grief and disease. He was succeeded in the electorate by his son Maximilian Joseph, in the imperial dignity by Francis I., husband of Maria Theresa.

Charles I., King of England and Scotland; born in Scotland in 1600; was the third son of James VI. and Anne of Denmark. Soon after the birth of his son James succeeded to the crown of England, and on the death of Prince Henry in 1612, Robert, the second son, having died in infancy, Charles became heir-apparent, but was not created Prince of Wales till 1616.

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His youth appears to have passed respectably, little being recorded of him previous to his romantic journey into Spain in company with Buckingham, in order to pay his court in person to the Spanish Infanta. Through the arrogance of Buckingham this match was prevented, and the prince was soon after contracted to Henrietta Maria, daughter of Henry IV. of France. In 1625 he succeeded to the throne on the death of his father, and received the kingdom embroiled in a Spanish war, and full of suspicion and dislike to the minister Buckingham. The first Parliament which he summoned, being much more disposed to state grievances than grant supplies, was dissolved; and by loans and other expedients an expedition was fitted out against Spain which terminated in disgrace and disappointment. In the next year a new Parliament was summoned, and the disgust and jealousy which prevailed between the king and this assembly laid the foundation of the misfortunes of his reign. The House of Commons impeached the minister, and the king supported him. They held fast the public purse, and he intimated a design of following new counsels should they continue to resist his will, and suddenly and angrily dissolved them, after a short session, while they were preparing a remonstrance against the levying of tonnage and poundage without consent of Parliament. Charles then began to employ his threatened mode of raising funds by loans, benevolences, and similar unpopular proceedings; which, however partially sanctioned by precedent, were wholly opposed to the rising notions of civil liberty throughout the nation, and to the constitutional doctrine which rendered the Commons the guardian and dispenser of the public treasure. His difficulties were further increased by a preposterous war with France, intended to gratify the private enmity of Buckingham, who added to the odium against him by an ill-fated expedition to assist the Huguenots of Rochelle.

In 1628 the king was obliged to call a new Parliament which showed itself as much opposed to arbitrary measures as its predecessor, and after voting the supplies prepared a bill called "A Petition of Right, recognizing all the Legal Privileges of the Subject," which, notwithstanding the employment of all manner of arts and expedients to avoid it, Charles was constrained to pass into a law; and had the concession been unequivocal and sincere, and the constitutional mode of government which it implied been really adopted by both sides, much that followed might have been prevented. Charles, however, by his open encouragement of the doctrines of such divines as Sibthorpe and Mainwaring, who publicly inculcated the doctrine of passive obedience, and represented all limitation of

kingly power as seditious and impious, too clearly sanctioned the jealousy of the Commons, who would not, in consequence, rest in confidence or slacken their attack on Buckingham, on which account they were suddenly prorogued. The assassination of the favorite soon after by the enthusiast Felton removed one source of discord, and Charles became more his own minister, and some differences with his queen, which had been fomented by Buckingham, being made up, he ever after continued much under her influence. The Parliament which met in January, 1628, manifested so determined a spirit against the king's claim of levying tonnage and poundage by his own authority, that it was suddenly dissolved, and Charles was determined to try to reign without one. For this purpose, having judiciously terminated the pending wars between France and Spain, he raised Sir Thomas Wentworth, afterward so celebrated as Lord Strafford, to the principal place in his councils. This able statesman had begun his political career in opposition to the court, but having been gained over, was by his austerity, talent, and firmness, an exceedingly fit instrument to curb the spirit of resistance to prerogative, which had become so strong among the Commons. In ecclesiastical affairs Charles, unhappily for himself and the Church, was guided by the counsels of Laud, then Bishop of London, a prelate whose learning and piety were debased by superstition and a zeal as indiscreet as intolerant.

Under these counsels about 11 years passed away in the execution of plans for raising money without the aid of Parliament, with other dangerous expedients. The arbitrary courts of High-commission and Star-chamber, in the hands of Laud, also exercised in many instances the most grievous oppression, of which the treatment of Williams, Bishop of Lincoln, and others, affords memorable examples. In 1634 ship-money began to be levied, which being strictly applied to naval purposes, the nation at large acquiesced in it with less than usual repugnance; and some writers, who courageously attacked the court against the principle, were treated with so much severity that others were deterred from following their example. So desperate did the cause of liberty at this time appear, that great numbers of the Puritans emigrated to New England, and by order of the court a ship was prevented from sailing, in which were Sir Arthur Hazelrig, John Hampden, and Oliver Cromwell. It was in 1637, not long after this remarkable event, that Hampden commenced the career of resistance by refusing to pay ship-money, the right to levy which, without authority of Parliament, he was determined to bring before a court of law. His cause was argued for 12 days

in the Court of Exchequer; and although he lost it by the decision of 8 of the judges out of 12, the discussion of the question produced a very powerful impression on the public mind.

It was in Scotland, however, that formal warlike opposition was destined to commence. From the beginning of his reign Charles had endeavored to introduce into that country a liturgy copied from the English—an innovation which produced the most violent tumults, and ended in the formation of the famous "Covenant" in 1638, by which all classes of people mutually engaged to stand by each other. The Covenanters levied an army, which the king opposed by an ill-disciplined English force, so equivocally inclined, that, not able to trust it, Charles agreed to a sort of pacification. The next year he raised another army, but his finances being exhausted, after an intermission of 11 years he again assembled a Parliament, which, as usual, began to state grievances previous to granting supplies. Losing all patience, the king once more hastily dissolved it, and prosecuted several members who had distinguished themselves by their opposition. Raising money in the best manner he could devise, an English army was again made to proceed toward the N.; but, being defeated by the Scots, it became obvious that affairs could no longer be managed without a Parliament, and in 1640 that dreaded assembly was again summoned, which proved to be the famous Long Parliament, whose career forms so memorable a portion of English history. It is not within the limits of this work to give an account of the proceedings connected with the prosecution, condemnation, and execution of Strafford and Laud, or the various measures of reaction in regard to ship-money, tonnage and poundage, and the abolition of the iniquitous courts of High-commission and Star-chamber. Suffice it to say, that Charles soon found himself obliged to be a comparatively passive spectator of the ascendancy of the democratic portion of the constitution, and was obliged, both in Scotland and in England, to yield to the torrent which assailed him.

In the meantime a flame burst out in Ireland, which had no small effect in kindling the ensuing conflagration at home. The oppressed Catholic population of that country, during the confusion of the times, rose against the government for the purpose of regaining their rights. Very exaggerated accounts of the massacre of the Protestants are to be found in several of the historians. Later writers have established the fact that the number who perished in this insurrection was not great. The old Catholic settlers of the English pale joined the native Irish, and to strengthen their cause pretended to have a royal commission, and

to act in defense of the king's prerogative against a puritanical and republican Parliament. This pretended commission is now generally deemed a forgery; but such was the supposed partiality of Charles to Popery that this event added considerably to popular disaffection. The Parliament being summoned, the king left the conduct of the war entirely to it; but it now became evident that the Commons intended systematically to pursue their advantages, and to reduce the crown to a state of complete dependence. They framed a remonstrance containing a recapitulation of all the errors of the reign; renewed an attempt for excluding bishops from the House of Lords; passed ordinances against superstitious practices; and, so inflamed the popular odium against the Episcopal orders as to intimidate its members from attending to their duty in Parliament.

At length, it being apparent that either zealous adherents of prerogatives, or those who were anxious to establish the government on a more democratic basis, must give way, Charles, instigated, it is supposed, by the injudicious advice of his queen and Lord Digby, caused his attorney-general to enter, in the House of Peers, an accusation against five leading members of the Commons, and sent a sergeant-at-arms to the House to demand them. Receiving an evasive answer, he, the next day, proceeded himself to the House, with an armed retinue, to seize their persons. Aware of this intention, they had previously withdrawn; but the king's appearance with a guard caused the House to break up in great disorder and indignation. The accused members retired into the city, where a committee of the House was appointed to sit, and the city militia was mustered under a commander appointed by Parliament, which also demanded the control of the army. Here the king made his last stand, the matter having now arrived at a point which arms alone could decide. The queen fled to Holland to procure ammunition, and Charles, with the Prince of Wales, proceeded N., and for a time fixed his residence at York. The king was received in his progress with great demonstrations of loyalty from the gentry; and many eminent and virtuous characters, who had been the conscientious opposers of his arbitrary measures in the first instance, now joined his party. On the other hand, all the Puritans, the inhabitants of the great trading towns, and those who had adopted republican notions of government, sided with the Parliament; and in no public contest was more private and public virtue ranged on both sides, however alloyed, as in all such cases, with ambition, bigotry, and the baser passions. The first action of consequence was the battle of Edge Hill (Oct. 23, 1642), which, although indecisive, enabled

the king to approach London, and produce considerable alarm. He then retired to Oxford, and negotiations were entered into which proved unavailing. Nothing decisive, however, happened against the royal side till the battle of Marston Moor in 1644, which was gained chiefly by the skill and valor of Cromwell. The succeeding year completed the ruin of the king's affairs, by the loss of the battle of Naseby.

Thenceforward a series of disasters attended his armies throughout the kingdom, and he took the resolution of throwing himself into the hands of the Scottish army, then lying before Newark (May 5, 1646). He was received with respect, although placed under guard as a prisoner; and, a series of abortive negotiations ensuing, an agreement was made with the Parliament to surrender him to their commissioners, on the payment of a large sum, claimed as arrears by the Scottish army. The king was accordingly surrendered to the commissioners appointed (Jan. 30, 1647), and was carried, in the first place, to Holmby House, in Northamptonshire; subsequently, to the headquarters of the army at Reading; and soon after to Hampton Court, where he was treated with no small portion of the respect becoming his station. In the meantime, however, the army and Independents becoming all-powerful, he was led into some fears for his personal safety, and, making his escape with a few attendants, proceeded to the S. coast. Not meeting a vessel, as he expected, he crossed over to the Isle of Wight, and put himself into the hands of Hammond, the governor, a creature of Cromwell's, by whom he was lodged in Carisbrooke Castle.

While the king was in this situation, the Scots, regretting the manner in which they had delivered him up, and indignant at the proceedings of the English, marched a considerable army to his relief, under the Duke of Hamilton. This force, although strengthened by a large body of English royalists, was entirely routed and dispersed by Cromwell at Preston, as were the insurgents in Kent and Essex by Fairfax. During this employment of the army and its leaders a new negotiation was opened with the king in the Isle of Wight, who agreed to nearly everything demanded of him, except the abolition of Episcopacy; and so much had it now become the interest of the Parliament itself to comply with him, that a vote was at length carried, that the king's concessions were a sufficient ground for a treaty. The triumphant army, however, on its return, cleared the House by force of all the members opposed to its views; and thereby procuring a reversal of this vote, the king's person was again seized, and, being brought from the Isle of Wight to Hurst Castle, preparations were made for trying him on the capital charge of high

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treason against the people. As the House of Lords refused to concur in a vote for this purpose, the Commons declared its concurrence unnecessary; and the king, being conducted to London and stripped of all ensigns of royalty, was brought before the court of justice specially erected for this unprecedented trial, on Jan. 20, 1649.

The behavior of Charles had been calm and dignified throughout his adversity, and in no respect was it more so than on this occasion. Three times he objected to the authority of the court when brought before it, and supported his refusal by clear and cogent arguments. At length, evidence being heard against him on the proof that he had appeared in arms against the Parliamentary forces, sentence of death was pronounced against him. He requested a conference with both Houses, which was rejected, and only three days were allowed him to prepare for his fate. The interposition of foreign powers, the devotion of friends and ministers, who sought to save him by taking all the blame upon themselves, were vain. After passing the three days in religious exercises, and in tender interviews with his friends and family, he was led to the scaffold. His execution took place before the Banqueting House, Whitehall, on Jan. 30, 1649, where, after addressing the people around him with great firmness and composure, the ill-fated king submitted to the fatal stroke.

Thus died Charles I., in the 49th year of his age. He was, in an eminent degree, temperate, chaste, and religious, and although somewhat cold and reserved in demeanor, was really kind and affectionate. His talents were also considerable; but he was deficient in the decision and self-reliance which are necessary to superior executive ability. His mind was cultivated by letters and a taste for the polite arts, particularly painting, the professors of which he munificently encouraged; and his collections of work on art show judgment in the selection. He had also some taste for poetry, and wrote in a good prose style, though we cannot adduce the "Eikon Basiliké" as a specimen, since his claim to its authorship is clearly untenable. To all these personal and private requirements he joined a graceful figure and pleasing countenance, and, under happier circumstances, would doubtless have been regarded as a very accomplished sovereign.

With respect to his political character, as exhibited in the great struggle between himself and the Parliament, it is impossible not to perceive that he strove to maintain a portion of prerogative that had become incompatible with any theory of civil and religious liberty; but it is equally certain that he only sought to retain what his predecessors had possessed. There are periods in the history of every people in which old and

Charles II.

new opinions conflict, and a concussion becomes unavoidable; and it was the misfortune of Charles to occupy the throne at a time when the development of the representative system necessarily brought it into conflict with the claims of prerogative. If the Parliament had acquiesced in the kingly pretensions, as usually explained by Laud and the high-churchmen of the day, it would have dwindled into a mere registry of royal edicts, like those of France. On the other hand, Charles acted a part which every monarch in his situation may be expected to act; for a philosophical appreciation of the true nature of a political crisis is scarcely to be expected from one who sits upon a throne. The most forcible accusation against Charles is on the score of insincerity. It is asserted that he never intended to fulfil the conditions imposed upon him. This can scarcely be denied; but it is equally certain that some of them might justly be deemed questionable, and may even have been imposed in order to produce that conduct in the king which so naturally followed.

Charles II., King of England, Ireland, and Scotland; son of Charles I. and Henrietta Maria of France; born in London, May 29, 1630. He was a refugee at The Hague on the death of his father, on which he immediately assumed the royal title. He first intended to proceed to Ireland, but was prevented by the progress of Cromwell. He therefore listened to an invitation from the Scots, who had proclaimed him their king on Feb. 5, 1649, and arrived in the Cromarty Firth, June 16, 1650. Being obliged to throw himself into the hands of the rigid Presbyterians, they subjected him to many severities and mortifications, which caused him to regard that sect ever after with extreme aversion. In 1651 he was crowned at Scone; but the approach of Cromwell with his conquering army soon rendered his abode in Scotland unsafe. Hoping to be joined by the English royalists, he took the spirited resolution of passing Cromwell and entering England, Carlisle readily throwing open its gates to receive him. He was immediately pursued by that active commander, who, with a superior army, gained the battle of Worcester, and Charles, after a variety of imminent hazards, being on one occasion sheltered for 24 hours in the branches of the famous Boscobel oak, reached Shoreham, in Sussex, and effected a passage to France. He passed some years in Paris, little regarded by the court, which was awed by the power of the English Commonwealth; and this indignity induced him to retire to Cologne.

It is the province of history to state the circumstances that produced the Restoration, which General Monk so conducted that Charles, without a struggle, succeeded at once to all those dangerous prerogatives

which it had cost the nation so much blood and treasure, first to abridge and then to abolish. This unrestrictive return was not more injurious to the nation than fatal to the family of the Stuarts, which, had a more rational policy prevailed, might have occupied the throne at this moment. On May 29, 1660, Charles entered his capital amid universal and almost frantic acclamations; and the different civil and religious parties vied with each other in loyalty and submission. His first measures were prudent and conciliatory. Hyde, Lord Clarendon, was made chancellor and prime minister; and an act of indemnity was passed, from which those alone were excepted who were immediately concerned in the late king's death. A settled revenue was accepted in lieu of wardship and purveyance, and the army was reduced. In respect to religion, there was less indulgence; for not only were prelacy and the parliamentary rights of bishops restored, which was to be expected, but an act of uniformity was passed, by the conditions of which nearly all the Presbyterian clergy were driven to a resignation of their livings. In 1662 he married the Infanta of Portugal, a prudent and virtuous princess, but in no way calculated to acquire the affection of a man like Charles. The indolence of his temper and the expenses of his licentious way of life soon involved him in pecuniary difficulties; and the unpopular sale of Dunkirk to the French was one of his most early expedients to relieve himself.

In 1663 a rupture took place with Holland, which, as it proceeded from commercial rivalry, was willingly supported by Parliament. It was attended, in the first instance, by various naval successes; but France and Denmark entering into the war, as allies of the Dutch, the English were overmatched, and a Dutch fleet entered the Thames, and, proceeding up the Medway, burned and destroyed ships as high as Chatham. Such was the naval disgrace of a reign which, on many other accounts, is probably the most discreditable and disastrous in the English annals. The domestic calamities of a dreadful plague in 1665, and of the great fire of London in 1666, added to the disasters of the period. Soon after, Clarendon, who had become very unpopular, and was personally disagreeable to Charles, was dismissed, and sought shelter from his enemies by a voluntary exile. A triple alliance between England, Holland, and Sweden, for the purpose of checking the ambition of Louis XIV., followed. It did honor to the political talents of Sir William Temple, and was one of the few public measures of the reign which deserve approbation. The thoughtless profusion of Charles, however, soon brought him into a condition which rendered him the mere pensioner of Louis, by whose secret aid he was supported in all his attempts to abridge the freedom of his

people. In 1670 he threw himself into the hands of the five unprincipled ministers, collectively denominated the cabal who supported him in every attempt to make himself independent of Parliament. A visit which Charles received from his sister, the Duchess of Orleans, was rendered subservient to French policy, by means of one of her attendant ladies, a beautiful French woman. This female made, as was intended, a conquest of Charles, who created her Duchess of Portsmouth; and, amid all his other attachments, she retained an influence over him which kept him steadily attached to France.

The party troubles of this reign commenced about this time by the open declaration of the Duke of York, presumptive heir to the crown, that he was a convert to the Roman Catholic religion. Soon after the ministry broke the triple alliance, and planned a rupture with the Dutch; and as the king did not choose to apply to Parliament for money to carry on the projected war, he caused the exchequer to be shut up in January, 1672, and, by several other disgraceful and arbitrary proceedings, gave great disgust and alarm to the nation. The naval operations against the Dutch were by no means successful, and a new Parliament being called, which strongly expressed the discontent of the nation, the cabal was dissolved, and a separate peace made with Holland in 1674. Divisions in the cabinet, fluctuations in the king's measures, and Parliamentary contests, followed, and occupied the next three years, till, in 1677, Charles performed a popular act, by marrying his niece, the princess Mary, to the Prince of Orange. By taking some decided steps in favor of the Dutch he also forwarded the peace of Nimeguen in 1678. The same year was distinguished by the pretended discovery of the popish plot for the assassination of the king, and the introduction of the Catholic religion. Notwithstanding the infamous characters of Oates and Bedloe, and the improbable nature of their disclosures, their tale, supported by the general suspicion of the secret influence of a Catholic faction, met with universal belief; the Parliament exhibiting nearly as much credulity and heat as the vulgar. Many Catholic lords were committed; Coleman, the Duke of York's secretary, and several priests were hanged; and a venerable nobleman, the Earl of Stafford, was beheaded. The Duke of York thought fit to retire to Brussels, and a bill for his exclusion from the throne passed the House of Commons. Such was the state of the country that Charles was obliged to give way to some popular measures, and the great palladium of civil liberty, the Habeas Corpus Bill, passed during this session. The temper of the Parliament was so much excited that the king first prorogued and then dis-

solved it. The court now sought to establish a balance of parties; to distinguish which, the terms Whig and Tory were about this time brought into use.

In 1680 a new Parliament assembled, and the Commons again passed the Exclusion Bill, which was rejected by the Lords. This Parliament was also dissolved in the next year, and a new one called at Oxford, which proved so restive, that a sudden dissolution of it ensued; and, like his father, Charles determined henceforward to govern without one. By the aid of the Tory gentry and the clergy he obtained loyal addresses from all parts of the kingdom, and attachment to high monarchical principles came again into vogue. The charge of plots and conspiracies was now brought against the Presbyterians. A person named College was executed on the same infamous evidence as had been previously turned against the Catholics; and the Earl of Shaftesbury, who headed the popular party, was brought to trial, but acquitted. The Nonconformists, generally, were also treated with much rigor; and a step of great moment, in the progress to arbitrary power, was the instituting suits at law (*quo warrantos*) against most of the corporations in the kingdom, by which they were intimidated to a resignation of their charters, in order to receive them back so modeled as to render them much more dependent than before. These rapid strides toward the destruction of liberty at length produced the celebrated Rye House plot, the parties to which certainly intended resistance; but that the assassination of the king was ever formally projected seems very doubtful. It certainly formed no part of the intention of Lord William Russell, whose execution, with that of Algernon Sidney, on account of the plot, forms one of the striking events of this disgraceful reign.

Charles was at this time as absolute as any sovereign in Europe; and had he been an active prince, the fetters of tyranny might have been completely riveted. Scotland, which at different periods of his reign had been driven into insurrection by the arbitrary attempts to restore Episcopacy, was very nearly dragooned into submission; and the relics of the Covenanters were suppressed with circumstances of great barbarity. It is said, however, that Charles was becoming uneasy at this plan, which was chiefly supported by the bigoted austerity of the Duke of York; and that he had made a resolution to relax, when he expired, from the consequences of an apoplectic fit, in February, 1685, in the 55th year of his age, and the 25th of his reign. At his death he received the sacrament according to the rites of the Romish Church, and thus proved himself to have been, during the whole of his life, as hypocritical as profligate.

The character of Charles II. requires little analysis. He was a confirmed sensualist and voluptuary; and, owing to the example of him and his court, his reign was the era of the most dissolute manners that ever prevailed in England. The stage was an open school of licentiousness, and polite literature was altogether infected by it. Charles was a man of wit, and a good judge of certain kinds of writing, but was too deficient in sensibility to feel either the sublime or the beautiful in composition; neither was he generous even to the writers whom he applauded. He possessed an easy good nature, but united with it a total indifference to anything but his own pleasure; and no man could be more destitute of honor or generosity. His ideas of the relation between king and subject were evinced by his observation on Lauderdale's cruelties in Scotland: "I perceive," said he, "that Lauderdale has been guilty of many bad things against the people of Scotland; but I cannot find that he has acted in anything contrary to my interest." Yet, with all his selfishness and demerits as a king, Charles always preserved a share of popularity with the multitude, from the easiness of his manners. Pepy's "Memoirs" and other private documents, however, clearly show the opinion of the more reflecting portion of his subjects; and it is now pretty generally admitted that, as he was himself a most dishonorable and heartless monarch and man, so his reign exhibited the English character in a more disgraceful light than any other in British history. It need not be added that he left many illegitimate children, the descendants of some of whom are still among the leading nobility of the country. The fate of his most distinguished son, the ill-fated Duke of Monmouth, is an affair of history.

Charles X. succeeded his cousin, Christina, in 1654, and by his prudence and valor considerably extended his dominions, wresting Livonia from the Poles, and several provinces from the crown of Denmark. After a short reign of six years, in which he was constantly engaged in war, sometimes meeting with severe reverses, but, on the whole, a considerable gainer, he was fatally attacked with an epidemic disease then raging among his troops, and died in 1660.

Charles XI., son of the preceding, succeeded, and immediately began a system of tyrannous exaction and arbitrary oppression, by which he in a short time made himself absolute. Having once become independent of the States, he studied to appease the people by ruling with justice and impartiality. In war he was unsuccessful, and lost much of his father's territorial acquisitions. He died in 1697.

Charles XII., King of Sweden; born in Stockholm, June 27, 1682; was instructed

in the languages, history, geography, and mathematics. He understood German, Latin, and French. Curtius' "History of Alexander" was his favorite book. On the death of his father in 1697 when he was but 15 years old, he was declared of age by the estates. Meanwhile the young king showed but little inclination for business; he loved violent bodily exercises, and especially the chase of the bear. To his jealous neighbors this seemed a favorable time to humble the pride of Sweden. Frederick IV. of Denmark, Augustus II. of Poland, and the Czar Peter I. of Russia concluded an alliance which resulted in the Northern War. The Danish troops first invaded the territory of the Duke of Holstein-Gottorp. This prince, who married the eldest sister of the King of Sweden, repaired to Stockholm and asked for assistance. Charles had a particular attachment for him, and proposed in the Council of State the most energetic measures against Denmark. After making some arrangements respecting the internal administration he embarked at Carlsrona in May, 1700. Thirty ships of the line and a great number of small transports, strengthened by an English and Dutch squadron, appeared before Copenhagen. Arrangements were making for the disembarkation when Charles, full of impatience, plunged from his boat into the water, and was the first who reached land. The Danes retired before the superior power of the enemy. Copenhagen was on the point of being besieged when the peace negotiated at Travendal was signed (Aug. 8, 1700), by which the Duke of Holstein was confirmed in all the rights of which it had been attempted to deprive him. Thus ended the first enterprise of Charles XII., in which he exhibited as much intelligence and courage as disinterestedness. He adopted at this time that severe and temperate mode of life to which he ever remained true, avoiding relaxation and useless amusements; wine was banished from his table; at times coarse bread was his only food; he often slept in his cloak on the ground; he generally wore a blue coat, with copper buttons, large boots reaching above his knees, and gloves of buffalo skin.

After thus checking Denmark the attacks of Augustus and Peter were to be repelled. The former was besieging Riga, the latter menaced Narva and the country situated about the Gulf of Finland. Without returning to his capital, which in fact he never revisited, Charles caused 20,000 men to be transported to Livonia, and went to meet the Russians, whom he found 80,000 strong in a fortified camp under the walls of Narva. On Nov. 30, 1700, between 8,000 and 10,000 Swedes placed themselves in order of battle, under the fire of the Russians, and the engagement began. On the

previous evening Peter had left his camp on pretence of bringing up reinforcements. In less than a quarter of an hour the Russian camp was taken by storm. Thirty thousand Russians perished on the field or threw themselves into the Narva; the rest were taken prisoners or dispersed. After this victory Charles crossed the Dwina, attacked the intrenchments of the Saxons, and gained a decisive victory. Charles might now have concluded a peace which would have made him the arbiter of the North; but instead of so doing he pursued Augustus to Poland, and determined to take advantage of the discontent of a great part of the nation for the purpose of de-throning him. Augustus attempted in vain to enter into negotiations; in vain did the Countess Königsmark, mistress of Augustus, endeavor to obtain an interview with Charles, and disarm by her beauty the Swedish hero, who all his life long remained indifferent to, and uninfluenced by the sex. Charles refused to negotiate with the king or to speak with the countess.

The war continued; the Swedes gained a brilliant victory at Clissau; in 1703 all Poland was in the possession of the conquerors; the cardinal primate declared the throne vacant; and by the influence of Charles the new choice fell on Stanislaus Leczinsky. Augustus hoped to be secure in Saxony, as Peter had meanwhile occupied Ingria, and founded St. Petersburg, at the mouth of the Neva. But the victor of Narva despised an enemy on whom he hoped, sooner or later, to take an easy revenge, and invaded Saxony. At Altranstadt he dictated the conditions of peace in 1706. The Livonian Patkul, who was the prime mover of the alliance against Sweden (at that time Peter's ambassador in Dresden), was delivered up to him on his demand, and was broken on the wheel. It might well cause general astonishment that a prince, till then so magnanimous, could stoop to such intemperate revenge. In other respects Charles exhibited, during his stay in Saxony, moderation and magnanimity. He subjected his troops to the strictest discipline. Several ambassadors and princes visited the camp of the king at Altranstadt, among whom was Marlborough, who sought to discover Charles' plans, urged him to direct all his energies against Russia, and convinced himself that the victorious hero would take no part in the great contests of the South. The King of Sweden, however, before he left Germany, required the emperor to grant to the Lutherans in Silesia perfect freedom of conscience; and the requisition was complied with.

In September, 1707, the Swedes left Saxony. They were 43,000 strong, well clothed, well disciplined, and enriched by the contributions imposed on the conquered. Six

thousand men remained for the protection of the King of Poland; with the rest of the army Charles took the shortest route to Moscow. But having reached the region of Smolensk he altered his plan, at the suggestion of the Cossack hetman Mazeppa, and proceeded to the Ukraine, in the hope that the Cossacks would join him. But Peter laid waste their country, and the proscribed Mazeppa could not procure the promised aid. The difficult marches, the want of provisions, the perpetual attacks of the enemy, and the severe cold, weakened Charles' army in an uncommon degree. General Lewenhaupt, who was to bring reinforcements and provisions from Livonia, arrived with only a few troops, exhausted by the march and by continual skirmishes with the Russians. Pultawa, abundantly furnished with stores, was about to be invested when Peter appeared with 70,000 men. Charles, in reconnoitering, was dangerously wounded in the thigh; consequently, in the battle of July 8, 1709, which changed the fortunes of the Swedish hero and the fate of the North, he was obliged to issue his commands from a litter, without being able to encourage his soldiers by his presence. This, and still more the want of agreement between Rehnsköld and Lewenhaupt, were the reasons why the Swedes did not display their usual skill in maneuvering, which had so often given them the victory. They were obliged to yield to superior force, and the enemy obtained a complete victory. Charles saw his generals, his favorite minister, Count Piper, and the flower of his army, fall into the power of those Russians so easily vanquished at Narva. He himself, together with Mazeppa, fled with a small guard, and was obliged, notwithstanding the pain of his wounds, to go several miles on foot. He finally found refuge and an honorable reception at Bender, in the Turkish territory. His enemies were now inspired with new hope. Augustus protested against the treaty of Altranstadt; Peter invaded Livonia; Frederick of Denmark made a descent on Schonen.

The regency in Stockholm took measures for the defense of the Swedish territory. General Steinbock assembled a body of militia and peasants, defeated the Danes at Helsingborg, and compelled them to evacuate Schonen. Several divisions were sent to Finland to keep off the Russians, who nevertheless advanced, being superior in numbers. Charles, meanwhile, negotiated at Bender with the Porte; succeeded in removing the ministers who were opposed to him, and induced the Turks to declare war against Russia. The armies met on the banks of the Pruth river July 1, 1711. Peter seemed nearly ruined when the courage and prudence of his wife produced a peace, in which the interests of Charles were entirely neglected. This monarch,

however, projected at Bender new plans, and through his agents solicited of the Porte auxiliaries against his enemies. But the Russian agents were no less active to prepossess the Porte against him, pretending that Charles designed to make himself, in the person of Stanislaus, the actual master of Poland, in order from thence, in connection with the German emperor, to attack the Turks. The seraskier of Bender was ordered to compel the king to depart, and in case he refused to bring him, living or dead, to Adrianople. Little used to obey the will of another, and apprehensive of being given up to his enemies, Charles resolved to defy the forces of the Porte with the 200 or 300 men of which his retinue consisted, and, sword in hand, to await his fate. When his residence at Varnitza, near Bender, was attacked by the Turks he defended it against a whole army, and yielded only step by step. The house took fire, and he was about to abandon it when, his spurs becoming entangled, he fell and was taken prisoner. His eyelashes were singed by powder, and his clothes covered with blood. Some days after this singular contest Stanislaus came to Bender to ask the King of Sweden to give his consent to the treaty which he saw himself obliged to conclude with Augustus; but Charles refused. The Turks now removed their prisoner from Bender to Demotica, near Adrianople. Here he spent two months in bed, feigning sickness, and employed in reading and writing. Convinced at last that he could expect no assistance from the Porte he sent a parting embassy to Constantinople, and set off in disguise with two officers.

Accustomed to every deprivation Charles pursued his journey on horseback through Hungary and Germany, day and night, with such haste that only one of his attendants was able to keep up with him. Exhausted and haggard, he arrived before Stralsund about one o'clock on the night of Nov. 22, 1714. Pretending to be a courier with important dispatches from Turkey he caused himself to be immediately introduced to the commandant, Count Dunker, who questioned him concerning the king, without recognizing him till he began to speak, when he sprang joyfully from his bed and embraced the knees of his master. The report of Charles' arrival spread rapidly throughout the city. The houses were illuminated. A combined army of Danes, Saxons, Russians, and Prussians immediately invested Stralsund. Charles performed, during the defense, miracles of bravery. But being obliged to surrender the fortress, on Dec. 23, 1715, he proceeded to Lund, in Schonen, and took measures to secure the coast. He then attacked Norway. The Baron of Görtz, whose bold but intelligent plans were adapted to the situation of the Swedish monarchy, was at that

time his confidential friend. His advice was that Charles should gain Peter the Great to the interest of Sweden by important concessions, make himself master of Norway, and from thence land in Scotland, in order to dethrone George I., who had declared himself against Charles. Görtz discovered resources for prosecuting the war, and entered into negotiations at Aland with the plenipotentiaries of the czar. Peter was already gained and a part of Norway conquered; the fortunes of Sweden seemed to assume a favorable aspect; Charles was besieging Frederikshall, when, on Nov. 30, 1718, as he was in the trenches, leaning against the parapet and examining the workmen, he was struck on the head by a cannon ball. He was found dead in the same position, his hand on his sword, in his pocket the portrait of Gustavus Adolphus and a prayer book. It is more than probable that the ball which killed him was fired, not from the fortress, but from the Swedish site. His adjutant, Siguier, has been accused as an accomplice in his murder. A century afterwards, Nov. 30, 1818, Charles XIV. caused a monument to be erected on the spot where he fell.

At Charles' death Sweden sank from the rank of a leading power. In his last years he had formed great plans for the improvement of its navy, trade and commerce. At Lund he often conversed with the professors of the university, and attended public disputations on geometry, mechanics, and history. In Bender the reading of useful books was one of his principal employments; he sent for Swedish scholars, and caused them to travel through Greece and Asia. Accounts of some of these travels have been printed; there are others in manuscript at Upsal. Firmness, valor, and love of justice were the grand features of Charles' character, but were disfigured by an obstinate rashness. After his return he showed himself more peaceable, gentle, moderate, and disposed to politic measures. Posterity, considering him in relation to his times, will say that he had great virtues and great faults; that he was seduced by prosperity, but not overcome by adversity. His history has been written by his chaplain, Norberg. Alderfeld has published his military memoirs. Voltaire's "*Histoire de Charles XII.*," though not complete nor free from errors in dates, names, and geographical facts, is written with much clearness and elegance.

Charles XIII., King of Sweden; born Oct. 7, 1748; second son of King Adolphus Frederick, and Louisa Ulrica, sister of Frederick the Great of Prussia. Having been appointed at his birth high-admiral of Sweden, his education was directed chiefly to the learning of naval tactics, for which purpose he engaged in several cruises in the Cattegat. In 1765 he became honorary pres-

ident of the Society of Sciences at Upsal. In 1770 he commenced the tour of Europe. The death of Adolphus Frederick recalled him to Sweden, where he took an important part in the revolution of 1772. His brother Gustavus III. appointed him governor-general of Stockholm, and Duke of Sundermannland. In 1774 he married Hedwig Elizabeth Charlotte, princess of Holstein-Gottorp. In the war with Russia in 1788 he received the command of the fleet, defeated the Russians in the Gulf of Finland, and, in the most dangerous season of the year, brought back his fleet in safety to the harbor of Carlscrona, after which he was appointed governor-general of Finland. After the murder of Gustavus III. in 1792, he was placed at the head of the regency, and happily for Sweden, preserved the country at peace with all other nations, while he united with Denmark for the protection of the navigation in the Northern seas. He likewise founded a museum, established a military academy for 200 pupils, and gained universal esteem. In 1796 he resigned the government to Gustavus Adolphus IV., who had become of age, and retired as a private man to his castle of Rosersberg. He never appeared again in public life till a revolution hurled Gustavus Adolphus IV., in 1809, from the throne, and placed Charles at the head of the State, as administrator of the realm, and some months afterward, June 20, 1809, as King of Sweden, at a very critical period. The peace with Russia, at Frederiksham, Sept. 17, 1809, gave the country the tranquillity necessary for repairing its heavy losses, and for completing the constitution. He had already adopted Prince Christian of Holstein-Sonderburg-Augustenburg as his successor, and after his death, Marshal Bernadotte, who was elected by the Estates, in August, 1810, to take the place of the prince. On him he bestowed his entire confidence. May 27, 1811, he founded the Order of Charles XIII., which is conferred solely on Freemasons of high degree. June 21, 1816, he acceded to the holy alliance. His prudent conduct in the war between France and Russia in 1812 procured Sweden an indemnification for Finland by the acquisition of Norway, Nov. 4, 1814. Although some disappointed nobles may have given utterance to murmurs against his government, Charles XIII. nevertheless enjoyed the love of his people till his death, Feb. 5, 1818.

Charles XIV. See BERNADOTTE, JEAN BAPTISTE JULES.

Charles I., King of Spain. See CHARLES V., Emperor of Germany.

Charles II., King of Spain, succeeded his father, Philip IV., in 1665. In this reign, Spain, which for nearly three cen-

Charles III.

turies had held the foremost rank in Europe as a great military nation, reached the highest point of its greatness, and began rapidly to decline both in influence and glory, but such was the prestige attached to its name and past history, that it had long become powerless before it ceased to be respected. Charles died in 1700, bequeathing his throne to the Duke d'Anjou, grandson of Louis XIV. of France, an act which led to the long and calamitous "War of the Spanish Succession."

Charles III. This prince, who was King of Naples, on the death of his brother Ferdinand exchanged his Sicilian throne for that of Spain, 1759. He sustained against England a war disastrous to the commerce of his country, and died in 1788.

Charles IV., King of Spain; born in Naples, Nov. 12, 1748; went to Madrid in 1759, when his father, Charles III., after the death of his brother, Ferdinand VI., ascended the Spanish throne, and succeeded him Dec. 13, 1788. He was married to the Princess of Parma, Louisa Maria. Too imbecile to govern, he was always ruled by his wife and his ministers, among whom the Prince of Peace, Godoy, Duke of Alcudia, from the year 1792, had unbounded influence over him. The hatred which this favorite drew on himself from the Prince of Asturias and other grandees brought on a revolution in 1808, which enabled Napoleon to dethrone the Bourbons. Charles abdicated at Aranjuez, March 19, revoked this abdication, and finally ceded, at Bayonne, his right to the throne to Napoleon, who settled on him for life the palace of Compiègne and a pension of 6,000,000 francs. Charles after this lived at Compiègne with the queen and her paramour the Prince of Peace, but subsequently exchanged this residence for Rome, where the climate was more congenial to him. From 1815 he occupied the Barberini palace in this city. Hunting he always made his principal employment. He died at Naples, Jan. 19, 1819, while on a visit to his brother, the King of the Two Sicilies. His wife died a short time previous, in December, 1818.

Charles I., or Charles Charobert, King of Hungary, the son of Charles, King of Naples, ascended the throne of Hungary in 1312, succeeding the powerful Otho of Bavaria to the crown of the Magyars, and after a stormy and turbulent reign of 32 years, died in 1342.

Charles II., King of Hungary. See CHARLES V., Emperor of Germany.

Charles, first Duke of Lorraine, born in 953, early succeeded to his paternal inheritance. No sooner, however, was he invested with sovereign power, than he laid claim to the crown of France, on the death

Charles II.

of Louis V., and immediately endeavored to sustain his claim by force of arms; but in the first battle fought between the two powers, he was made prisoner, his army entirely defeated, and himself cast into a dungeon in the gloomy castle of Orleans, where he died a prisoner, 994. Of the other dukes of this house, the only one of special interest is Charles V., born in 1643. Having been deprived of his ancestral rights by the will of his uncle, who had bequeathed his province to Louis XIV., and being foiled in an attempt to recover it by arms, he took service with Austria, married the emperor's sister, and rose to be one of the most distinguished captains of the age, and the first general in the imperial service. He died in 1690.

Charles I. (d'Anjou), King of Naples, the son of Louis VIII. of France, waged war on King Manfred of Sicily, and having defeated him, seized on the Neapolitan crown in 1266. His cruelty and exacting rule raised such a spirit of anarchy, and induced such a detestation of the French name, that the Sicilians, headed by John de Procida, rose in arms on the eve before Easter-day, 1282, and slaughtered all the French in the town and neighborhood of Palermo, the signal for rising being the tolling of the vesper-bell; this tragedy is hence recorded in history as the "Sicilian Vespers." By this act the French were entirely expelled from the island, and Sicily lost to Charles I.'s crown. Charles died in 1285.

Charles II., King of Naples; the son of Charles I.; born in 1248; succeeded his father; and after many fruitless attempts to recover Sicily, died in 1309.

Charles III., of Durazzo, the grandson of the latter king, ascended the throne in 1382, and fell in battle against the Hungarians, 1386.

Charles IV. See CHARLES V., Emperor of Germany.

Charles I., King of Navarre. See CHARLES IV. of France.

Charles II., or The Bad, Count of Evrau, King of Navarre, born in 1332, succeeded his mother in 1350. Having gratified his personal hatred by the murder of Charles de la Corda, he was arrested by Charles V. of France, and thrown into one of the state prisons, but having found means to bribe his jailers, contrived to escape; when, burning with indignation at his treatment, he collected all the forces of his kingdom, entered France and ravaged his enemy's country; but after a long and harrassing struggle, failing in all his attempts to obtain the throne of France, he was at last compelled to sue for peace, and make terms with his powerful rival. He died in 1387.

Charles III.

Charles III., or The Noble, King of Navarre, succeeded his father in 1387, and died in 1425.

Charles I., King of Savoy, succeeded to the hereditary honors in 1472, was educated in France, and died in 1489.

Charles, Archduke of Austria; third son of the Emperor Leopold II.; born in Florence, Sept. 5, 1771. In his 20th year he distinguished himself in the battles of Jemappes and Neerwinden, in both of which the French republican armies were beaten, and was appointed governor-general of Belgium in 1793. In the campaign the following year victory favored the French under Pichegru, and the Netherlands were lost. Charles retired to Vienna, where he spent some time recruiting his impaired health. Appointed in 1796 field-marshal of the empire and commander-in-chief of the Austrian army on the Rhine, he opened the campaign by the victory of Neumarkt over Jourdan, which was quickly followed by the successes of Teining and Amberg, which compelled Moreau to make his memorable retreat. In the winter of 1797 he captured Kehl, the only position the French occupied in Germany. Meanwhile Bonaparte had finished his conquest of Italy, and was rapidly pushing his way into the heart of Austria. Charles was sent against him, but it was too late. He was compelled to conclude the treaty of Leoben (1797), which was followed by the peace of Campo Formio. After the fruitless congress at Rastadt he again put himself at the head of the Rhine army, and again defeated his old opponent Jourdan at Ostrach and Stockach. Misunderstandings that arose between him and the Russian generals Suwarow and Korsakow, and his weak state of health, compelled him to throw up his command and retire to Bohemia. In the protracted struggle in the heart of Germany Napoleon's genius was on every occasion triumphant, once only, at Aspern, did Charles snatch a victory from him (May 21, 22, 1809), but the bloody battle of Wagram (July 5, 6) laid Austria at the feet of the French emperor. The military career of Charles closes here. His literary work is comprised in "Principles of Strategy" (1814). In 1815 he married Henrietta Princess of Nassau-Weilburg, by whom he had a numerous family with whom he spent his remaining years. He died April 30, 1847.

Charles Albert, King of Sardinia; born Oct. 2, 1798; was descended from a collateral branch of the royal family, and the son of Charles Emmanuel, Prince of Savoy-Carignan. He was educated in France, and on the breaking out of the insurrection against the Sardinian government in 1821, was nominated regent by Victor Emmanuel

Charles d'Orleans

till the arrival of his brother Charles Felix, in whose favor he had been obliged to abdicate. In 1831 he succeeded to the throne as the nearest heir on the death of Charles Felix, and in the first years of his reign showed himself favorable to the cause of progress by promoting a number of beneficial reforms. Subsequently, indeed, he became more absolute in his views, but after the French Revolution of February, 1848, he granted the nation a constitution, and took the field against Austria on behalf of the revolted peoples of the Lombardo-Venetian kingdom and the duchies of Central Italy. His armies were at first very successful, defeating the Austrians in various encounters, but he was at last repulsed by Marshal Radetzky, and obliged to apply for an armistice. On its expiration he resumed hostilities, but only to endure reverses. The battle of Novara, fought March 23, 1849, proved fatal to the aspirations of Charles Albert and Sardinia. That very day he abdicated in favor of his son, Victor Emmanuel II., afterward King of Italy, and retired to Oporto, in Portugal, where he died July 28, 1849. His remains were conveyed to Turin, where a statue has been erected to his memory.

Charles Augustus. See WEIMAR.

Charles City College a co-educational institution in Charles City, Ia., organized in 1891, under the auspices of the German Methodist Episcopal Church; has grounds and buildings valued at over \$60,000; endowment exceeding \$50,000; volumes in the library, over 2,000; average annual ordinary income, about \$15,000; average number of faculty, 20; average student attendance, 250.

Charles d'Orleans (shärl'dor-lā-än'), a French nobleman and poet, son of Louis d'Orléans, born May 26, 1391. He was the grandson of Charles V. of France, and the father of Louis XII. He was taken prisoner at Agincourt, and kept in captivity in England from 1415 to 1440, when he was ransomed. He wrote a number of lyrics while in prison and after his return to France. At Blois, where he held his court, he gathered together the chief French writers of his time, and took part with them in poetical tournaments, in one of which Francois Villon competed successfully. He has been termed the father of French lyric poetry, but he has no claim to the title. His light and graceful lyrics are the last flowering of the courtly poetry of the Middle Ages; they show no trace of the modern spirit which appears so strongly in the works of his contemporary, Villon. His favorite themes are love and the spring-time; his favorite form is the rondel, with two rhymes, of which he is considered the chief master, as Villon is of the *ballade*,

and Voiture of the *rondeau*. He died in 1465.

Charles Edward Stuart, called **THE PRETENDER**, grandson of James II., King of England, son of James Edward and Clementina, daughter of Prince Sobieski; born in Rome in 1720. The last scion of the royal house of Stuart, from the very cradle he was inspired with an impulse that induced him, at the early age of 22, to attempt the recovery of the throne of his ancestors. Supported by the court of Rome, he went to Paris in 1742, disguised as a Spanish courier, and succeeding in gaining over to his views Louis XV., 15,000 men were on the point of sailing from Dunkirk for England when the English Admiral Norris dispersed the whole French fleet before it had gained the open sea. This prevented the French court from undertaking a second expedition; all the requests of Charles were in vain, and he now resolved to trust to his own exertions. With borrowed money, and seven trusty officers, he landed like a knight-errant, July 28, 1745, at Lochnanuadh, Scotland, from a ship of 18 guns called the "Doutelle," which contained arms for 1,500 men. The attempt succeeded, and he found so many adherents among the discontented Scottish nobles, who went over to his party together with the Highlanders under them, that he was soon at the head of a little army. With this he marched forward, conquered the British troops which advanced to meet him from Edinburgh, captured Perth, and caused himself to be proclaimed Regent of England, Scotland, and Ireland. He also took Edinburgh, Sept. 17, 1745, where he was once more proclaimed regent, and surrounded with his ministers and generals. Sept. 22, 1745, he defeated at Prestonpans an army of 4,000 British under Sir John Cope. He set the prisoners at liberty. His force was now 7,000 strong. With this he advanced, and laid siege to Carlisle, Nov. 15, which, after three days, surrendered, and supplied him with a great number of arms.

He now caused his father to be proclaimed King, and himself Regent of England; removed his headquarters to Manchester, and soon found himself within 100 miles of London, where many of his friends awaited his arrival. The rapid successes of the adventurer made the British government tremble; and a part of the British forces in Germany was recalled. Want of support, disunion, and jealousy among the adherents of the house of Stuart, some errors, and the superior force opposed to him, compelled Prince Charles to retire in the beginning of 1746. The victory at Falkirk (Jan. 28, 1746) was his last. As a final attempt he risked the battle of Culloden, against the Duke of Cumberland, April 16, 1746, in which his army was defeated and entirely dispersed. The prince now wandered about

for a long time through the wilds of Scotland, often without food, and the price of £30,000 sterling was set on his head. Once, when fairly surrounded by enemies, he succeeded in escaping by the devotion and courage of Flora McDonald. He was at last discovered by his most faithful friend O'Neil, a Scottish nobleman; they escaped detection by sailing in a miserable skiff from island to island, and wandering from valley to valley, pursued by a thousand dangers; for constant search was made for Charles in every direction. At Lochnanuadh he was fortunate enough to meet a French frigate which had been sent for his rescue. Sept. 20, 1746, five months after the defeat of Culloden, he sailed from Scotland, and arrived in France destitute of everything. By the interest of Madame de Pompadour Charles now received an annual pension of 200,000 livres for life; he had also 12,000 doubloons yearly from Spain.

The peace of Aix-la-Chapelle (1748) deprived him of all prospects of recovering the throne of Great Britain; and when he heard that his own removal from France was stipulated in the articles of peace, his anger knew no bounds. He was carried under a guard to the frontiers of Italy. He went to Rome, the residence of his father, James III.; but his relations to the Roman court were changed after his father's death, Jan. 1, 1766. His often ridiculous requests in regard to the etiquette to be observed toward him, which he made under the name of Count of Albany, rendered his presence troublesome. He went to Florence till Pius VI. recalled him to Rome by withdrawing his pension. That his family might not become extinct, he married in the 52d year of his age, April 17, 1772, a princess of Stolberg-Gedern; but his violence led to a separation in 1780. He now became addicted to intoxication. He died Jan. 31, 1788, in the 68th year of his life. Three years before he sent for his natural daughter from France, legitimated her, and declared her, on his royal authority, his lawful heiress, under the title of Countess of Albany. His body was carried to Frascati, and entombed in a style worthy of a king. A scepter, crown, sword, and the escutcheons of England and Scotland adorned his coffin; and his only brother then living, the Cardinal of York, performed the funeral services for "dead King Charles." The Cardinal of York received a pension from Great Britain after 1799, and died in Frascati, July 13, 1807.

Charles Emanuel I., Duke of Savoy, surnamed **THE GREAT**; born at the castle of Rivoli in 1562. He proved his courage in the battles of Montbrun, Vigo, Asti, Chatillon, Ostage, at the siege of Berne, and on the walls of Suza. He formed (1590) the plan of uniting Provence to his dominions.

Charles Martel

Philip II. of Spain, his father-in-law, obliged the Parliament of Aix to acknowledge him as the protector of this province, in order by this example to induce France to acknowledge the King of Spain as protector of the whole realm. The Duke of Savoy, not less ambitious, likewise aimed at this crown, and after the death of Matthias desired also to be chosen Emperor of Germany. He likewise intended to conquer the kingdom of Cyprus, and to take possession of Macedonia, the inhabitants of which, oppressed by the Turks, offered him the sovereignty over their country. The citizens of Geneva were obliged to defend their city in 1602 against this ambitious prince, who fell on them by night in time of peace. Henry IV., who had reason to complain of the duke, and whose general, the Duke of Lesdiguières, had beaten Charles Emanuel several times, entered at last into a treaty of peace with him, not disadvantageous to the Duke of Savoy; but he could not remain quiet, and began again a war with France, Spain, and Germany. He died of apoplexy in Savillon in 1630.

Charles Martel, son of Pepin Héristal (mayor of the palace under the last kings of the Merovingian dynasty). His father had governed under the weak Kings of France with so much justice, and so much to the satisfaction of the people that he was enabled to make his office hereditary in his family. Childeric II., King of the Franks, refusing to acknowledge Charles Martel as mayor of the palace, the latter deposed him, and set Clothaire IV. in his place. After the death of Clothaire he restored Childeric, and subsequently placed Thierry on the throne, showing how absolute was the control of the mayor, and that the royal dignity was a mere phantom. Charles Martel rendered his reign famous by the great victory which he gained in October, 732, over the Saracens, near Tours, from which he acquired the name Martel, signifying *hammer*. He died in 741.

Charles the Bold, Duke of Burgundy; son of Philip the Good and Isabella of Portugal; born in Dijon, Nov. 10, 1433; at first bore the name of Count of Charolais, under which he distinguished himself in the battles of Rupelmonde in 1452, and of Morbepue in 1453. His dislike of the lords of the house of Croy, the favorites of his father, was insurmountable; and being unable to procure their disgrace, he withdrew from the court and went to Holland. He was again reconciled, however, with his father, whom he inspired with his own hatred of Louis XI., and placed himself at the head of the party then forming against that monarch, for the purpose of preserving the power in the hands of the feudal nobility. Having passed through Flanders and Artois, he crossed the Somme at the head of 20,000 men, and appeared before Paris.

Charles the Bold

Louis met him at Montlhéry, but was defeated, and had to offer terms of peace at Conans, whereby he gave up to the victor the towns on the Somme and the counties of Boulogne, Guines, and Ponthieu. Charles succeeded his father in 1467, and immediately engaged in a war with the citizens of Liège, whom he conquered and treated with extreme severity. Before this undertaking he had been obliged to restore to the citizens of Ghent the privileges which had been taken from them by Philip the Good. He now revoked his forced concessions, caused the leaders of the insurrection to be executed, and imposed a large fine on the city.

In 1468 he married Margaret of York, sister of the King of England, and resolved immediately to renew the civil war in France; but Louis disarmed him by giving him 120,000 crowns of gold. Oct. 3 of the same year the monarch and the duke had a meeting at Peronne in order to adjust their differences. There the duke learned that the inhabitants of Liège, instigated by the king, had rebelled anew and made themselves masters of Tongres. Charles was enraged. In vain did Louis on oath protest his innocence. The duke finally compelled the king to sign a treaty, the most disgraceful condition of which was that he should march with Charles against the city of Liège, which he had himself excited against the duke. Charles encamped before Liège in company with the king; the city was taken by storm, and abandoned to the fury of the soldiers. Such success rendered the mind of the duke utterly obdurate, and added the last traits of that inflexible sanguinary character which made him the scourge of his neighborhood and led to his own destruction. Edward IV. conferred on him in 1470 the Order of the Garter. Shortly after he received in Flanders Edward himself, who came to seek an asylum with the duke. Charles gave him money and ships to return to England.

About the end of the same year the war between the King of France and the Duke of Burgundy was renewed, and never did Charles show himself more deserving of the name of the Bold, or Rash, than in this war. Forced to sue for a truce, he nevertheless soon took up arms anew, accused the king publicly of magic and poisoning, and, at the head of 24,000 men, crossed the Somme. He took the city of Nesle by storm and caused fire to be set to it. Charles desired to be equal to Louis XI. in dignity and rank as well as in power and formed the plan of enlarging his dominions on the Rhine, and elevating his States into a kingdom under the name of Belgic Gaul. He visited the Emperor Frederick III. at Trèves to obtain the title of king and viceroy-general of the empire, which the emperor had promised him on condition that he should marry his daughter to the arch-

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duke; but as neither would enter first into obligations, they separated in dissatisfaction, and the negotiation was broken off.

Louis, meanwhile, involved Charles in greater embarrassments by exciting against him Austria and the Swiss. Charles now determined to dethrone him, and for this purpose made an alliance with the King of England; but being compelled to hasten to the aid of his relative, the Bishop of Cologne, he lost 10 months before Neuss, which he besieged in vain, and then hastened to Lorraine, to take revenge on the Duke René, who, at the instigation of France, had declared war against him. Having completed the conquest of Lorraine by the taking of Nancy in 1475, he turned his arms against the Swiss; and notwithstanding the representations of these peaceful mountaineers, who told him that all that he could find among them would not be worth so much as the spurs of his horsemen, he took the city of Granson, and put to the sword 800 men by whom it was defended. But these cruelties were soon avenged by the signal victory which the Swiss obtained near the same city, March 3, 1476. The loss of this battle plunged Charles into a gloomy dejection, which disturbed his mind and his health. With a new army he returned to Switzerland, and lost the battle of Murten (Morat), June 22. The Duke of Lorraine, who had fought in the army of the Swiss, led the victors to the walls of Nancy, which surrendered Oct. 6. At the first information of this siege Charles marched to Lorraine to retake the city of Nancy from the Duke of René. He intrusted to the Count of Campo-Basso the charge of the first attack, and though assured of the treachery of this officer, refused to believe it. Campo-Basso protracted the siege, and gave René time to come up with 20,000 men. On the approach of this army he deserted, with his troops, to the enemy, so that the army of Charles now consisted of only 4,000 men.

Against the advice of his council Charles persisted in risking battle with unequal forces. On Jan. 5 or 6, 1477 (John von Müller himself is in doubt respecting the day), the two armies met; the wings of the Burgundian army were broken through and defeated. Carried along with the current of fugitives Charles fell with his horse into a ditch, where he was killed by the thrust of a lance, in the 44th year of his age.

Charleston, a city, port of entry, and county-seat of Charleston Co., S. C.; the first city in population and importance in the State, situated at the confluence of the Ashley and Cooper rivers, 7 miles from the ocean. Charleston has one of the safest and most commodious harbors in the United States, with a depth at the inner harbor of over 40 feet and 22 feet at low

Charleston

water on the bar. It is defended by Forts Sumter and Moultrie and Batteries Sergt. Jasper and Capron. Two bridges connect the city with the W. shore of the Ashley river. Area $5\frac{1}{2}$ square miles; pop. (1890), 54,955; (1900) 55,807; (1910) 58,833.

Topography.—The city is built on a peninsula at an average elevation of 8 to 10 feet above high water. The streets are generally at right angles, and four, King and Meeting streets, and Rutledge and Ashley avenues, run N. and S. the entire length of the city. The first is the principal retail street. At its S. extremity is a beautiful park, named White Point Garden, and to the E. of this is the Battery, a broad esplanade, 1,500 feet long, and affording a grand view of the harbor and forts. The public buildings are grouped about the intersection of Meeting and Broad streets, and consist of the court house, a substantial brick building; the City Hall, an imposing structure, entered by a double flight of steps, and the new Post-office, a magnificent four-story building of Carolina granite, with a tower and all modern appliances, costing about \$500,000. The United States Custom House, near Market wharf on the Cooper river, is a magnificent building, having cost \$3,000,000. In front of the City Hall is Washington Park, containing two handsome fountains and a statue of William Pitt, erected before the Revolution. One of the arms was shot off by the English in 1780. There is also a monument to the Confederate dead. Charleston has one of the best electric street railways in the country, with about 30 miles of track within the city limits, connecting with Chicora Park, about 7 miles from the city, and with the Isle of Palms, a magnificent seaside resort about 10 miles distant. There is a complete system of tidal drainage and the sanitary condition of the city is excellent.

Manufactures.—The Federal census of 1900 reported 364 manufacturing establishments, employing \$12,473,187 capital and 5,027 persons; paying \$1,489,966 for wages and \$5,633,578 for stock used; and yielding products of an aggregate value of \$9,562,387. The principal industries, according to the value of products, were fertilizers (\$3,697,090); bakery products (\$462,993); men's clothing (\$306,250); and lumber products (\$294,350). Among other important industries were cotton compressing, printing and publishing, and the manufacture of bagging, lead, flour and grist, foundry and machine shop products, and clothing. Charleston is the first city in the world in the production of phosphate fertilizers. In 1898 there were 19 establishments engaged in this industry, with an output of 332,912 tons of fertilizers and 481,076 tons of phosphate rock.

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Commerce.—Charleston is the second city of commercial importance in the South. In the calendar year 1900, the imports of merchandise aggregated in value \$1,382,777, and the exports, \$9,811,352. The entrances of shipping (1899) were 11 American sailing vessels of 3,264 tons; 10 American steam vessels of 12,858 tons; 9 foreign sailing vessels of 4,027 tons, and 79 foreign steam vessels of 102,811 tons. The clearances were 2 American sailing vessels of 536 tons; 7 American steam vessels of 12,079 tons; 8 foreign sailing vessels of 3,232 tons, and 63 foreign sailing vessels of 80,418 tons. Total vessels, 189; total tonnage, 219,125. The principal exports are cotton, rice and phosphate.

Banks.—In 1900 there were 3 National and 13 savings and State banks, with an aggregate capital and surplus of over \$2,700,000. There were also 14 building and loan associations in active operation, with aggregate capital amounting to about \$1,500,000.

Education.—At the close of the school year 1897-1898 the children of school census age aggregated 7,916; the enrolment in public day schools was 7,916, and in private and parochial schools (largely estimated), 825; and the average daily attendance in the public day schools was 7,520. There were 94 regular teachers, six buildings used for public school purposes, and public school property of an estimated value of \$150,000. The institutions for higher education include the Memminger High School; Academy of Our Lady of Mercy; High School of Charleston; Porter Military Academy, including the Porter Manual Training Institute; Smith's School for Young Ladies; University School; the College of Charleston, chartered in 1785, and possessing a Museum of Natural History and a library; the South Carolina Military Academy, a State institution established in 1843, one of the foremost military schools in the country, and the State Medical College, chartered in 1852. There were also the Avery Normal Institute and the Wallingford Academy for Colored Youth.

Churches and Charitable Institutions.—Charleston has over 60 churches. The most prominent are St. Michael's, built in 1752-1761, with a tower which can be seen several miles out at sea; St. Philip's (P. E.), the first church built in the city, in the graveyard of which lie the remains of John C. Calhoun; the Circular Church (Congregational), and St. Finbar's Cathedral, rebuilt in 1890. Other noteworthy churches are Grace (P. E.), Westminster (Presbyterian), Citadel Square (Baptist), the Old Huguenot, Unitarian, Bethel and Trinity Methodist, and the Hebrew Synagogue. The most prominent charitable institutions are the Orphan House, founded

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in 1792, the oldest of its kind in the United States; the Enston Home for the Aged; Home for Widows and Daughters of the Confederate Soldiers; the City and the Roper Hospitals; the Alms House, and the Old Folks' Home for Aged Colored People. Among charitable societies are St. Andrew's Society, founded by Scotchmen in 1720, the oldest society in the city, and the South Carolina Society, founded by the Huguenots in 1736, formerly the Two-Bit Club, so called from the sum contributed by each member at each meeting, for the relief of the indigent among themselves.

Finances.—On Jan. 1, 1900, the net debt was \$3,798,200; the assessed valuation of all taxable property, \$17,293,458, or 40 per cent. of the real valuation, of which \$12,394,298 was real estate and \$4,899,160 personal property, and the city tax rate, \$26.50 per \$1,000, to which is added a school tax of \$1.00 and a State and county tax of \$10.62½.

History.—Charleston was founded in 1670, receiving from France about 1685 a large influx of Protestant refugees. It was taken by the British in 1780, but evacuated in 1782. It was here that the first open movement was made in favor of secession. In 1860 and 1861 the harbor was the scene of several conflicts, and Fort Sumter was reduced to ruins. The harbor was blockaded in 1861, and several dismantled hulks were filled with stones and sunk in order to prevent passage. In August, 1863, the city was bombarded, and in February, 1865, after 565 days of continuous military operations, during which period 2,550 shells reached the city, it was occupied by Federal troops. On Aug. 31 and Sept. 1, 1886, the city was partially destroyed by an earthquake. Earth tremblings continued for some months thereafter, but with indomitable energy the city was soon restored to its former beauty and prosperity. On Dec. 1, 1901, a South Carolina Inter-State and West Indian Exposition was opened here.

J. ADGER SMYTH.

Charleston, a city, capital of the State of West Virginia, and county-seat of Kanawha Co., at the junction of the Kanawha and Elk rivers, on the Chesapeake and Ohio, the Ohio Central, and the Charleston, Clendenning, and Sutton railroads, 130 miles S. by W. of Wheeling. It is an important commercial and coal mining center, with steamer communications with all Ohio and Mississippi river ports; has extensive salt springs, State house, Custom house, hospital and opera house, three National banks, several daily and weekly newspapers, and an assessed property valuation of over \$4,000,000. Pop. (1910) 22,996.

Charlestown (Mass.). See BOSTON.

Charlestown, a village and county-seat

Charlet

of Jefferson co., W. Va.; is on a branch of the Baltimore and Ohio railroad, 10 miles S. W. of Harper's Ferry. It is the center of an agricultural region, is noted as being the place of the capture, trial, and execution (Dec. 2, 1859) of John Brown, and has a National bank, several weekly newspapers, and an assessed property valuation of about \$1,000,000. Pop. (1890) 2,287; (1900) 2,392.

Charlet, Nicolas Toussaint (shär-lä'), a French painter and engraver, born in Paris, Dec. 20, 1792; held a clerkship under the Empire, but lost it at the Restoration (1815), and in consequence betook himself to art. After studying awhile under Gros, he gradually formed for himself a style in which he had no rival. The Béranger of caricature, he was especially successful in his sketches of children and military incidents. His drawings numbered about 2,000. Charlet died in Paris, Oct. 29, 1845.

Charlevoix, Pierre François Xavier de (shärl-vwä'), a French Jesuit traveler, born in St. Quentin, Oct. 29, 1682, twice visited Canada, and voyaged down the Mississippi to New Orleans. He published his journal, histories of San Domingo, Japan, and Paraguay, and a "History of New France." He died at La Flèche, Feb. 1, 1761.

Charlock, a small, cruciferous plant with yellow flowers, commonly called wild mustard. It is very common and troublesome in cornfields.

Charlotte, a city and county-seat of Mecklenburg co., N. C.; is on Sugar creek, and the Southern and the Seaboard Air Line railroads, 226 miles N. E. of Atlanta, Ga. It is the trade center of Mecklenburg and surrounding counties, and also the center of the Southern cotton mill industry, having 100 mills within a radius of 200 miles; is the seat of Biddle University and a military institute; has several churches, parks, opera houses, public library, four National banks, and several weekly newspapers. The Mecklenburg Declaration of Independence was adopted here in 1775, and the city was occupied by the British in 1780. Assessed property valuation, about \$5,000,000. Pop. (1890) 11,557; (1900) 18,091; (1910) 34,014.

Charlotte Amalie, the capital of the West Indian island of St. Thomas.

Charlotte Augusta, Princess, daughter of Queen Caroline and George IV., born at Carlton House, Jan. 7, 1796. She was carefully educated and highly accomplished. In 1816 she married Prince Leopold of Coburg, afterward King of the Belgians, and died Nov. 5, 1817.

Charlottenburg, a town of Prussia, on the Spree, about 3 miles from Berlin, with a royal palace and park, and many places

Charlottetown

of amusement, as also a number of industrial and manufacturing establishments. Pop. (1905) 239,559.

Charlottesville, a city and county-seat of Albemarle co., Va.; is on the Chesapeake and Ohio and the Southern railroads, 96 miles S. W. of Washington. It is the seat of the University of Virginia and of Monticello, the home of Thomas Jefferson; is a popular summer resort; has important manufactures, electric lights and street railways, a National bank, several daily and weekly newspapers, and an assessed property valuation of over \$1,500,000. Pop. (1900) 6,449; (1910) 6,765.

Charlottetown, a city of Prince Edward Island, Canada, the capital of the province; in Queen's co.; on Hillsborough bay, at the confluence of 3 rivers, and on the Prince Edward Island and Murray Harbor railways, 117 miles N. by E. of Halifax, 160 miles by rail and water. The city is well laid out, with broad streets at right angles to each other, on a gentle southern slope, and has an excellent harbor which is navigable by the largest ships. The principal business thoroughfares are Water and Queen streets. Queen square is in the heart of the city. King square is planted with trees. The Esplanade, Great George street, and Upper Prince street are the leading residential streets. The surrounding district is wholly agricultural; no minerals exist. The most noteworthy buildings are the Colonial or Legislative building, the court house, the post office, which contains also the customs, inland revenue, and marine and fisheries offices; the Market building, with a large public hall; St. Dunstan's cathedral (Roman Catholic), the finest edifice in the city; Falconwood Hospital for the Insane, Masonic Opera House, Prince of Wales College, and St. Dunstan's College (Roman Catholic). Queen square contains a handsome bronze statue erected in honor of those who fought and of two who were killed in the Boer war. There are fine golf links and club to the E. of the city. Besides St. Dunstan's cathedral there are St. Paul's church (Anglican), St. James (Presbyterian), First Methodist, with other Anglican and Methodist, and also the Baptist and Disciples' churches. The educational institutions are Prince of Wales College (provincial), St. Dunstan's College, a normal school, and a business college. There are three hospitals, including one for the insane, a Young Men's Christian Association building, and a poorhouse. Journalism is well represented by 3 daily newspapers, the "Guardian," the "Patriot," and the "Examiner." An American consul resides here. The leading manufactures for export are condensed milk and tobacco.

Charlton

Manufactories of foundry products, sashes and blinds, agricultural implements, and fishing supplies meet the local demand. The excellent water supply comes from artesian wells outside the city limits. In 1906 the city's assets were \$792,755 and the liabilities \$767,870. Charlottetown was originally called Port la Joie, and was founded by the French in 1750. In 1763 it was ceded by France to Great Britain. In 1775 American privateers attacked the town and carried off the acting governor, but General Washington disapproved the proceeding and ordered the prisoner's return under escort. In 1864 a convention of delegates was held here to discuss the legislative union of the Maritime Provinces, and this broadened into further conferences that resulted in Dominion confederation in 1867. Pop. (1901) 12,080; local est. (1907) 12,500.

Charlton, John, an English artist, born in Bamborough, Northumberland, June 28, 1849. Educated at Newcastle-on-Tyne; studied at Newcastle School of Arts and South Kensington; exhibited at R. A., 1870, and regularly thereafter. Among his paintings are: "A Winter's Day," "The Hall Fire," "Rescue," "Huntsman Courtship," "Gone Away," "Stag at Bay," "British Artillery Entering Enemy's Lines at Tel-el-Kebir," "Ulundi," "Meynard's Requiem," "Bad News from the Front." He died in 1893.

Charlton, John, a Canadian statesman, born near Caledonia, N. Y., Feb. 3, 1829. He was in early life a clerk, but removed to Canada in 1849, and entered business and political life. He was elected as a Liberal to the Canadian House of Commons in 1872, and has held his seat ever since. He is best known as a promoter of moral legislation.

Charm, anything believed to possess some occult or supernatural power, such as an amulet, spell, etc., but properly applied (as the name, derived from Lat. *carmen*, a song, indicates) to spells couched in formulas of words or verses. See also INCANTATIONS.

Charnel-house, a chamber or building under or near churches where the bones of the dead thrown up by grave-diggers were deposited.

Charon (kā'ron), the ferryman who conducted the souls of the departed in a boat across the Stygian lake to receive judgment from Æacus, Rhadamanthus, and Minos, judges of the infernal regions. He received an obolus from every passenger, for which reason that piece of money was placed in the mouths of the dead. He was said to be the son of Erebus and Night.

Charpie, lint for dressing wounds.

Chart

Charras, a resinous substance which exudes from the Indian hemp and is collected for use as a narcotic or intoxicant, forming a considerable article of trade in Asia.

Charron, Pierre (shär-ôn'), a French theologian, born in Paris in 1541. He studied for the law, but after being called to the Paris bar, entered the Church, and became a conspicuous member of the *politiques*, or party of moderate Catholics. He assailed the League in his "Christian Discourses" (1589), vindicated Catholicism against Protestantism in his treatise, "The Three Truths" (1594), and in his chief work, the treatise "On Virtue" (1601), took a skeptical attitude toward all forms of religion. He died in Paris, Nov. 16, 1603. He was a friend and disciple of Montaigne, to whom he was, as a writer, immeasurably inferior, and from whose essays he borrowed freely.

Chart, a representation of a portion of the earth's surface projected on a plane. The term is commonly restricted to those intended for navigators' use, on which merely the outlines of coasts, islands, etc., are represented. A globular chart is a chart constructed on a globular projection. A Mercator's chart is a chart on the projection of Mercator. A plane chart is a representation of some part of the superficies of the earth, in which the spherical form is disregarded, the meridians drawn parallel, the parallels of latitude at equal distances, and the degrees of latitude and longitude equal. A selengraphical chart is a chart representing the surface of the moon; and a topographical chart is a chart of a particular place, or of a small part of the earth.

The United States Coast Survey, a vast undertaking, was begun in 1807, carried on intermittently till 1845, and since then more systematically, save during the Civil War, under Professor Bache, Professor Pierce, and their successors, the superintendent in 1902 being Henry S. Pritchett. In the American service, the coasts of the United States are surveyed and the charts produced by the coast and geodetic survey attached to the Treasury Department, and the unsurveyed foreign coasts are surveyed by the Bureau of Navigation, the charts being produced by the Hydrographic Office, Navy Department. The coast and geodetic charts are sold at from 10 cents to \$1 each, being the cost of printing and paper. Naval vessels are supplied free. The charts are obtainable at coast and geodetic survey agencies at all seaports of the United States. They exhibit accurate and minute topography as far inland as will supply landmarks for the navigator, or serve for purposes of defense; the shore

line at high-water and sanding to mean low-water; soundings, contours, and material of bottom at different depths; bars, channels, sailing ranges and directions; true meridian and compass variation, rocks, reefs, buoys, beacons, lights; tide establishment, detailed explanation of lighthouses and signal stations. They are carefully corrected for every substantial change in any of those features. They range in scale from $\frac{1}{2400}$ (30.401 inches to the nautical mile) to $\frac{1}{1200000}$ ($\frac{61}{1000}$ of an inch to the nautical mile), and comprise sailing charts, general charts, coast charts, and harbor charts.

Charta, Magna. See MAGNA CHARTA.

Charte (shärt), a term originally used to indicate the rights and privileges granted by the French kings to various towns and communities; but applied at present to the fundamental law of the French monarchy, as established on the restoration of Louis XVIII. in 1814. As is well known, it was the violation of an article of the Charte by the ministers of Charles X. that led to the revolution of 1830, the expulsion of that monarch from the throne, and the accession of Louis Philippe, who, on Aug. 29, 1830, swore to a new charter, sensibly modifying that of 1814 in a liberal sense. After 18 years' sway, Louis Philippe was himself expelled from France, Feb. 24, 1848, and therewith the Charte which he was called to support fell to the ground.

Charter, a written instrument, executed with usual forms, given as evidence of a grant, contract, or other important transaction between man and man. Royal charters are such as are granted by sovereigns to convey certain rights and privileges to their subjects, such as the Great Charter, granted by King John (see MAGNA CHARTA), and charters granted by various sovereigns to boroughs and municipal bodies, to universities and colleges, or to colonies and foreign possessions; somewhat similar to which are charters granted by the State or Legislature to banks and other companies or associations.

Charter-house, a celebrated school and charitable foundation in London, England. In 1370 Sir Walter Manny and Northburgh, Bishop of London, built and endowed it as a priory for Carthusian monks (hence the name, a corruption of Chartreuse, the celebrated Carthusian convent). After the dissolution of the monasteries it passed through several hands till it came into the possession of Thomas Sutton, who converted it into an hospital, richly endowed, consisting of a master, preacher, head schoolmaster, with 44 boys and 80 indigent gentlemen, together with a physician and other officers and servants of the

house. Each boy is educated at a certain expense, and each pensioner receives food, clothing, lodging, and an allowance of about £130 a year. The poor brethren must be over 50 years of age, and members of the Church of England. The Charter-house School has been removed to new buildings near Godalming in Surrey, while the non-academic department of the Charter-house still remains in the old buildings. The school has a high reputation, and many lads are educated there other than the scholars properly so called. Several of the famous men who have received their education at the Charter-house are Isaac Barrow, Addison, Steele, John Wesley, Blackstone, Grote, Thirlwall, Havelock, John Leech and Thackeray.

Charter Oak, a tree which formerly stood in Hartford, Conn., in the hollow trunk of which the colonial charter is said to have been hidden. The story is that when Governor Andros went to Hartford in 1687 to demand the surrender of the charter, the debate in the Assembly over his demand was prolonged until darkness set in, when the lights were suddenly extinguished, and a patriot, Captain Wadsworth, escaped with the document and hid it in the oak. The venerable tree was preserved with great care until 1856, when it was blown down in a storm.

Charter Party, an agreement in writing concerning the hire of a vessel and the freight, containing the name and burden of the vessel, the names of the owner, master, and freighter, and every other particular as to rate of freight, duration of voyage, time of loading and unloading, etc.

Charters Towers, a mining township of Queensland, Australia, on the N. spurs of the Towers Mountain, 820 miles N. W. of Brisbane. It dates from the gold discovery here of 1871-1872, and was incorporated in 1877. It has railway connection with Townsville on the coast. Up till 1891, when the pop. was 4,597 (of the field, 14,129), the gold-field had yielded over 2,300,000 ounces. Pop. (1901) 20,976.

Chartier, Alain (shär-tyā), a French poet, born probably in Bayeux about 1386. His contemporaries considered him the father of French eloquence. His poems are often graceful and nervous, and his vigorous prose contains many fine thoughts and prudent maxims. He died in 1449.

Chartist, a name given to a political party in England whose views were embodied in a document called the "People's Charter." The chief points were, universal suffrage, vote by ballot, annual parliaments, payment of members, equal electoral divisions, and the abolition of property qualification for members. These principles were set out in a bill prepared in

Chartist

1838. The party became divided in the following year, the extreme members advocating the employment of force for the attainment of their object. These were known as Physical Force Chartists. They perpetrated great outrages at Birmingham on July 15, 1839, and at Newport in Monmouth, on Nov. 4 of the same year. Inspired by the proclamation of a republic in France early in 1848, they agreed to assemble on April 10 of that year to the number of 200,000 men, and march in procession to Parliament, to present a petition alleged to be signed by 6,000,000 persons. Under the direction of the first Duke of Wellington, the Bank of England, the Post-office, and other public buildings were in consequence temporarily fortified, while troops supported by artillery held the bridges. About 200,000 civilians were sworn in as special constables, among them being William E. Gladstone and Louis Napoleon, afterward the Emperor Napoleon III. The petition was permitted to be delivered, and was found to have only 2,000,000 signatures, many of them forged. The procession was forbidden, its suppression being facilitated by the suggestive fact that only about 20,000 had actually put in an appearance at the place of rendezvous. The rise of the Chartists was in large measure produced by distress, and with rising wages and cheapening food, the movement died away. Some of the most important points of the Charter, and notably household suffrage and vote by ballot, have been accepted by the Legislature and are the law of the land.

Chartres (shär'tr), a town and capital of the department of Eure-et-Loire, France, on the Eure, 48 miles S. W. of Paris. The cathedral is reckoned one of the finest Gothic buildings in France. The town has one of the most important corn markets in the empire, and manufactures hosiery, hats, and leather. This is a very ancient city, being accounted, before the Roman conquest, as the capital of Celtic Gaul. Henry IV. was crowned here in 1594.

Chartres, Robert Philippe Louis Eugène Ferdinand d'Orléans, Duc de, grandson of Louis Philippe; born in Paris, Nov. 9, 1840. He served in the Italian army in 1859, and on General McClellan's staff in 1861-62. After the Revolution of Sept. 4, 1870, in France, he served under an assumed name in General Chanzy's army. In 1871, the banishment of the Orléans family being revoked, he was made major. In 1878 he became colonel, but in 1886 he was expelled from the army by the law excluding members of royal families. Died Dec. 5, 1910.

Chartreuse, La Grande (shär-trēz'), a famous monastery of France, in the depart-

Chasca

ment of Isère, 14 miles N. of Grenoble, among lofty mountains, at an elevation of 3,281 feet above sea level. The access to it is very difficult. It was built in 1084, but having been several times pillaged and burnt down, the present building was erected after 1676. It is of vast extent, and cost an immense sum. During the Revolution, the monks were driven out, and their property, including a valuable library, confiscated and sold; but in 1826 the building, which had escaped, was restored to its original possessors, and till 1903, when they were expelled by the French government, it was the chief monastery of the Carthusians. The monks have long derived their principal subsistence from the sale of the celebrated liqueur, or cordial, which they manufacture under the name of chartreuse, and into the composition of which enter many aromatic herbs, etc. This liqueur has never been successfully compounded elsewhere. After their expulsion in 1903 the monks established themselves in Tarragona, Spain, where they continue to make their famous cordial, being protected by legal decision in their exclusive right to its name.

Chartulary, a collection of charters. So soon as any body, ecclesiastical or secular, came to be possessed of a considerable number of charters, obvious considerations of convenience and safety would suggest the advantage of having them classified and copied into a book or roll. Such book or roll has generally received the name of a chartulary. Mabillon traces chartularies in France as far back as the 10th century, and some antiquaries think that chartularies were compiled even still earlier. But it was not till the 12th and 13th centuries that chartularies became common. They were kept not only by all kinds of religious and civil corporations, but also by private families. Many of them have been printed, and their contents generally are of the greatest value in historical, archæological, and genealogical inquiries. The name is in Scotland applied to the record of feu-charters kept by the superior's law-agent.

Charybdis (ka-rib'dis), an eddy or whirlpool in the Straits of Messina, celebrated in ancient times, and regarded as the more dangerous to navigators because in endeavoring to escape it they ran the risk of being wrecked upon Scylla, a rock opposite to it. There are several whirlpools in this region which may have been dangerous enough to the undecked boats of the Greeks, but none which the modern navigator with due caution may not easily pass.

Chasca, the name under which the ancient Peruvians adored the planet Venus.

Chase, Ann, an American patriot; born in Ireland in 1809; came to the United States in 1818; settled in New Orleans in 1832; removed to Tampico, Mex., in the following year, where she met and married Franklin Chase, United States consul, in 1836. During the War with Mexico, in the absence of her husband, she remained at the consulate to protect the American records. On one occasion a mob attempted to pull down the American flag that floated over the consulate, but she protected it with drawn revolver, and declared that the flag should not be touched except over her dead body. Later through her efforts the city of Tampico was taken. She died in Brooklyn, N. Y., Dec 24, 1874.

Chase, Salmon Portland, an American jurist; born in Cornish, N. H., Jan. 13, 1808; educated at Windsor, Vt., in his uncle's family at Columbus, O. and in Dartmouth College; taught school in Washington, while studying law with William Wirt; opened law practice in Cincinnati, where he edited the "Ohio Statutes," and came to public notice. In 1846 he argued the Fugitive Slave Law with William H. Seward, in a celebrated case, and his support of the anti-slavery cause soon made him a leader of the Liberty party, and a leading spirit in the Free-Soil and Republican parties. In 1849 he was elected to the United States Senate; in 1855 Governor of Ohio; in 1860 was a prominent candidate for the Republican presidential nomination; appointed Secretary of the Treasury by President Lincoln, in 1861, and in 1864 became Chief-Justice, in which office he presided at the impeachment trial of President Johnson. He died in New York city, May 7, 1873.

Chase, Samuel, one of the signers of the American Declaration of Independence; born in Somerset Co., Md., April 17, 1741. His father, a learned clergyman, instructed him in the ancient classics, and subsequently placed him at Annapolis as a student of law. He was admitted to the bar at the age of 20. His talents, industry, intrepidity, imposing stature, sonorous voice, fluent and energetic elocution, raised him to eminence in a very few years. Having become a member of the colonial legislature, he distinguished himself by his bold opposition to the royal governor and the court party. He took the lead in denouncing and resisting the famous Stamp Act. His revolutionary spirit, his oratory and reputation, placed him at the head of the active adversaries of the British government in his State. The Maryland Convention of June 22, 1774, appointed him to attend the meeting of the General Congress at Philadelphia in September of that year. He was also present and conspicuous at the session of December following, and in

the subsequent Congresses during the most critical periods of the Revolutionary War. That of 1776 deputed him on a mission to Canada along with Dr. Franklin, Charles Carroll, of Carrollton, and the Rev. John Carroll, afterward Roman Catholic archbishop of Baltimore. He signed the Declaration of Independence with promptitude, and was an active and able member of Congress almost throughout the war, at the end of which he returned to the practice of his profession. In June, 1783, the legislature of Maryland sent him to London as a commissioner to recover stock of the Bank of England, and large sums of money which belonged to the State. He remained in England nearly a year, during which time he put the claim in a train of adjustment. There he passed much of his time in the society of the most eminent statesmen and lawyers. In 1791 he accepted the appointment of chief-justice of the General Court of Maryland. Five years afterward President Washington made him an associate judge of the Supreme Court of the United States. Political cases of deep interest having been tried when he presided in the Circuit Courts, and his conduct having given much displeasure to the Democratic party, he was impeached by the National House of Representatives. The trial of the judge before the Senate is memorable on account of the excitement which it produced, the ability with which he was defended, and the nature of his acquittal. He continued to exercise his judicial functions with the highest reputation till 1811, in which year his health failed. He died June 19 of that year.

Chase, Thomas, an American educator; born in Worcester, Mass., June 16, 1827; in 1855 became Professor of Philology and Classical Literature at Haverford College, near Philadelphia; in 1875 its president. In 1878 Harvard gave him the degree of LL. D. Among his publications are: "Hellas: Her Monuments and Scenery" (1861); an address on "Liberal Education: Its Aims and Methods." He died in Providence, R. I., Oct. 5, 1892.

Chase, William Henry, an American military officer; born in Massachusetts in 1798; was graduated at the United States Military Academy and commissioned 2d lieutenant of engineers in 1815; became 1st lieutenant in 1819, captain in 1825, and major in 1838. He was engaged in repairing Fort Niagara in 1817-1818; in constructing defenses for New Orleans and the gulf ports in 1819; as superintending engineer for many important works in 1819-1828; and had charge of the defenses in Pensacola harbor, Fla., in 1828-1854. He superintended the improvements of Mobile bay; as senior engineer officer had charge of all the fortifications and river and harbor improvements at the mouth of the Mis-

Mississippi; and took an influential part in all projects connected with the development of the region around Pensacola. He was appointed by President Pierce in 1856 superintendent of the United States Military Academy; resigned before taking charge, and became president of the Alabama and Florida Railroad Co. At the outbreak of the Civil War he entered the Confederate army, and was prominent in the seizure of the Pensacola navy yard. He died in Pensacola, Fla., Feb. 8, 1870.

Chase, William Merritt, an American artist, born in Franklin, Ind., Nov. 1, 1849. He studied painting in oil at the National Academy in New York and subsequently in Europe with Piloty. He has made a specialty of portraits and figure pieces, winning celebrity with "Ready for the Ride," "The Apprentice," and "The Court Jester," and portraits of American ladies. He was appointed instructor at the Brooklyn Art School, in 1881, and elected a National Academician in 1890. In 1896 he conducted an art class to Madrid. He has a studio in New York City.

Chasidim. See PIETIST.

Chasing, the art of working decorative forms in low-relief in gold, silver, or other metals. It is generally practiced in connection with *repoussé* work, in which the figures are punched out from behind and are then sculptured on the front or chased with the graver.

Chasles, Michel (shäl), a French engineer, born near Chartres, Nov. 15, 1793. He entered the *École Polytechnique* in 1812, and on leaving was classed among the engineers; but with rare generosity he renounced his place as an officer in order to assure a career to one of his unsuccessful comrades. In December, 1829, he addressed to the Brussels Academy a memoir on two general principles of geometry, duality and homography. The introduction to this memoir expanded into the well-known "Historical View of the Origin and Development of Method in Geometry," the first edition of which was published in 1837. In 1841 he was appointed to the chair of Machines and Geodesy at the *École Polytechnique*, and in 1846 to that of Higher Geometry, which had just been instituted at the Sorbonne. In 1852 appeared his "Treatise on Higher Geometry"; in 1860, "The Three Books of Euclid's Porisms Reestablished for the First Time"; in 1865, "Treatise on Conic Sections"; in 1870, "Reports on the Progress of Geometry." These, his principal works, are geometrical and historical. His contributions to the "Comptes Rendus" of the Academy of Sciences and to other scientific publications are extremely numerous, and though in the main geometrical, are

not exclusively so. In particular he treated in several memoirs the question of attraction, and gave the first synthetic demonstration of a celebrated theorem of Maclaurin on the attraction of ellipsoids. Two of his memoirs on the properties of cones of the second degree, and on the spherical conics, were translated into English, and published, with additions, by Charles Graves in 1841. During his long life he was the recipient of many scientific distinctions, and he will always be cited as one of the great geometers of the present century. He died in Paris, Dec. 18, 1880.

Chasles, Philarete, a French historical and literary critic, born in Mainvilliers, near Chartres, Oct. 8, 1798. The son of a Jacobin, and educated according to Rousseau, he acquired the point of view which, enlarged by life abroad, makes his essays so unique and instructive. He has written in every imaginable prose form, from a romance to a riddle; but his enduring work is contained in "French Language and Literature from the Beginning of the Sixteenth Century to 1610" (1828); "Studies of Antiquity" (1847); "Studies of the Sixteenth Century in France" (1848); "Journeys of a Critic through Life and Books" (2d series, 2d. ed., 1866-1868); and "Memoirs" (1876-1878). He died in Venice, July 18, 1873.

Chassaignac, Charles Louis, an American physician; born in New Orleans, Jan. 5, 1862; was graduated at the Medical Department of the University of Louisiana; and was president and Professor of Genito-Urinary Diseases at the New Orleans Polyclinic in 1902. He was editor of the "New Orleans Medical and Surgical Journal"; president of the Orleans Parish Medical Society; vice-president of the Louisiana State Medical Society; one of the founders and president of the New Orleans Sanitarium and Training School for Nurses; etc.

Chasse, David Hendrik, Baron (shā-sā'), a Dutch soldier, born at Thiel, in Guelders, March 18, 1765; began his military career when but 10 years of age; became a lieutenant in 1781, and captain in 1787. After the failure of the revolutionary movement he took French service; was appointed lieutenant-colonel in 1793; and two years later found himself marching toward the Netherlands under the command of Pichegru. He afterward fought with the French in Germany and Spain, gaining great distinction, and from Napoleon himself, from his fondness for bayonet charges, the name of "Général Baïonette." He was made a baron by Louis Bonaparte in 1809. As lieutenant-general of the Dutch forces in 1815 Chassé did

good service at Waterloo against his old comrades, the French. As governor of Antwerp he covered himself with glory by his heroic three-weeks' defense of the citadel with 5,000 men against 60,000 Belgians and French (1832). He died in Breda, May 2, 1849.

Chassepot, Antoine Alphonse (shäs-pō), a French inventor, born March 4, 1833; was an employe in the Paris arsenal of St. Thomas, where he became an official in 1858, and in 1863 brought before the government the model of his breech-loading rifle, adopted three years afterward, and subsequently abandoned. It was about 4 pounds lighter than the needle-gun and about 1 pound lighter than the Martini-Henry rifle. He died Feb. 14, 1905.

Chasseur (shäs-er') a male attendant upon persons of distinction, attired in a military dress, and wearing a sword. It is also the name given by the French to bodies of light infantry which act as skirmishers and sharpshooters. The name was originally given to some troops raised in 1815, in imitation of the Jägers of the Austrian army, who were chiefly Tyrolese chamois-hunters, and unerring marksmen. The French Chasseurs are of two kinds, light cavalry and infantry. Every battalion of infantry has a company of Chasseurs, but the term is more particularly applied to that body of men called the *Chasseurs de Vincennes*, who were enrolled and armed with rifles in 1833, and quartered at Vincennes. The Chasseurs of the Italian army are called Bersaglieri. Garibaldi's Chasseurs, that took a prominent part in the Italian war of 1859, and in the campaign against Francis II. of Naples, in 1860, were known as *Cacciatori dei Alpi*, or Alpine hunters.

Chastelard, or Chastelet, Pierre de Bescosel (shät-lär'), a French poet, nephew of the Chevalier Bayard, born about 1540. He was one of the French gentlemen who accompanied Mary Stuart on her return to her native country. The young and handsome poet fell in love with the beautiful queen, and in his madness, believing that his addresses were encouraged, he invaded the bedroom of Mary, was discovered, and ordered to quit the court. Chastelard, however, again concealed himself, Feb. 14, 1563, within a recess in the bedroom of Mary, at Burntisland; and, while her women were undressing her, he rushed out before them all, and attempted to plead for pardon. For this offense he was brought publicly to trial at St. Andrew's, sentenced to death, and hanged; the queen remaining inaccessible to all appeals for mercy on his behalf. As he was about to die, he cried aloud: "Adieu, most lovely and cruel of princesses!"

Chastellux, François Jean, Chevalier de, a French historian; born in Paris in 1734; entered the army in 1749; distinguished himself as colonel in the Seven Years' War, and later served in the American Revolution as major-general under Rochambeau, and gained the friendship of Washington by his amiable character. He published numerous works relating to the United States, including "Voyage dans l'Amerique septentrionale dans les annees, 1780-1782"; "Discours sur les avantages et les dessavantages qui resultent pour l'Europe de la decouverte de l'Amerique"; and translated into French David Humphry's "Address to the Army of the United States." He died in Paris, Oct. 28, 1788.

Chasuble, the upper garment worn by a priest during the celebration of mass. It was originally circular, had a hole in the middle for the head, but no holes for the arms. In later times the sides were cut away to give a freer motion to the arms, and it has now become an oblong garment hanging down before and behind, made of rich materials, as silk, velvet, cloth of gold, and has a cross embroidered on the back.

Chat (*Saxicola*), a genus of small birds in the Thrush family (*Turdidæ*). The bill at the base is broader than its height, and the upper portion is not hooked. The genus includes some 36 species, especially at home in northern temperate regions, frequenting dry, stony places, and nesting in holes. They are lively birds, flitting about rapidly and untiringly in pursuit of insects, on which they chiefly feed. The wheatear (*S. ænanthe*) is a good example, found in Europe, North Africa, and North America, and along with other chats frequent in Great Britain. Yellow-breasted chat is a popular name for a bird common in the United States, and technically known as *Icteria virens*.

Chatard, Francis Silas Mareau, an American clergyman; born in Baltimore, in 1834. He was graduated at Mt. St. Mary's and at St. Urban College (Rome), being ordained a Roman Catholic priest in 1863. He became rector of the American College in Rome and in 1878 Bishop of Vincennes. He has written "Christian Truths" and other works.

Chateaubriand, François Auguste, Vicomte de, a French author and politician; born in St. Malo, Brittany, Sept. 4, 1768. His father was Auguste de Chateaubriand, lord of the manor of Combourg, and he was the youngest of a family of 10, of whom only four sisters and an elder brother reached maturity. His original destination was the French navy, and he studied first at the College of Dol, and afterward at that of Rennes; but he appeared to have no

special vocation for the sea, nor indeed for any of the professions. Latterly he made up his mind in favor of the Church, whereupon he was sent to study at Dinan. His life here was rather an indolent one, made up chiefly of day dreams and desultory studies. He was soon, however, summoned from this to a more active sphere, by receiving the appointment of sub-lieutenant in the regiment of Navarre. At the commencement of the Revolution he was in Brittany, and hurried into Paris to witness the great commotions then taking place there. In the spring of 1791 his ardent and enthusiastic spirit led him to join an expedition to America for the purpose of exploring its Arctic regions, and discovering the Northwest passage. He crossed the Atlantic, landed at Baltimore, and proceeded to Philadelphia, where he had an interview with Washington. In the course of his wanderings in America he one day fell in with an English newspaper, which recounted the flight of Louis XVI. and his arrest at Varennes. The chivalrous spirit of Chateaubriand was stirred, and he conceived himself bound in honor to return to France to assist in succoring the fallen dynasty.

Almost immediately on his return he married Mdlle. de Lavigne, but in contracting this union he does not appear to have been animated by any strong feeling of affection. Very shortly after its celebration he quitted France and joined with other emigrants the Prussian army on the Rhine. At the siege of Thionville he was wounded in the thigh, and left for dead in a ditch. He was picked up by some attendants of the Prince de Ligne, and conveyed in a wagon to Brussels, and for a time he wandered about from door to door, vainly seeking admission. At last he found lodgings in the house of a barber, where he remained for a while, and then passed over to Jersey to join some Breton royalists. On arriving there he was in a delirious state, and continued for some months between life and death. In 1793, believing himself sufficiently convalescent to resume a military life, he crossed over to England, but his health again gave way, and friendless and penniless he continued for a time to wear out a miserable existence in London. He at last found means of earning a subsistence by giving lessons in French and executing translations for the booksellers. In 1797 he published his "*Essai historique, politique et moral sur les Révolutions anciennes et modernes, considérées dans leurs Rapports avec la Révolution Française.*" It was not attended with much success in England, and attracted no notice whatever in France. The essay is pervaded by a strong skeptical spirit in religious matters, but its author's views on this subject were soon to experience a sudden and important change. The

death of his mother in prison, and the accounts of her last moments transmitted to him by his sister, who herself was no more by the time her letter reached her brother, made a deep and lasting impression on the mind of Chateaubriand, and he became a firm believer in Christianity. In the ardor of his conversion he conceived and traced out a rough sketch of his "*Génie du Christianisme.*" In 1800 he ventured to return to France and take up his abode under an assumed name in Paris. Encouraged by the success of an essay on literature, contributed to the "*Mercure,*" he published in 1801 his "*Atala,*" which was afterward introduced as an episode into his "*Génie du Christianisme.*" In the following year appeared his celebrated work, "*Le Génie du Christianisme,*" which may be said to have caused a religious reaction, and inaugurated a new period in the social history of France. The object of Chateaubriand was to demonstrate the superiority of Christianity over all other religions in a poetic and artistic, as well as moral and beneficial point of view. Though a work more brilliant than profound, it is unsurpassed for beauty of language and description and the eloquence of its impassioned appeals. The main charm indeed of the book may be said to lie in its beautiful imagery, drawn from external nature, and more especially from nature as exemplified in the glowing scenery of the New World. In this respect Chateaubriand may be said to have revived in French literature the description of natural scenery and objects which had long been almost unknown. His work attracted the attention and admiration of Bonaparte, and in November, 1803, he was appointed French minister for the Republic of the Valais. This office he resigned in 1804, on receiving intelligence of the execution of the Duke of Enghien, an act which not only cost him the favor of Napoleon, but required the good offices of powerful friends, including the Empress Josephine, to screen him from serious consequences.

In order to give life and tangible form to the theories propounded in the "*Génie du Christianisme,*" he commenced "*Les Martyrs,*" and to qualify himself for describing accurately the scenes amid which the poem is laid, he resolved to make a pilgrimage to the East. In July, 1806, he embarked at Trieste, traversed Greece, Asia Minor, and the Holy Land, then visited the N. coast of Africa, and lastly embarked for Spain, through which he returned to France after a year's absence. In 1809 "*Les Martyrs*" was published, and is considered by many the best of his works. Some of the descriptions, such as the ancient forests of Gaul, the assemblies of the Christians in the catacombs, and the picture of Rome under the emperors, are given with marvelous beauty and effect. In 1811 appeared his

"Itinéraire de Paris à Jerusalem." The restoration of Louis XVIII. was hailed by him with enthusiasm, and a pamphlet entitled "De Bonaparte et des Bourbons," published by him in 1814, was said by the king to have been worth to him an army of 100,000 men. On the second restoration he preserved the title of minister of State, but refused to take office along with Fouché. On the accession of Villèle to power Châteaubriand was appointed ambassador to Berlin, then to London, and in September, 1822, crossed the Alps to represent France at the Congress of Verona. In 1824 he was summarily dismissed from office at the instance of Villèle, and the indignation which he felt at such treatment made him join the ranks of the Opposition, where in the columns of the "Journal des Débats" he fulminated attacks against government. On the accession of the Martignac ministry he again returned to office, and went as ambassador to Rome, but resigned this appointment on Polignac becoming premier. On the Revolution of 1830 he refused to take the oath of allegiance to Louis Philippe, and consequently forfeited his seat in the House of Peers and a pension of 12,000 francs. In 1831 a new work appeared from his pen, entitled, "De la Restauration, et de la Monarchie élective," in which occurs the following singular avowal: "I am a Bourbonist by honor, a royalist by reason and conviction, and a republican by inclination and character." In the same year he published his "Études ou Discours historiques sur la Chute de l'Empire Romain," a work of considerable merit, but exhibiting more of the imagination of the poet than the critical acumen of the historian. Owing to several pamphlets of a legitimist tendency issued by him, he was arrested in 1832, but defended by M. Berryer, and acquitted. In the latter years of his life he published an "Essay on English Literature," a literal prose translation of Milton's "Paradise Lost," and other works. He lived to witness the terrible scenes in Paris in June, 1848, and died July 4 following, in the midst of the season of gloom and mourning, which then enshrouded the capital. His memoirs of himself, on which he had been occupied for many years, appeared after his death, under the title of "Mémoires d'outre Tombe." They possess a great interest, and contain many charming passages, but are at times disfigured by the ebullitions of personal vanity, which formed one of the principal weaknesses of Châteaubriand. He was an intimate friend of the celebrated Madame Récamier, whose feeling toward him amounted almost to worship, and to his last days he reigned supreme in her salon.

Chateau-Lafitte (lä-fēt'), **Chateau-La-**
tour (lä-tör'), and **Chateau-Margaux**
(mär-gō'), famous vineyards, all in the de-

partment of the Gironde, France, furnishing the best of the red wines of Bordeaux.

Chatelard. See CHASTELARD.

Chatfield-Taylor, Hobart Chatfield, an American novelist; born in Chicago, Ill., March 25, 1865; graduated at Cornell in 1886. He has written: "With Edge Tools"; "An American Peeress"; "Two Women and a Fool"; "The Land of the Castanet," etc.

Chatham (chat'am), a town, naval arsenal, and seaport of England, county Kent, on the Medway, about 34½ miles by rail from London. The importance of Chatham is due to the naval and military establishments at Brompton in its immediate vicinity. The royal dockyard was founded by Queen Elizabeth previous to the sailing of the Armada. It has been greatly enlarged in recent years, and has now capacious docks, in which the heaviest warships can be equipped and sent directly to sea. Building-slips, sawmills, metal-mills, etc., and all the requisites of a great naval station are here on the largest scale and in the finest order. The military establishments include extensive barracks, arsenal, and park of artillery, hospital, store-houses and magazines, etc. The town is poorly built, but is defended by a strong line of fortifications which also serve as a flank defense for the metropolis. Pop. municipal borough (1901) 40,753.

Chatham, a city of Ontario, Canada, on the Thames; 67 miles S. W. of London, with a number of mills and foundries, soap and candle works, and an active trade in grain, pork, and wood. Pop. 9,068. Also a port of entry in the N. of New Brunswick, on the Miramichi, 6 miles N. E. of Newcastle, with a good harbor, shipyards, foundries, a Catholic cathedral, and a college. Pop. (1901) 9,068.

Chatham, William Pitt, Earl of, one of the most illustrious statesmen of Great Britain; son of Robert Pitt, of Boconnoc, in Cornwall; born Nov. 15, 1708; educated at Eton and Oxford. On quitting the university he became a cornet in the Blues, and in 1735 represented the borough of Old Sarum (which was the property of his family) in the House of Commons, where he attracted universal notice. He was a powerful opponent of Sir Robert Walpole, who revenged himself by taking away his commission. In January, 1741, he delivered the speech reported by Johnson for the "Gentleman's Magazine," beginning, "The atrocious crime of being a young man, which the honorable gentlemen has with such spirit and decency charged upon me, I shall neither attempt to palliate nor deny"; but it is probable that there is more of Johnson than of Pitt in it. In 1744 he received, on account of his patriotism, a leg-

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acy of £10,000 from the Duchess of Marlborough, and at a later period a considerable estate was bequeathed him by Sir W. Pynsent. He had been appointed gentleman of the bedchamber to the Prince of Wales, but resigned this place in 1745; became in 1746 vice-treasurer of Ireland, paymaster-general of the army, and member of the privy-council. In 1755 he resigned the paymaster's office. In 1756 he was appointed Secretary of State, but was dismissed in the same year on account of his opposition to the Hanoverian policy of George II. The nation was enthusiastically attached to him, and the public discontent was so loudly manifested that he was appointed Secretary of State again in 1757. His great mind now revealed its full force. His ascendancy was complete over the Parliament no less than in the ministry; he aroused the English nation to new activity, and in the space of a few years recovered the superiority over France, annihilating her navy, and stripping her of her colonies. In 1760 he advised the declaration of war against Spain while she was unprepared for resistance, as he foresaw that she would assist France. The elevation of England on the ruins of the house of Bourbon was the great object of his policy. But his plans were suddenly interrupted by the death of George II. George III. was prejudiced against Pitt by his adversary, the Earl of Bute, a statesman of limited views. Pitt therefore resigned his post in 1761, only retaining his seat in the House of Commons. In 1762, when Spain formally allied herself with France, Pitt urged the continuance of the war, by which both States would perhaps have been totally exhausted; but peace was concluded by the opposite party in 1763.

Pitt uniformly supported the cause of the people. Foreseeing the separation of the American colonies from the mother country if the arbitrary measures then adopted should be continued, he advocated, especially in 1766, a conciliatory policy and the repeal of the Stamp Act. In the same year he was invited to assist in forming a new ministry, in which he took the office of privy-seal, and was created Viscount Burton, Baron Pensent, and Earl of Chatham. In 1768 he resigned, as he found himself inadequately seconded by his colleagues. In the House of Lords he continued to recommend the abandonment of the coercive measures employed against America, particularly in 1774; but his warning was rejected, and in 1776 the colonies declared themselves independent. In vain did he renew his motion for reconciliation in 1777; in vain did he declare the conquest of America impossible. On April 7, 1778, though laboring under a severe illness, he repaired to the House, to attack the unjust and impolitic proceedings of the ministers toward

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the colonies. At the close of his speech he fainted and fell backward; he was conveyed out of the House, and afterward removed to his country-seat at Hayes, in Kent, where he died, May 11. The Parliament annexed an annuity of £4,000 to the earldom of Chatham; his debts were paid, and he was honored with a public funeral, and a magnificent monument in Westminster Abbey. Another was erected in 1782 in Guildhall. The sentiments of Lord Chatham were liberal and elevated, but he was haughty, and impatient of contradiction. His private was as estimable as his public character. No literary production of Lord Chatham, except one or two short poems, had appeared until the publication by Lord Grenville, in 1804, of his "Letters" to his nephew, afterward the first Lord Camelford, which contain much excellent advice to a young man, clothed in easy and familiar language, and reflect equal honor on the author's head and heart. Integrity, disinterestedness, and patriotism were united in him with indefatigable industry, promptitude, and sagacity. His speeches were bold and sublime, and his influence over the minds of his audience was irresistible. His ease and dignity, fine voice and masterly gesticulation (in which even Garrick allowed him to be his superior), prepossessed his hearers in his favor, while the perspicuity and power of his arguments carried conviction.

Chatham Island. See GALAPAGOS.

Chatham Islands, a small group in the Pacific, lying 360 miles E. of New Zealand, to which they politically belong. They are the antipodes of Toulouse in France. There are three islands—of which the largest, Chatham Island, is 25 miles long—and some rocky islets. Total area, 375 square miles; pop. (1906) 399, of whom 202 were Maoris and Morioris and 197 Europeans. The Chatham Islands were discovered in 1791 by Lieut. Broughton, of the brig "*Chatham*." A large brackish lake occupies the interior of Chatham Island, which is of volcanic origin and hilly. Stock-rearing and seal-fishing are the chief industries, the islanders having no fewer than 65,000 sheep and about 500 cattle, with which they supply passing whalers. Timber of any size is unknown, so that the native canoe is merely wicker-work bound together by cordage of indigenous flax.

Chatillon-sur-Seine (sha - tē - yōn' - sūr-sen), a town in France, department of Côte d'Or, 45 miles N. W. of Dijon, on the Seine. It is chiefly noted for the congress of the Allied Powers and France, held here in 1814.

Chat Moss, an extensive morass in England, in Lancaster county, covering 6,000 acres, most part of which is now reclaimed and under tillage. George Stephenson, the

Chatrian

celebrated engineer, first utilized this swamp by carrying the Liverpool and Manchester Railway across it, in 1830.

Chatrian, Alexandre. See ERCKMANN, EMILE.

Chatsworth, the seat of the Duke of Devonshire, one of the most splendid private mansions in England; in Derbyshire, on the Derwent, 25 miles N. by W. of Derby. The domain was purchased by Sir William Cavendish, who in 1553 began the old mansion, which, after his death in 1557, was completed by his widow, "Bess of Hardwick," afterward Countess of Shrewsbury. Here Mary, Queen of Scots, was five times imprisoned during 1573-1581. The present edifice includes the old Palladian pile built in 1687-1706 by the first Duke of Devonshire, and the N. wing added in 1820. The façade is 720 feet long, or with the terraces, 1,200 feet. The building is nearly a square, with an inner quadrangle. Chatsworth is famed for its library, and for its pictures and sculptures by Holbein, Titian, Teniers, Murillo, Reynolds, Landseer, Canova, Thorwaldsen, Chantrey, etc. The gardens and park, 10 miles in circuit, offer an exquisite variety of hill and dale. They were laid out by Loudon and Paxton, and are celebrated for their trees, shrubs, rockwork, deer, and waterworks—only surpassed by those at Versailles. The conservatory, unrivaled in Europe, covers nearly an acre, measures 300 by 145 feet, is 65 feet high, and has 70,000 square feet of glass, with a carriage-road through it. Hobbes, the philosopher, lived much at Chatsworth.

Chattanooga, city and county-seat of Hamilton Co., Tenn.; on the Tennessee river, with railroad and steamship communications with all Southern ports. It is situated on high grounds, at the foot of Lookout Mountain, and in the midst of picturesque scenery. It is the site of a National Soldiers' Cemetery, with over 13,000 graves, and the Chattanooga and Chickamauga National Military Park.

Business Interests.—Chattanooga has a larger variety of small industries than any other Southern city. In 1900 there were reported 330 manufacturing establishments, employing \$7,642,695 capital and 5,336 persons; paying \$1,832,733 for wages and \$7,036,567 for materials; and having products aggregating in value \$11,628,800. The principal industries were the manufacture of foundry and machine shop products, furniture, lumber, masonry, and carpentry. It has also a Bessemer steel furnace, rolling mills, cotton mills, car works, etc. There are 3 National banks, with a combined capital of \$550,000, and a surplus of \$363,000, and several State and private banks. The assessed property valuation in 1900 was \$15,000,000.

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Public Interests.—The city has electric lights and street railways. The most notable buildings are the Custom House, of marble; the Baroness Erlanger Hospital, Public Library, Opera House, Grant University (Meth.), Chattanooga Normal University, Chattanooga Female Institute, and Chattanooga Medical College. Besides the educational institutions mentioned, there were in 1899 6 public school buildings, with 4,414 pupils and 88 teachers, and public school property valued at \$500,000; a public high school for white and one for colored students; and two private secondary schools.

History.—Chattanooga was settled in 1836, and was originally called Ross's landing. It was incorporated in 1851, and in 1863 was occupied and nearly destroyed by the Union forces. It was the scene of three of the greatest battles of the Civil War: Chickamauga, Missionary Ridge, and Lookout Mountain. Pop. (1900) 32,490; (1910) 44,604. See CHICKAMAUGA.

Chattels, property movable and immovable, not being freehold. The word chattels is originally the same word with cattle, all property being reckoned in early periods by the number of heads of cattle possessed, or their equivalent. From the fact that cattle were reckoned by the head, it appears probable that they were called *capitalia* (from the Latin *caput*, the head), which became contracted by syncope into *captalia*, and then *catalia*, whence the legal term *catalla*, and our chattels and cattle. Hence the word chattels signified originally only movable property, but in course of time came to be applied to all property not held in feudal tenure. Chattels are divided into real and personal. Chattels real are such as belong not to the person immediately, but dependently upon something. Any interest in land or tenements, for example, is a real chattel; so also is a lease, a rent for a term of years, an interest in advowsons, and so forth. Chattels personal are goods which belong immediately to the person of the owner, and include all movable property. Chattels usually pass to the executor, except such, for instance, as trees, which may not be severed from the freehold, and therefore pass to the heir.

Chatterton, Thomas, an English youth whose genius, eccentricity, and melancholy fate have gained him much celebrity; born in Bristol in 1752, of poor parents. He had not yet learned to read when an old French musical work happened to fall into his hands, the characters of which excited his curiosity. His mother taught him to read from an old black letter Bible. When eight years old he entered a charity school—Colston's, where the workings of his genius lay concealed under the appearance

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of melancholy and incapacity. At about 10 years of age he acquired a taste for reading, which became from that period a kind of ruling passion. His first work, a satire on a Methodist who had abandoned his sect from interested motives, was written at the age of 11½ years. From this time his taste was decided. His melancholy gave way to vivacity and vanity, and dreams of glory, fortune, and immortality. He became particularly fond of antiquities and antique expressions. At the age of 14 he left school, and was articled as apprentice to a scrivener in Bristol. His father, who died before his birth, had accidentally obtained possession of a number of old parchments of the 15th century. Many of these were consumed in the family, but several fell into the hands of Chatterton, who after a few days declared that he had discovered a treasure. He then procured glossaries of the old dialects of the country and in 1768 when the new bridge at Bristol was completed, he inserted a paper in the Bristol "Journal," entitled "A Description of the Friars' First Passing over the Old Bridge, taken from an Ancient Manuscript." He was then but 16 years old. On being questioned as to the manner in which he had obtained it, he finally asserted that he was in the possession of several valuable old manuscripts, taken from an old chest (Canynges Cofre) in Redcliffe Church. He had been engaged for a year in the composition of several poems, which he attributed to different ancient writers, particularly to one Rowley. In 1769 he ventured to write to Horace Walpole, who was then engaged on his "Anecdotes of Painters," giving him an account of a number of painters who had flourished in Bristol, which Chatterton pretended to have discovered along with several ancient poems in that city. Having received a polite answer he wrote a second letter, informing Walpole of his situation, and requesting assistance to enable him to follow his inclination for poetry. Walpole submitted some of the poems sent in a second letter to Gray and Mason, who declared them to be spurious, and he returned them to Chatterton without taking any further notice of him. Discontented with his situation, he obtained a release from his apprenticeship by threatening to put an end to his life, and went to London. The favorable reception which he there met with from the booksellers inspired him with new hopes. He wrote for several journals on the side of the Opposition. He indulged the hope of effecting a revolution, and used to boast that he was destined to restore the rights of the nation. Failing to procure the rewards which he had expected for his exertions in favor of one party, he observed that "he must be a poor author who could not write on both sides." On this principle he acted; but prosperity did not attend his dereliction

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from principle. His situation daily became worse. Although extremely temperate, and often voluntarily confining himself to bread and water, he was frequently destitute even of these necessities. What he gained by his labors he spent partly in presents for his mother and sisters, to whom he always held out the most splendid expectations, partly in public places of amusement, which he continued to visit under the appearance of easy circumstances. At last, after having been several days without food, he poisoned himself in 1770, when not yet 18 years old. His works were more extensively read as the public became acquainted with the history of his misfortunes. The most remarkable are the poems published under the name of "Rowley," which he composed at the age of 15 years. They display a vigorous and brilliant imagination, fertility of invention, and often a deep sensibility. Among the poems which he published under his own name his satires deserve the preference. His prose writings are spirited.

Chaucer, Geoffrey, "the father of English poetry"; born in London probably about 1340. He was the son of a vintner named John Chaucer. Nothing is known of his education, but in 1356-1359 he was a page to Princess Lionel. In 1359 he bore arms in France and was taken prisoner. He was ransomed next year, the king paying \$80 toward the necessary sum. In 1367 his name appeared as a valet of the king's chamber. In 1367 he received a pension of 20 marks, and between 1370 and 1380 he was employed abroad in seven diplomatic missions. In one of these, in 1372, he was sent to Genoa as a commissioner to negotiate a commercial treaty. It is probable that he visited the Italian poet Petrarch on this occasion. In 1374 he was appointed comptroller of the customs on wool at London, a lucrative post, and he also received an annual allowance. In 1377 he was sent to Flanders and France on diplomatic business and next year to Lombardy. In 1382 he was appointed comptroller of the petty customs. In 1386 he was returned to Parliament as knight of the shire for Kent, but in the same year he shared the disgrace of his patron, John of Gaunt, was dismissed from his comptrollership, and reduced to a state of comparative poverty. Three years later, however, he was made clerk of the works at two shillings a day, and afterward had other offices and one or two annuities bestowed upon him, but in 1394-1398 must have been quite poor. In 1399 he got a pension of 40 marks from Henry IV., but did not live long to enjoy it. His most celebrated work, "The Canterbury Tales," was written at different periods between 1373 and 1400. It consists of a series of tales in verse (two

in prose), supposed to be told by a company of pilgrims to the shrine of St. Thomas (Becket) at Canterbury in 1386. In its pages we get such pictures of English life and English ways of thought in the 14th century as are found nowhere else. Besides his great work Chaucer wrote many poems (and others are falsely attributed to him): "The Book of the Duchess" (1369), "The Parliament of Fowls" (1374), "Troilus and Cressida" (1380-1382), "The Legend of Good Women" (1385), "The House of Fame" (1386), etc., some of which are founded on French or Italian works. He also translated "Boethius," and wrote a treatise on the "Astrolabe" (1391) for his son Lewis (who probably died early). He died in London, Oct. 25, 1400, and was buried in Westminster Abbey.

Chaumette, Pierre Gaspard (shō-met'), a French revolutionist; born in Nevers, May 24, 1763. He was some years a seaman, but the opening of the Revolution found him a clerk at Paris. He attached himself to Camille Desmoulins, and soon gained such popularity by his extravagant sansculottism that he was appointed procurator of the commune of Paris. In his zeal he rejected his own Christian name, Pierre, as having been sullied by saintly associations, and styled himself "Anaxagoras." The institution of the tribunal of the Revolution, the decree for a revolutionary army, and the law against suspected aristocrats, were largely due to his efforts. One of his proposals was that all Parisians should wear sabots, another that the Tuileries and Luxembourg gardens should be planted with potatoes. His antics in connection with the "worship of reason" excited the disgust of Robespierre, who devised measures for bringing the whole company of actors under Hébert to the scaffold. He was executed April 13, 1794.

Chaumont (shō-mon), a town of France, capital of the department of Haute-Marne, on a height between the Marne and the Suize, with manufactures in woolens, hosiery, etc. Here the allies (Great Britain, Russia, Austria, and Prussia) signed the treaty of alliance against Napoleon, March 1, 1814.

Chautauqua, a lake in S. W. New York State, 18 miles long, from 1 to 2 miles in width, and about 1,300 feet above the sea. On its banks is the village of Chautauqua, the center of a religious and educational movement of large and growing interest. This originated in 1874, when the village was selected as a summer place of meeting for all interested in Sunday-schools and missions.

Chautauqua System, an educational organization founded in Chautauqua, N. Y., in 1874 by Lewis Miller and Bishop John H. Vincent. Its original object was to apply scientific principles to Bible study and to train Sunday school teachers. It holds annual sessions during the months of July and August at Chautauqua. In 1878 the CHAUTAUQUA LITERARY AND SCIENTIFIC CIRCLE was established to spread the influence of the system throughout the country. The circle aims to promote habits of reading and study in connection with the routine of daily life. The essentials of the plan are: A definite course covering four years, each year complete in itself; specified books approved by the counsellors; an allotment of time by the week and month; a monthly magazine with additional readings and notes; a membership book with review outlines; and other aids. Individual readers have all the privileges of the parent circle, and local circles may be formed by three or more persons. Certificates are issued to all members who complete the prescribed course. In addition to the different courses there are many lectures, concerts, and entertainments. Membership may be acquired by application and the payment of \$5 for books and magazines. In 1904 there were more than 250,000 enrolled members.

Chauveau, Pierre Joseph Olivier (shō-vō), Canadian statesman and writer of prose and verse; born in Quebec, May 30, 1820. Among his contributions to literature were many popular poems, including "Simple Joys," "Donnaconna," "Letters to M. de Puibusque," also many valuable prose works: "Tour of H. R. H. Prince of Wales in America" (1861), "Souvenirs and Legends" (in prose and verse) (1877), and "François Xavier Garneau, His Life and Works" (1883). He died in Quebec, April 4, 1890.

Chauveau-Lagarde, Claude François, a French advocate; born in Chartres, in 1756. He studied law in his native town and began to practice in Paris shortly before the outbreak of the Revolution. He became celebrated for his eloquent defense of those on trial in the Reign of Terror. He was the advocate of Marie Antoinette at her trial and also of Charlotte Corday. Others of his clients were Brissot and Madame Elizabeth of France. His defense of Mirandola saved the latter from the scaffold. In 1814 he was ennobled by the government of the Restoration and two years later he published an account of the trial of Marie Antoinette and Princess Elizabeth. He died in 1841.

Chauvenet, William, an American astronomer and mathematician; born in Milford, Pa., May 24, 1819. He was graduated

at Yale in 1839, and became instructor in mathematics at the Philadelphia Naval Asylum in 1841, professor of mathematics and astronomy at the United States Naval Academy in 1845, and professor of astronomy at Washington University, St. Louis, in 1859. In 1862 he became chancellor of the last institution. He wrote "Spherical and Practical Astronomy," "Elementary Geometry," and similar works. He died in St. Paul, Minn., Dec. 13, 1870.

Chauvinism, a French word derived from Nicholas Chauvin, a soldier of the French Republic and of the First Empire. His name became a synonym for a passionate admirer of Napoleon, and the word *Chauvinism* was formed to signify the almost idolatrous respect entertained by many for the First Emperor, and generally any feeling of exaggerated devotion, especially of patriotism. A vaudeville, "*La Coquarde Tricolore*," in which there was a character named Chauvin, with a song that became immensely popular, fixed the word in the French language. The word is now used to express exaggerated patriotism, jingoism, etc.

Chay, the root of the plant *Oldenlandia umbellata*, used for giving the beautiful red color of the Madras cottons. It grows on the Coromandel coast in India.

Chazars, a people of the Finnic stock known in the 7th century on the shores of the Caspian; in the 9th century their kingdom occupied the S. E. of Russia from the Caspian and the Volga to the Dnieper. Their capital was long at Astrakhan, called by them Balandshar. They were singularly tolerant of all religions, Jewish, Christian, and Moslem; and a large part of the nation formally adopted the Jewish faith from Jews who fled from the persecutions of the Emperor Leo. Cyril converted many to Christianity in the 9th century. The power of the Chazars was ultimately broken in the 12th century by the Byzantine emperors and the Russians.

Chazy Epoch, the name given by American geologists to that division of Silurian time during which the Chazy limestone of New York, Canada, etc., was formed.

Check, or Cheque, a draft or bill on a bank, payable on presentation. A check may be drawn payable to the bearer, or to the order of some one named; the first form is transferable without endorsement and payable to anyone who presents it; the second must be endorsed, that is the person in whose favor it is drawn must write his name on the back of it. Checks are a very important species of mercantile currency wherever there is a well-organized system of banking. The regular use of them for all payments, except of small amount,

makes the transfer of funds a mere matter of cross-entries and transferring of balances among bankers, and tends greatly to economize the use of the precious metals as a currency.

Checkers or Chequers (also called DRAUGHTS), a game played by two persons on a board similar to that used in playing chess. Each player has a set of 12 pieces, consisting of small, round, flat discs, made of wood or ivory; one set being black and the other white. The pieces must all be placed on the same color on the board, in alternate fours in the first three rows before each player. The pieces must move only one square at a time, diagonally and forwards. If an opponent's piece stands in the way, there is no retreat,—the player must either advance or take his adversary's piece. A piece can only be taken, however, when there is a vacant space directly behind it; the attacking piece is lifted over and placed on this vacant square, while the piece leaped over is removed from the board. The object is either to take all the adversary's pieces, or to hem them in so that he cannot play. The game increases in interest toward the close, as those pieces that reach a vacant square on the adversary's king row become kings (or, as some style them, queens), that is, their power is doubled, and they can move backward or forward to all parts of the board. The game of checkers does not require so much science as chess, but it is a favorite recreation with a great number of people. In France it is called *Les Dames*, probably on account of its always having been very popular with ladies.

Cheddar, a parish and thriving village of England, in Somerset county, 18 miles S. W. of Bristol. The dairies in the neighborhood have long been famous for the excellence of their cheese, which is made from the whole milk, and the whey skimmed off, heated, and added to the curd.

Cheduba, an island in the Bay of Bengal, belonging to Burma, about 25 miles off the coast of Arracan; length and breadth, each about 15 miles; area, nearly 250 square miles; pop., 8,534. The soil is fertile and produces tobacco, rice, indigo, pepper, etc. Petroleum is also found.

Cheese, the curd of caseine of milk, with variable quantities of butter and common salt, pressed into molds and ripened by keeping. The various kinds of cheese differ chiefly in the mode of manufacture, the amount of fat which they contain, and in the flavor, which is due partly to the food, and partly to the breed of the animal. In this country, and in England, cheese is made from the milk of the cow, but on the continent of Europe it is made from goat's milk and ewe's milk, while in Arabia it is

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prepared from the milk of the camel and the mare. There are three kinds of cheese, viz., whole-milk, skim-milk, and cream-cheese. Whole-milk cheese is made from unskimmed milk and contains from 20 to 40 per cent of fat or cream, and 30 to 50 per cent of caseine. Skim-milk cheese is poor in fat, containing from 1 to 4 per cent. Cream-cheese contains from 60 to 70 per cent. Authorities differ as to the dietetic value of cheese, some affirming that it is very indigestible, while others assert that it assists digestion. Its digestibility, however, varies with its age, its texture, and its composition, and it is possible that it may produce different effects on different persons. Cream-cheese is more digestible than any other kind of cheese, owing to its containing less caseine. Cheese is rarely adulterated. To suit the public taste it is frequently colored with annatto, or some other vegetable color, and so long as the coloring matter is not injurious, it cannot be considered an adulteration.

Cheese Fly, a small black dipterous insect bred in cheese, the *Piophilæ casei*, of the same family to which the house fly, blow-fly, etc., belong. It has a very extensible ovipositor, which it can sink to a great depth in the cracks of cheese, and lay its eggs there. The maggot, well known as the cheese-hopper, is furnished with two horny claw-shaped mandibles, which it uses both for digging into the cheese and for moving itself, having no feet. Its leaps are performed by a jerk, first bringing itself into a circular attitude, when it can project itself twenty to thirty times its own length.

Cheesewring, **The**, a fanciful appellation applied to a pile of eight stones, 32 feet high, in Cornwall, England; so named from their resemblance to a cheese press. They are probably a freak of nature.

Cheetah, an East Indian name for two species of feline animals, *felis leopardus*, the leopard, and *felis jubata*, the hunting leopard.

Cheever, George Barrell, an American journalist, poet, and clergyman; born in Hallowell, Me., April 17, 1807. He was editor of the New York "Evangelist" from 1845 to 1846, and at different times connected with the New York "Observer" and "Independent." He was an able and vigorous writer and speaker, and the author of a large number of works in prose and verse. Among his publications are: "Studies in Poetry" (1830), "God's Hand in America" (1841), "Poets of America" (1847), "Windings of the River of the Water of Life" (1849), "The Voice of Nature to her Foster-Child, the Soul of Man" (1852), "Lectures on the Life, Genius, and Insanity of Cowper" (1856), arguing that Cowper's religious terrors proved him sane in-

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stead of insane; and "God against Slavery, and the Freedom and Duty of the Pulpit to Rebuke It" (1857). One of his most effective works was "Deacon Giles's Distillery." He died in Englewood, N. J., Oct. 1, 1890.

Cheever, Henry Theodore, an American prose-writer and clergyman, brother of the preceding; born in Hallowell, Me., Feb. 6, 1814. His writings were popular, and include: "The Island World of the Pacific" (1852), "Short Yarns for Long Voyages" (1855), and "Correspondences of Faith and Views of Madame Guyon" (1886). He died in 1897.

Chee-foo (properly the name of the European colony of the Chinese town of Yen-Tai), a treaty port on the N. side of the peninsula of Shan-tung, at the entrance to the Gulf of Pechili, in which it is the only port that remains open throughout the winter. The foreign quarter is in some sense a colony of Shanghai, and, having the best climate of all the treaty ports, it is much resorted to by convalescents. The Chinese town, built on the sandy shore, with exceedingly dirty streets, has fortifications, a signal-station, and about 32,000 inhabitants. As a market for foreign manufactured goods, particularly English cotton yarn and American sheetings, Chee-foo is of great increasing importance. The principal articles of import besides those mentioned are sugar, paper, iron, edible seaweed, matches, and opium. The chief exports are silk, straw-braid, bean-cake, and vermicelli. The Chee-foo Convention, which settled several disputed points between China and Great Britain, and extended certain commercial advantages to the latter country, besides throwing open four new treaty ports, was signed Sept. 13, 1876. Since then the "open door" policy of the United States has tended to widen the relations of this port with the rest of the commercial world. In 1896 American merchandise found a market in Chee-foo to the extent of over \$2,750,000. The port was the scene of a naval demonstration in 1900, when British and American warships threatened to bombard the forts if their hostile attitude was not abandoned. There were 150 missionaries in the city, whose rescue was thus effected. Pop. (1905) est. 82,000.

Cheh-Chiang, or **Cheh-Kiang**, a maritime province of China proper, in which is included the Chusan archipelago. Cheh-Chiang is bounded N. by the province of Chiang-Su (Kiang-Su), E. by the Eastern sea or East China Sea (Tung-Hai), S. by the province of Fu-Chien (Fo-Kien), and W. by the provinces of Chiang-Hsi (Kiang-Si) and Ngan-Hwei (An-Hui or Gan-Hui). As a province, Cheh-Chiang is of great commercial importance, containing three treaty

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ports, Ning-Po, Wan-Chau (Wen-Chow), and Hang-Chau (Hang-Chow), all of which are to be connected with Shanghai by a projected railway under British control. The area of Cheh-Chiang is 36,670 square miles (about that of Kentucky), and the population in 1905 was estimated at 15,000,000. The last census (1882) gave a population of 11,588,692. There are thousands of native Christians. The foreign population was estimated (1905) at 2,750.

The province is mountainous and traversed by rivers, notably the Tsien-Tang and Ta-Kia, which run down to the Eastern sea. The Grand canal affords the only means of internal communication apart from an extensive system of narrow foot roads. Trade in silk and tea is well developed, this province being, with Chiang-Su and Fu-Shien, the first to contain a treaty port, that of Ning-Po, opened in 1844. Beside tea and silk the province produces cotton and sedge for hats and mats. It imports opium, cotton and woolen goods, tin and iron, kerosene oil, indigo and sugar.

Cheh-Chiang is famed for its native system of education. It contains the great religious and literary center of China, Hang-Chow (not to be confused with Hang-Kow or Han-Kow), where thousands of candidates yearly resort for the public examinations. Hang-Chow is also the capital of the province, which is ruled by a viceroy. Marco Polo visited the province in the 14th century, when it contained beautiful temples, now in ruins. The most magnificent architectural feature of the province is the temple of the Queen of Heaven, dating from 1680. Cheh-Chiang suffered severely during the Tai-Ping rebellion in 1861. It contains the gateway to the Grand canal, or system of Chinese waterways. The Italians in 1900 laid claim to part of Cheh-Chiang as a sphere of influence, and demanded the privilege of establishing a port on the coast to be called San Mun.

Cheiracanthus, a genus of ganoid fishes founded by Agassiz for species from the Old Red Sandstone of Gowrie in Forfarshire, Scotland, and of the Orkney Islands.

Cheirromancy. See PALMISTRY.

Cheironectes, the Frog-fish, the name given by Cuvier to a genus of *Acantheropterygian* fishes, comprising some of those fishes popularly known under the name of anglers. They are most grotesquely and hideously shaped, having the pectoral fins supported like short feet on peduncles, by means of which they can creep over mud or sand when left dry by the receding tide. It is also a name given by Illiger to a genus of marsupial animals, the water opossums, in which the hinder feet are webbed.

Cheiroptera, or **Bats**. This order is perhaps the most natural assemblage in the

Cheiroptera

class of mammals. Its essential character is the possession of a patagium, or expansion of the integument of the body which connects the tail throughout its whole length to the hinder limbs as far as the ankle, and thence passes along the side of the body to the fore limbs, which are greatly elongated, and give support and varied movement to the expansion (which is popularly called the wing) by means of the very long and slender digits. Other mammals, as some of the squirrels and the flying lemur, have the power of gliding through the air for some distance, but none of them have the power of sustained flight, nor are the anterior extremities modified in the same way as are those of the bats. The anatomical characters of the order are well seen in the accompanying plate. The bats approach most closely to the *Insectivora*, of which they may be regarded as an extremely modified section. A comparison of the skulls, figs. 5, 13, 14, 20, 22, will show that in general aspect these two orders resemble each other, and agree with the *Carnivora* in the hour-glass contraction which separates the cranial from the facial portions of the skull. But there is not the massive appearance, nor is there the same muscular development that we see in the latter. The vertebrae are broad, and as in the *Lemurs* and *Insectivora* the processes are not prominent. The head of the thigh bone is articulated to the pelvis so that when the animal is resting on the ground the knee points upward and backward, and as a consequence the toes point backward and slightly outward, somewhat after the fashion of lizards. The fibula is rudimentary, so that in fig. 8 only the slender tibia or shin bone is apparent, but an accessory bone or cartilage, *f*, springs from the side of the ankle and supports the edge of the patagium. The long and strong clavicles, *a*, are attached to the expanded head of the sternum, which shows a crest along the middle line, whereby, as in birds, an increased surface of attachment is provided for the powerful muscles which act on the wing; but, unlike birds, the scapula or shoulder-blade is also broad and has a strong keel. The humerus, *o*, is succeeded by the radius, *n*, which alone supports the wrist, *m*, the ulna being imperfect distally (at the end farthest from the body), so that in both extremities there is provision only for upward and downward movement, anything like rotation being checked. The thumb, *l*, consists as usual of two phalanges, the distal of which always supports a nail. The second digit, *k*, sometimes also supports a nail; but when the nail is absent, as is invariably the case with the other three digits, only two phalanges are present in the member. Three kinds of teeth are always present, incisors, canines, and molars. The favorite attitude of rest is hanging head

downward suspended by the hind feet, which are made to turn in the same direction by the free rotation of the bones of the ankle. The intestine varies according to the diet of the animal, the stomach of the insectivora group being of the average size and pyriform shape, while the frugivorous group have a great pyloric, the blood-sucking *Desmodus* a very large cardiac dilatation. The sense of touch is wonderfully developed, as Spallanzani's experiment with blinded bats showed.

The *Cheiroptera* are divided into two sub-orders, *Frugivora* and *Insectivora*. The *Frugivora* have all, with the exception of *Hypoderma*, a nail on the index finger as well as on the thumb; and the index has in all three joints. The crowns of the molar teeth are speedily ground flat, but when entire they are tuberculated and divided by a narrow longitudinal groove. No cutaneous appendages are developed in connection with either nose or ear. *Pteropus* is the most widely distributed genus belonging to this division, all the members of which are found in Eastern Africa, tropical Asia, and Australia. From the sharpness of the muzzle and the brownish-red color they are commonly known as flying foxes, a name unfortunately used also for an insectivore, *Galeopithecus*.

The insectivorous bats are illustrated by the vampire, fig. 9, and by the long-eared and common bat, figs. 10, 11, 12. The obvious difference in the figures, namely, the possession by the vampire of lanceolate or leaf like cutaneous appendages to the nose, furnishes the external guide to the arrangement of the sub-order. The *Istiophora*, as that section is called to which the most blood-thirsty animals belong, include the genus *Desmodus* of South America (which certainly contains blood-sucking species, while that long known as the vampire appears not to be a blood sucker), the leaf-nosed bats (*Phyllostoma*), the horse-shoe bat (*Rhinolophus*), the broad winged bat (*Megaderma*), and the mormops, which, with its rudimentary nasal appendages, forms a transition to the gymnorhinous or naked faced group. The teeth in this group range from 20 in *Desmodus* to 32 in *Rhinolophus* (fig. 13). The *Gymnorhina*, or bats without nasal cutaneous appendages, have the molar teeth sharply tuberculated, and the tragus of the ear is always enlarged so as to form a kind of valve, conspicuous in fig. 11.

The common bats of the genera *Vespertilio* and *Scotophilus* have a very wide distribution, the former being cosmopolitan. In geological time the bats range from the Eocene tertiaries down to the present, the *Istiophora* and *Vespertilio* being among the earliest and most common forms. Lastly, it is noteworthy in connection with the mode of their distribution,

that they are found on oceanic islands on which no other mammals exist, their power of flight giving them a very obvious advantage.

Cheirotherium (kī-rō-thē'ri-um), a name given to a great unknown animal that formed the larger footsteps upon the slabs of the Trias, or Upper New Red Sandstone, and which bear a resemblance to the human hand. It is supposed to be identical with the *Labyrinthodon*.

Cheke, Sir John, an English scholar; born in Cambridge June 16, 1514, educated at St. John's College, and made regius professor of Greek. In 1544 he was appointed tutor to the future Edward VI., and appears likewise to have assisted in the education of the Princess Elizabeth. On the accession of Edward he received substantial signs of favor, was knighted, became Secretary of State in 1553, and was also a Privy-Councillor. On the King's death he supported Lady Jane Grey, and was committed to the Tower. After a few months, however, he was set at liberty and settled in Strasburg; but his connection with the English Protestant church there gave offense to the Catholics in England, and his estates were confiscated. He supported himself by teaching Greek, but in 1556, having been induced to visit Brussels, he was arrested by order of Philip II. and sent prisoner to England. Under threat of the stake he recanted, and received the equivalent of his forfeited estates. His chief distinction was the impulse given by him to the study of Greek. He died in London, Sept. 13, 1557.

Chel-ab-ku-kil, or **Ab-ku-kil-chel**, an Indian priest who lived in Yucatan and flourished in the 15th century. His name is mentioned in almost every Yucatanic legend, and fragments of history composed by him are found in documents of Yucatan and Central American missions.

Chelard, Hippolyte André Jean Baptiste (shā-lär'), a French musician and composer; born in Paris, Feb. 1, 1789. He was the son of a musician. After studying in the various musical centers of Europe, he brought out his first comic opera, "Casa da Vendere," in Naples in 1815. In 1816 he settled in Paris as a teacher of music and violinist. In 1827 his lyrical opera "Macbeth" (with words by Rouget de Lisle) was very successful, and procured for him the place of chapel master to the King of Bavaria. He produced other operas, cantatas, etc. He died Feb. 12, 1861.

Chelifer, a genus of Arachnidans, spiders, which have the appearance of small scorpions without the tail.

Chelmsford, Frederic Augustus Thesiger, Lord, eldest son of the first Lord

Chelmsford

Chelmsford, who was twice lord-chancellor of England; born May 21, 1827, educated at Eton, served in the Crimea and through the Indian mutiny. As deputy adjutant-general he served in the Abyssinian campaign, was nominated C.B., made aide-de-camp to Her Majesty, and adjutant-general to the forces in India (1868-1876), and in 1877 was appointed commander of the forces and lieutenant-governor of Cape Colony. He restored Kaffraria to tranquillity, and was given the chief command in the Zulu war of 1879. After great difficulties with the transport, and some disasters, he gained the decisive victory of Ulundi, before the arrival of Sir Garnet Wolseley, who had been sent to supersede him. On his return to England he was made G. C. B., and in 1884 lieutenant of the Tower. He died April 9, 1905.

Chelone, a genus of turtles, including the tortoise, often written chelonia. Thus, the common green turtle is called by some naturalists *C. midas*, and by others *Chelonia midas*. In botany, the word is applied to a small genus of linariads, closely allied to the Pentstemon. The corolla has a broad-keeled upper lip and scarcely open mouth, giving it some resemblance to the head of a tortoise or turtle, to which it owes its scientific appellation, and the popular name of turtle-head given it in this country. The best-known species is *C. obliqua*, a perennial with creeping roots and flowers in terminal spikes, with corollas mostly of a rosy-purple color.

Chelsea, a city in Suffolk county, Mass.; separated from East Boston by Chelsea creek, and from Charlestown by the Mystic river. It is a suburb of Boston, and is connected with it by ferries, and electric and steam railroads; and the Mystic river is crossed here by a bridge 3,000 feet long. Chelsea has a United States Marine Hospital, United States naval powder-magazine, Soldiers' Home, Fitz Public Library, and Odd Fellows' and Masonic halls. Though Chelsea is in the Boston customs district and most of its business men are directly identified with the interests of Boston, it has extensive manufactories of rubber goods, foundry and machine shop products, leather, cordage, brass goods, pottery, iron and steel, etc. The Federal census of 1900 reported 308 manufacturing establishments, with \$8,211,682 capital and 3,332 hands, and an annual output valued at \$10,333,549. It has numerous churches, high and graded public schools, weekly newspapers, 2 National banks, and an assessed property valuation of over \$23,000,000. Chelsea was settled as Winnisimmet in 1630; was a part of Boston until it was organized as a town in 1738, and

Chemical Affinity

was incorporated as a city in 1857. Pop. (1900) 34,072; (1910) 32,452.

Chelsea, a suburb of London, England, on the Thames, opposite Battersea, and chiefly distinguished for containing a royal military hospital, originally commenced by James I. as a theological college, but converted by Charles II. for the reception of sick, maimed, and superannuated soldiers. The building was finished in 1692 by Sir Christopher Wren. Connected with the hospital is a royal military asylum, founded in 1801, for the education and maintenance of soldiers' children.

Chelyuskin, Cape (formerly North-east Cape, and sometimes called Cape Severo), the extreme N. point of Asia, on a peninsula of the same name, which forms the W. arm of the E. half of the Taimyr peninsula. It is named after a Russian officer who led an expedition thus far in 1742, and here succumbed, with his wife, to the fatigues of the journey; it was not revisited till 1878, when Nordenskjöld, in the "Vega," spent Aug. 19 and 20 here. He found it a low promontory, divided into two parts by a small bay; the lat. of the W. is 77° 36' 37" N., that of the E. 77° 41' N.

Chemical Affinity, the name given to the tendency to combine with one another which is exhibited by many substances; or to the force by which the substances constituting a compound are held together. The tendency of any given element to unite with a number of other elements varies greatly. Chlorine, for instance, unites with great readiness with most metals and with many nonmetallic elements, much heat being produced during the union; but it has little or no affinity for, or tendency to combine with, oxygen, so that compounds of chlorine with oxygen can only be obtained by roundabout methods, and are very liable to sudden and explosive decomposition into chlorine and oxygen. Where the affinity of elements for each other is great, the compounds produced by their union are decomposed with difficulty, and where the affinity is feeble, decomposition is easily effected.

Chemical Combination.—The combination of chemical substances into a compound different from any of the constituents, and having a definite percentage composition, and mostly having their vapor densities the halves of their molecular weights. When such union takes place heat is generally evolved. The constituents of a chemical compound cannot be separated by mechanical means.

Chemical Deposits.—Deposits, like carbonate of lime, thrown down from water by chemical action. They are distinguished

from mechanical deposits precipitated by mechanical means.

Chemical Equivalents.—The relative proportions in which chemical substances will replace one another, according to their atomicity; thus one atom of oxygen, a dyad element, is the chemical equivalent of two atoms of hydrogen, a monad element.

Chemical Formulæ.—The formulæ or symbolic expressions which indicate the chemical constituents of a body, as NaCl indicates that chloride of sodium contains one atom of chlorine and one atom of sodium.

Chemical Nomenclature.—In naming various chemical substances the professors of the science have always had due regard to the constituent elements of the candidate for a title. We append a list of the chemical names of a few common substances:

COMMON NAMES.	CHEMICAL NAMES.
Aqua Fortis	Nitric Acid.
Aqua Regia	Nitro-Muriatic Acid.
Blue Vitriol	Copper Sulphate.
Cream of Tartar.....	Potassium Bitartrate.
Calomel	Sub-Chloride of Mercury, or Mercurous Chloride.
Chalk	Calcium Carbonate.
Salt of Tartar.....	Potassium Carbonate.
Caustic Potash	Potassium Hydrate.
Chloroform	Chloride of Formyl.
Common Salt	Sodium Chloride.
Copperas, or Green Vitriol	Ferrous Sulphate.
Corrosive Sublimate	Bi-Chloride of Mercury, or Mercuric Chloride.
Dry Alum	Aluminum and Potassium Sulphate.
Epsom Salts	Magnesium Sulphate.
Ethiops Mineral	Black Sulphide of Mercury.
Fire Damp	Light Carburetted Hydrogen.
Galena	Lead Sulphide.
Glauber's Salt	Sodium Sulphate.
Goulard Water.....	Basic Acetate of Lead.
Grape Sugar.....	Glucose.
Iron Pyrites.....	Bi-Sulphide of Iron.
Iron Rust.....	Iron Oxide.
Jeweler's Putty.....	Stannic Oxide.
King's Yellow.....	Arsenic Sulphide.
Laughing Gas.....	Nitrogen Protoxide.
Lime	Calcium Oxide.
Lunar Caustic.....	Silver Nitrate.
Mosaic Gold.....	Bi-Sulphide of Tin.
Muriate of Lime.....	Calcium Chloride.
Niter or Saltpeter.....	Potassium Nitrate.
Oil of Vitriol.....	Sulphuric Acid.
Potash	Potassium Oxide.
Red Lead.....	Lead Oxide.
Salammoniac	Ammonium Chloride.
Slaked Lime.....	Calcium Hydrate.
Soda.....	Sodium Oxide.
Spirits of Hartshorn.....	Ammonium Hydroxide.
Spirit of Salt.....	Hydrochloric or Muriatic Acid.
Stucco, or Plaster of Paris	Calcium Sulphate.
Sugar of Lead.....	Lead Acetate.
Verdigris	Basic Acetate of Copper.
Vermilion	Sulphide of Mercury.
Vinegar.....	Acetic Acid (Diluted).
Volatile Alkali.....	Ammonia.
White Vitriol.....	Zinc Sulphate.

Chemistry, the science treating of the relations and combinations of atoms, or, that branch of natural science which considers the combination of two or more sub-

stances to form a third body with properties unlike either of the components; and the separation from a compound substance of the more simple bodies present in it, each possessing distinct properties. Considering that the steps of the combination and decomposition of substances can never be correctly understood without an intimate knowledge of the properties of substances, it follows that the science of chemistry must take into notice likewise the description of all the simplest as well as of the most complex bodies. When the science of chemistry is considered as a whole, including the properties of all the elements or substances, and the combinations and changes which they can under all circumstances undergo, it is distinguished by the title of Pure, Theoretical, or Philosophical Chemistry. Particular departments of Chemistry, where the science is confined to the examination of special objects, receive distinctive names, as Physical Chemistry, or Chemical Physics, which considers phenomena bordering on physics and Chemistry; Mineralogical Chemistry, which takes cognizance of the composition of minerals; Physiological Chemistry, which includes the changes which food undergoes in its transit through the animal economy, and the transformations that take place in substances of organized beings generally; Medical Chemistry, which considers the composition and compounding of medicines; Agricultural Chemistry, which relates to the composition of soils and manures, the ingredients in plants, and the best modes of supplying the food that they require, etc.; Inorganic Chemistry takes cognizance of the metals and compounds generally not derived from hydrogen-carbon types, while Organic Chemistry is best defined as treating of the hydrogen-carbon compounds, or (by a classification no longer recognized in science) of the substance of plants and animals. Chemistry ranks as one of the arts as well as one of the sciences, and the division of Practical Chemistry comprehends the rules and processes which must be followed and the mechanical means for the prosecution of the art. Practical Chemistry is subdivided into Analytical Chemistry (see ANALYSIS), which is occupied with the separation of simple substances from more complex—as chlorine (Cl) and sodium (Na) from the chloride of sodium or common salt (NaCl)—and with the estimation of the quantity of the several ingredients; and Synthetical Chemistry, which has for its object the union of simpler bodies to form more complex—as hydrogen (H) and oxygen (O) to form water (H₂O). The art of assaying is a department of the Analytical Chemistry. Applied Chemistry includes the art of manu-

facturing the various substances entering into commerce and domestic life so far as chemical processes and application are required. It is subdivided into Technical Chemistry, which relates to everything connected with the arts and manufactures, and Pharmaceutical Chemistry, which takes cognizance of substances used in medicine.

History.—The Egyptians, of all nations of antiquity, appear to have had the greatest amount of chemical knowledge. They skilfully preserved dead bodies from decay, fixed colors in silk by means of mordants, prepared many medicines and pigments, as also soap, beer, vinegar, metals and metallic alloys, common salt, vitriol, soda, sal ammoniac, glass, enamel, tiles, and painted earthenware. The Chinese were very early acquainted with the processes for dyeing and the preparation of metallic alloys, the fabrication of niter, sulphur, gunpowder, borax, alum, porcelain, verdigris, paper, etc. From the Egyptians the Greeks and Romans derived what chemical knowledge they possessed, but they added little or nothing; and at the migration of the northern tribes, and the overthrow of the Roman Empire, a stop was put for a time to the advancement of all science in Europe. The prosecution of chemical knowledge was taken up by the Arabs before the 8th century, and was carried on by them and by their European scholars, calling themselves alchemists. The first germs of the real science of chemistry appear about the end of the 17th and beginning of the 18th century, in the speculations of Becher and Stahl. After this chemistry rapidly advanced. In 1718 Geoffrey brought out the first table of affinities; in 1732 Boerhaave published many original experiments on the chemical relations of heat and light; in 1724 Hales, and in 1756 Black, published researches on the air and aeriform bodies, showing that the carbonic acid evolved during fermentation, respiration, and by the action of acids on chalk was different from atmospheric air. In 1754–1759 Margraff added to the then known earths—lime and silica—two others, alumina and magnesia; he also extracted sugar from plants. In 1770 Priestley began to announce his discoveries of oxygen, ammoniacal, hydrochloric and sulphurous acid gases, etc. In 1772 Rutherford discovered nitrogen, and in 1773–1786 Scheele contributed chlorine, hydrofluoric, prussic, tartaric, and gallic acids; also baryta, phosphoric acid from bones, etc., and gave the first hints regarding a new doctrine of combustion. About the same time Bergman and Cavendish enlarged our knowledge of the gases. Lavoisier, between 1770 and 1794, reorganized much of the then known chemistry, and founded a system which still remains the frame-work of the science. Berthollet,

1787, contributed much to the doctrine of affinity, and made researches in chlorine, etc. Fourcroy and Vauquelin advanced Organic Chemistry. Klaproth gave many contributions to Mineral Chemistry. Richter devoted himself to the doctrine of combining proportion in the molecule afterward perfected by Dalton. The discovery of galvanic electricity by Galvani, and its advancement by Volta, led Sir Humphrey Davy and others to important researches in the metals and gases. Gay-Lussac and Thenard advanced the knowledge of organic substances and the chemical relations of heat. Berzelius made laborious researches in mineral chemistry, and gave an exactness to this department which is an astonishment to the chemists of the present day. His determinations of atomic weights still remain in most cases unshaken. He was also the author of the electro-chemical theory, which was almost perfected by the labors of Faraday, De la Rive, Becquerel, etc. Organic chemistry latterly advanced most rapidly under the researches of Liebig, Wohler, Mitscherlich, Mulder, Laurent, and others.

Composition of Chemical Names.—In early times chemical substances were named according to the fanciful theories of Alchemy. Thus the name “flowers of sulphur” was applied to sulphur (sublimed), which grew or sprang like a flower from sulphur when heated; “spirit of salt,” to hydrochloric acid, the corrosive acid or spirit obtained from common salt; and a multitude of other names had a fanciful origin. In 1787 Lavoisier founded the system of nomenclature still followed by chemists. At first it was intended that the name of a simple as well as of a compound substance should be regulated by system, and that it should indicate the nature of its elementary constituents, as well as the relative proportion in which they were present. Hence such terms as oxygen, the acid-producer, given from the notion then held that no acid was without oxygen; and hydrogen, the water-producer, from the supposition that hydrogen had more to do with the formation of water than any other element. The advance of chemistry, however, so completely changed the opinion of chemists regarding the simpler bodies that such names were found to mislead; and thereafter, though such as had been given on this system were retained, their meaning was discarded, and the systematized nomenclature restricted to compound substances. In the non-metallic elements a close analogy exists between chlorine, bromine, iodine, fluorine; and to indicate this the common termination *ine* has been given; and for a similar reason carbon, silicon, and boron end in *on*. As a general rule, however, the chemical name of an elementary substance does not

convey any scientific meaning, and must be regarded as a simple mark or designation, analogous to the names of persons, which give no notion regarding their moral character or physical development. The ancient and more common metals retain their popular titles, such as gold, silver, and copper; but the more recently discovered metals have names given which end in *um*. The symbol of an element is obtained from the abbreviation or first letter of its Latin name, as O for "oxygen"; Pb for "lead" (Lat. *plumbum*). When the names of two or more elements commence with the same letter a smaller letter or satellite is attached to one or more of these; such as S for "sulphur," Se for "selenium," and Si for "silicon." The most common of these are O., oxygen; H., hydrogen, and N. nitrogen. The name of a compound substance generally indicates the elements of which it is composed. Thus the name "ferric oxide" indicates that the red powder is made up of oxygen and iron; the name "plumbic sulphide" (galena) that it is composed of sulphur and lead. In both these cases the adjective is derived from the Latin name of the metal. When two elements combine with each other in more than one proportion or equivalent, the names of the compound bodies are contrived to express this. The term protoxide is applied to a compound of one equivalent of oxygen with one equivalent of another element; binoxide when oxygen is present in the proportion of two equivalents to one equivalent of the other element, and teroxide when the proportion is as three to one, and a sesquioxide when three equivalents of oxygen are present to two of the other element. A suboxide contains less than one equivalent of oxygen; and a peroxide is the highest oxide not possessing acid properties. The same prefixes are applied to the compounds of chlorine, sulphur, etc. When one element combines with another to produce several compounds possessing acid properties various terminations are employed to distinguish the compounds. Thus, oxygen combines with a number of elements to produce with each a series of acid compounds, the more highly oxidized of which receive the termination *ic*, while those containing less oxygen end in *ous*. Thus sulphuric acid contains three equivalents of oxygen to one equivalent of sulphur, and sulphurous acid two equivalents of oxygen with one equivalent of sulphur. These terminations are qualified by the use of the prefixes *hypo* ("underneath") and *hyper* ("over"). Thus "hyposulphuric acid" is applied to a compound containing less oxygen than the sulphuric acid, and "hyposulphurous" to one with less oxygen than sulphurous acid. The same applies to certain other elements,

such as chlorine and sulphur. "Ferrous chloride" indicates the lower chloride, and "ferric chloride" the higher chloride, of the metal iron. When acids combine with bases or metallic oxides to form salts they produce compounds the names of which are influenced by the terminations of the acids. Thus, sulphuric acid and sodium form sodium sulphate; sulphurous acid and sodium, sodium sulphite, and hyposulphurous acid and sodium, sodium hyposulphite. In the same manner nitric acid combined with potassium forms potassium nitrate, while nitrous acid and potassium produce potassium nitrite.

Chemical Symbols.—A symbol denotes one equivalent of the element. Thus, O signifies one equivalent, or 16 parts by weight, of oxygen; C, one equivalent, or 12 parts by weight, of carbon; H, one equivalent, or one part by weight, of hydrogen. The combination of two elements is represented by placing the symbols for those elements side by side; thus, H_2O signifies two equivalents of hydrogen and one equivalent of oxygen in a state of chemical combination (*viz.*, water), and $NaCl$ is one equivalent of sodium (Lat. *natron*) united with one equivalent of chlorine (*viz.*, common salt). When two or more equivalents of one element unite with one or more equivalents of another element the number of such equivalents is signified by a small figure placed immediately after the symbol of the element so multiplied. Thus MnO_2 is one equivalent of manganese with two of oxygen (black oxide of manganese), Fe_2O_3 is two equivalents of iron with three equivalents of oxygen, and Pb_3O_4 is three equivalents of lead with four equivalents of oxygen (red lead). In expressing the formula of a compound substance the symbol of the metal or its analogue is generally placed first in order, and is succeeded by the oxygen, chlorine, or similar element. The same order is carried out in the construction of the formula of more complex substances; the metallic half is placed first. Thus, ferrous sulphate—containing sulphuric oxide and the oxide of iron—is generally expressed as $FeSO_4$. In other words, the symbols are written in the order in which the substances would be named in Latin. In the construction of the formula of complex substances, the comma (,) and the plus sign (+) are often introduced; the former to separate the component radicals or groups of a compound, and the latter to form a line of demarcation where the components are still less intimately combined. Thus, $FeSO_4 + K_2SO_4$ represents a compound of sulphate of iron with sulphate of potassium; $KCl + PtCl_4$ is the double chloride of potassium and platinum. Large figures multiply all the symbols to the right till the end, or till a comma or plus sign appears. Thus, $3SO_3$

represents three equivalents of sulphuric oxide; and $K_2SO_4 \times Al_2(SO_4)_3 \cdot 24H_2O$ (alum) is one equivalent of sulphate of potassium, with one equivalent of sulphate of aluminum and 24 equivalents of water. When a compound substance requires to be multiplied it is enclosed within parentheses, and a large figure placed immediately before it, or a small one directly after it; thus, $3(K_2C_2O_4) + Fe_2(C_2O_4)_3 + 6H_2O$ represents three equivalents of potassium oxalate, one equivalent of ferric oxalate, and six equivalents of water. In expressing the formulas of organic compounds the symbols are generally written in the following order: CHNO. Other arbitrary symbols are occasionally used to represent important complex substances. Two classes of chemical work may be accepted as typical of the science. One is, *analysis* signifying unbinding; and the other is *synthesis*, or putting together. By the first process the chemist ascertains the composition of a substance; by the second process he forms a substance by bringing together and combining the constituents. Analysis has been applied to almost all substances that exist on the earth, as well as meteorites, and it has been found that they are all composed of about 75 constituents which are called *elements*. But of these only 12 enter largely into the composition of the earth.

Metals.—Largely from their physical characteristics, a number of the elements are called metals. They all possess the metallic lustre, are opposite affinity to oxygen, can within certain limits for each case replace hydrogen in acids and other metals in salts. They conduct electricity and heat comparatively well, and are generally solid at an ordinary temperature.

Metalloids.—The non-metallic elements are called metalloids. Some are solid, such as sulphur and iodine, bromine is liquid, and many are gaseous at ordinary temperatures, such as oxygen and chlorine. Some elements are on the border line, such as silicon and arsenic, it being hard to class such definitely as metals or metalloids.

Unsaturated Radicals.—An atom is always unsaturated till, by entering the molecular state, its bond or bonds, or atomicity or atomicities, are satisfied. An atom has only a hypothetical existence, and may be a monad, dyad, etc., up to hexad. The same is to be said of radicals. The number of bonds of any element or radical is an expression of its capacity for combination, the combining capacity of one atom of hydrogen being the unit. The atomic value of an element is ascertained by the number of monad elements combining with the element in question to form a compound vaporizing undecomposed.

Inorganic Chemistry.—The name of this branch of the science was originally derived from the fact that it treats of those elements and compounds that form the inorganic or mineral elements and compounds that form the inorganic or mineral portion of the world. Its significance has been broadened, and now it is defined by the character of compounds and elements, irrespective of their origin. It emerges into organic chemistry, so that an exact line of demarcation cannot be well drawn. In general terms, unlike substances have their highest chemical attraction or affinity for each other. Thus, hydrogen and oxygen, both colorless gases, when brought together and heated, unite with an evolution of light and heat and form water, a liquid at ordinary temperatures. As regards general properties and electric relations, hydrogen, sodium, and potassium may be accepted as representatives of one extreme, and oxygen, chlorine, and iodine of the other. When an element of one extreme unites with that of another, or when two groups, also of unlike properties, unite, a comparatively great amount of energy is set free, usually in the form of heat, and often of electricity. If the uniting elements or molecular groups are similar the energy set free is comparatively small. This amount is absolutely invariable for each case, and has been determined for many combinations. The elements or combinations resembling in their properties hydrogen and the metals are called basic; those at the other extreme are called acid; but these qualifying terms are not very definite. As basic elements, all the metals may be cited; as basic compounds, most of their oxides. As acid elements, chlorine and the other halogens, and also sulphur, may be cited; as acid compounds, the higher oxides of the same. Thus, oxygen, though typical of the acid elements, is itself of constituent of basic groups as well. All organic chemistry is built up on a few types, and by addition to or substitution of atoms of typical molecules almost all its innumerable combinations can be produced. Inorganic chemistry can be treated in the same way. The principal types are: I. Basic oxides.—Oxides of metals. In general terms, the less oxygen they contain the more truly basic they are. Thus, ferrous oxide, FeO , can never play any rôle but that of a base, ferric oxide Fe_2O_3 , generally is a base, and combines as such with acid molecules; but sometimes, as in magnetic oxide of iron, Fe_3O_4 , it approaches in functions an acid group, the rational formula of this oxide being FeO (base) Fe_2O_3 (acid). II. Oxygen and haloid acids.—A combination of an acid-forming oxide, radical or atom, with hydrogen. Chlorine and its congeners have been referred to as acid elements. There-

fore HCl, HI, and HBr are acids, respectively called hydrochloric, hydriodic, and hydrobromic acids. The higher oxides tend to form acids. Thus the trioxide of iron, FeO_3 , united with water, H_2O , forms H_2FeO_4 , or Ferric acid. In discussing oxygen acids, water and an oxide may be treated as the constituent part, as H_2O , FeO_3 , or hydrogen and an acid unsaturated radical, H_2 , FeO_4 . In the latter formula FeO_4 takes the place of an atom of oxygen in water. III. Sulphur and other acids.—These are the analogues of oxygen acids, except that sulphur or some other element may be substituted for oxygen. Thus arsenic acid, H_3AsO_4 , may have its oxygen replaced by sulphur, giving H_3AsS_4 , sulpho-arsenic acid. IV. Salts.—Compounds of an acid radical or atom with a basic element always a true or hypothetical metal. They are formed by replacement of the hydrogen of an acid by a metal. Thus, zinc, Zn , added to sulphuric acid, H_2SO_4 , replaces the hydrogen, giving a salt known as zinc sulphate ZnSO_4 . The hydrogen is set free. As hydrogen is a metal, acids are sometimes called hydrogen salts. V. Hydrates.—Compounds of water with a saturated oxide. Thus, ferrous oxide, FeO , combines with water, H_2O , giving ferrous hydrate, FeH_2O_2 .

Organic Chemistry.—The element carbon may be termed the corner stone of this branch of the science. When a single atom is completely saturated with the monad hydrogen we have the compound whose molecule has the formula CH_4 . This is methane or marsh-gas. A second atom of carbon with two of hydrogen can be inserted, still giving a saturated molecule, C_2H_6 . It is obvious that as many carbon atoms as we wish may in like manner be inserted, provided each carries with it two atoms of hydrogen. The general formula for all compounds thus formed is written $\text{C}_n\text{H}_{2n+2}$. Any compound of the series contains twice as many hydrogen atoms, and two additional, as it does carbon atoms. The series represents very stable compounds, and they are termed paraffines. This series may be termed the basic series of hydrocarbons. Many other series exist in greater or less development. Up to a certain point the hydrocarbons may be structurally represented by chains, as such formulæ as shown are termed. But when the series of $\text{C}_n\text{H}_{2n-6}$ is reached a departure has to be made. The formula for benzole, the lowest member of the series, is C_6H_6 , and it has a ring-like structure. This is called the benzole ring, and on it are based the structural formulæ of a host of organic compounds. In these hydrocarbons the respective atoms of hydrogen may be replaced by other atoms or unsaturated radicals. Thus enough has been said to enable us to give the classification of organic compounds.

I. Hydrocarbons.—Containing even numbers of hydrogen atoms.

II. Alcohols.—Compounds of unsaturated hydrocarbon radicals with hydroxyl (OH).

III. Oxygen Ethers.—Compounds of the same with oxygen.

IV. Haloid Ethers.—Same as the preceding, except that chlorine, iodine, bromine, or fluorine takes the place of oxygen.

V. Sulphur Selenium, and other alcohols, and ethers.

VI. Organic Acids.—Compounds of unsaturated oxygen radicals with hydroxyl.

VII. Acid Halides.—Compounds of such oxygen radicals with chlorine, bromide, etc.

VIII. Anhydrides, or Acid Oxides.—Formed from acids by replacement of hydroxyl by oxygen.

IX. Compound Ethers, or Ethereal Salts.—Formed from acids by substitution of the hydrogen of the hydroxyl radical by a hydrocarbon unsaturated radical.

X. Aldehydes.—Compounds intermediate between alcohols and acids.

XI. Ketones.—Derived from aldehydes by replacement of an atom of hydrogen by an unsaturated hydrocarbon radical.

XII. Amines.—Compound ammonias in which one or more of the hydrogen atoms of the compound NH_3 (containing trivalent N) are replaced by unsaturated hydrocarbon radicals.

XIII. Amides.—Analogous to amines, but containing oxygen radicals in place of hydrocarbon radicals.

XIV. Phenols.—Compounds formed from hydrocarbon formed on the benzole ring type by replacement of hydrogen by hydroxyl; sometimes classed as alcohols.

Several other classes could be produced in both organic and inorganic chemistry, but the above represent the important divisions. For prominent substances or compounds, see the respective titles throughout the work.

Chemistry, Agricultural. See AGRICULTURAL CHEMISTRY.

Chemistry, Animal. See ANIMAL CHEMISTRY.

Chemnitz, a town of Saxony, at the base of the Erzgebirge, and at the confluence of the Chemnitz river, with three other streams, 51 miles S. S. E. of Leipsic. It is the principal manufacturing town of the kingdom—the “Saxon Manchester” its townsfolk call it—its industry consisting in weaving cottons, woollens, and silks, and in printing calicoes, chiefly for German consumption. It supplies the world with cheap hosiery, and makes mixed fabrics of wool, cotton, and jute for the markets of Europe

Chemnitz

and the United States. It has several extensive machine-factories, producing locomotives and other steam-engines, with machinery for flax and wool spinning, weaving, and mining industry. Created a free imperial city as early as 1125, Chemnitz suffered much during the Thirty Years' War. Pop. (1900) 206,584; (1910) 286,465.

Chemnitz, Martin, a German Protestant theologian; born in the mark of Brandenburg in 1522. He was educated at Wittenberg and became a schoolmaster in Wriezen on the Oder. In 1550 he became librarian of Duke Albert of Prussia, and about this time wrote his "Loci Theologici," 1591, a learned commentary on Melancthon's system of dogmatics. He subsequently went as a minister to Brunswick, where he died in 1586. Of his other works the most valuable is the "Examen Consilii Tridentini."

Chemnitzia, (named after Chemnitz, a distinguished conchologist of Nuremberg, who published a work on shells in seven



MARTIN CHEMNITZ.

volumes between A. D. 1780 and 1795), a genus of gasteropodous mollusks, family *Pyramidellidæ*. The shell, which is slender, is many-whorled with a simple aperture closed by a horny subspiral operculum. The animal has a very short head, with a long proboscis. Recent species 32; fossil 240, from the Silurian period onward.

Chemosh, the national god of the Moabites and of the Ammonites; worshiped also in the reign of Solomon at Jerusalem.

Chemulpo, a town on the W. coast of Korea, 25 miles by road W. S. W. of the capital, Seoul. It is one of the three treaty ports opened in 1883 to foreign commerce, the volume of which has since steadily advanced, in spite of the drawbacks resulting

Cheney

from the great difference between high and low water here (33 feet), and the want of wharves. The imports attain a value of \$3,500,000 in some years; the exports, \$1,500,000. Pop., 30,000; the bulk of the 3,000 foreigners are Japanese. Small steamers owned by Japanese run to Seoul in summer, and Chemulpo is connected by telegraph both with China and Japan.

Chemung Period, the name given by American geologists to one of the principal divisions of Devonian time.

Chenab, a river of Hindustan; one of the five rivers of the Punjab. It rises in the Himalayan ranges of Kashmir, and entering the Punjab near Sialkot, flows in a S. W. direction till it unites with the Jehlam; length about 800 miles. At Wazirabad it is crossed by a great iron railway bridge more than a mile long.

Chenavard, Paul (shān-vār'), a French painter of history; born in Lyons in 1808. He studied some years in Italy, and acquired a reputation by his picture of "Mirabeau Replying to the Marquis de Dreux-Brezé." After the revolution of 1848 he received a commission to paint large compositions for the decoration of the Pantheon. Among these are "The Deluge" and "The Passage of the Rubicon." The Pantheon having been restored to the Catholic worship, he was not permitted to finish the task. He died April 12, 1895.

Chenery, Thomas, journalist and Orientalist; born in Barbadoes in 1826, and educated at Eton and Cambridge. He was called to the bar, but was soon after sent out as "Times" correspondent to Constantinople, where he remained during the Crimean war. Afterward he was constantly employed on the "Times" staff until 1877, when he became its editor, a post which he laboriously filled till within 10 days of his death. As a singularly thorough Hebrew and Arabic scholar he had few equals among his contemporaries, and his translation of the Arabic classic, the "Assemblies of Al Hariri" (1867), led to his appointment to a chair of Arabic at Oxford in 1868. He was one of the company of Old Testament revisers, and besides other works published an edition of the "Machberoth Ithiel" (1872), a Hebrew version of the "Assemblies." He died Feb. 11, 1884.

Cheney, Charles Edward, an American clergyman; born in Canandaigua, N. Y., Feb. 12, 1836. He was graduated at Hobart College in 1857, and, after a course at the Theological Seminary of Virginia, was ordained a clergyman of the Protestant Episcopal Church in 1858. Becoming rector of Christ Church, Chicago, he incurred censure for heterodoxy and was tried on that charge and deposed from the priesthood. He at once became a leader in the

Reformed Episcopal movement, and was consecrated bishop of the new denomination in 1873, a post he has since held, as well as the rectorship of Christ Church.

Cheney, Ednah Dow (Littlehale), an American writer; born in Boston in 1824. She became president of the New England Woman's Club and the Massachusetts Suffrage Association. She was author of "Handbook of American History for Colored People" (1866); "Gleanings in the Field of Art" (1881); "Life of Louisa M. Alcott" (1889); and several stories, including "Nora's Return," a sequel to Ibsen's "A Doll's House"; "Sally Williams, the Mountain Girl" (1872); besides other books. She died in 1904.

Cheney, John Vance, an American writer; born in Groveland, N. Y., Dec. 29, 1848; is author of "The Old Doctor" (1885); "Thistle-Drift," poems (1887); and a volume of essays.

Cheney, Theseus Apoleon, an American historian; born in Leon, N. Y., March 16, 1830. His publications include: "Historical Sketch of the Chemung Valley" (1866); "Historical Sketch of Eighteen Counties of Central and Southern New York" (1868); "Laron"; "Relations of Government to Science"; and "Antiquarian Researches." He died in Starkey, N. Y., Aug. 2, 1878.

Chenier, Andre Marie de (shā-nyā'), a French poet; born in Constantinople, Oct. 30, 1762. He went to France when very young, and entered the army, but left six months after to devote himself to literary pursuits. He was for about three years secretary to the French embassy at London, but in 1790 returned to Paris. Advocating the doctrine of a limited monarchy, he made himself equally offensive to the Royalist and the Jacobinical party. In consequence of his attacks on the Jacobins he was condemned by the revolutionary tribunal, and executed July 20, 1794. Although but little known in his own day, Chénier has long been regarded as one of the finest French poets of his century, his chief characteristics being purity of form combined with vigor of thought and diction. He wrote idyls, elegies, odes (including one to Charlotte Corday), dithyrambs, philosophic pieces, etc. The maturity, breadth and soundness of his judgment in poetical composition are demonstrated by his poem on "Invention." Of the same year is his fine idyl "Liberty." Similar in spirit to this, and of perfect Pindaric form, is the "Dithyrambic on the Tennis Play" (1791). In his prison of St. Lazare he composed a beautiful elegy, "The Girl Captive."

Chenier, Marie Joseph de, a French dramatist; younger brother of André M. Chénier; born in 1764. He was a Jacobin, and member of the Legislative Assembly in the Revolution. His tragedies—"Charles IX." (1789); "Henry VIII." and "Calas" (both 1791); "Caius Gracchus" (1793); and others—brought him fame and success by the accordance of their republican and revolutionary sentiments with the public opinion of the time, rather than by their merits as compositions. His national songs were approved by the best test of such productions,—popularity: one of them, "The Parting Song" (*Partant pour la Syrie*), is hardly less famous than the "Marseillaise." His satires are full of spirit, point and wit, but often rancorous and unjust. He died in 1811.

Chenille, a round fabric or trimming, made by uniting with two or more sets of warps, either by weaving or twisting, a fine filling or weft, which is allowed to project beyond the warps. This filling is cut at its outer edges, and the fabric is then twisted, assuming a cylindrical shape with weft projecting radially from the central line of warps.

Chenonceaux (shā-nôn-sō'), a famous French château, standing partly on an island in the Cher, partly on a bridge spanning the river, near a station 20 miles E. by S. of Tours. It was begun in 1524 by the Chancellor Thomas Bohier, continued by Diana of Poitiers, and completed by Catharine de' Medici, who richly embellished the building, and surrounded it with a beautiful park. It passed into the hands of the Condés, and afterward of Madame Dupin, widow of a *fermier général*, who here was visited by Montesquieu, Bolingbroke, Voltaire, Rousseau, Buffon and others. The castle is in excellent preservation; it possesses a fine chapel, a theatre, and memorial of its former occupants in furniture, personal relics, ciphers, and a collection of portraits.

Chenopodiaceæ, the goosefoot family, a natural order of *monochlamydeous dicotyledons*, characterizing Lindley's chenopodal alliance. The species are inconspicuous herbs or undershrubs, found in waste places in all parts of the world, but abounding in extra-tropical regions. Some are used as potherbs, as spinach, orach, beet, etc. The *mangold-wurzel* is a variety of beet used for the food of cattle. In 1866 there were 74 genera and 533 species known.

Cheops (kē'ops), the name given by Herodotus to the Egyptian despot whom the Egyptians themselves called Khufu. He belonged to the rulers who had for their capital Memphis; lived about 2800–2700 B. C., and built the largest of the pyramids. Ac-

Cherasco

according to Herodotus he employed 100,000 men on this work constantly for 20 years.

Cherasco (ker-as'kō), a walled town in the province of Cuneo, North Italy, 37 miles S. S. E. of Turin. In the Middle Ages Cherasco was one of the chief fortresses of North Italy, but its works were destroyed by the French in 1801. A peace was concluded here between Louis XIII. of France and the Duke of Savoy in 1631, and another between the Sardinian commissioners and Napoleon in 1796.

Cherbourg, a strongly fortified arsenal and seaport of France, in the department of La Manche (The Channel), 196 miles W. N. W. of Paris; on the N. coast of the peninsula of Cotentin, and nearly due S. of Southampton. It consists of the old or civil town, and the new or military (Port Militaire), the latter quite distinct from the former, and separated from it by the fortifications with which it is surrounded. Apart from its consideration as a naval station, Cherbourg is unimportant; it is the works by which it has been converted into a great naval fortress and place of arms that give it its special importance. These altogether have cost £8,000,000, and were chiefly carried out under Napoleon I., Louis Philippe, and Napoleon III. Foremost among them must be mentioned the *digue*, or breakwater, stretching across the entrance to the roadstead, which was formerly open to heavy seas from the N. It is more than 2 miles in length, of very massive construction, and consists of a W. or longer and an E. or shorter portion, forming at their junction a very obtuse angle pointing toward the N. Here there are a fort and lighthouse, and there are also a fort and lighthouse at either end. The breakwater alone cost about £2,700,000. The E. entrance to the harbor, between the breakwater and the island of Pelée, is about 500 yards wide; the W. entrance, between the breakwater and Fort Chavagnac (on a rocky islet), is about 1,000 yards, with a depth of 36 feet. It is the latter that large ships of war make use of.

The Port Militaire has three great basins for war vessels—an outer accessible at all states of the tide for vessels of the largest class; a floating basin communicating with this by gates; and a third communicating with both by similar gates. The aggregate water area of the three basins is about 56 acres, the depth of water being from about 30 to 50 feet. They have been excavated from the solid slate rock which forms the foundation of the entire dockyard, much of the excavated material being used in the construction of the breakwater. There are also slips for vessels of the largest dimensions, dry docks, building sheds, masts-houses, boiler works, and in short everything necessary for the building and fitting out of ships of war. The numerous forts

Cherbuliez

and other works with which Cherbourg is defended render it, if not impregnable from the sea, at least very difficult of attack. The commercial town has quite a modern aspect, the streets being generally wide, regular, well paved, and clean, but it is rather dull and uninteresting. There is an outer harbor, entered from the sea by a passage between two jetties, and an inner harbor or floating dock. The principal industry of Cherbourg is centered in the works of the dockyard, the commercial trade and manufactures being comparatively small.

Cherbourg is supposed to occupy the site of a Roman station, which is said to have borne the name of Cæsaris Burgum. Aigrold, King of Denmark, we are told, resided here about A. D. 945. William the Conqueror founded a hospital in it, and built the castle church. The English held possession of the place till about 1200. The castle, in which Henry II. frequently resided, was one of the strongholds of Normandy, and escaped the fate of the town, which, about 1295, was pillaged by an English fleet from Yarmouth; but it sustained afterwards three memorable sieges, in 1378, 1418, and 1450. In 1758 the town was taken by the English without opposition, notwithstanding that the garrison was large. They kept possession of it eight days, destroyed the fortifications, carried off the artillery and the bells, and only retired after having exacted a heavy ransom from the inhabitants. The completion of the fortifications was celebrated by Napoleon III. in 1858, the festivities being graced by the presence of Queen Victoria. A statue of Napoleon I. was unveiled on the occasion. Pop. (1901) 42,952.

Cherbuliez, Victor (shär-bü-lya'), a French romancist; born in Geneva, of a noted family of littérateurs, July 19, 1829. Having studied in the universities of Geneva, Paris, Bonn, and Berlin, he was for a time an educator at Geneva; but in 1864 became one of the editors of the "Revue des Deux Mondes." He first gained distinction as art critic and observer of public affairs, as also by his romances, under the pseudonym "G. Valbert." He wrote a volume of art travels in Greece; "A Horse by Phidias"; "Political Spain"; "Foreign Profiles"; "Art and Nature"; etc. His romances are characterized by clever treatment of the problems of domestic and social life and a fine psychological analysis, with a marked bias for description of odd characters. Among his most successful novels—and their success has hardly been less abroad than at home—are: "Romance of a Respectable Woman" (1866); "Ladislas Bolski's Adventure" (1869); "Samuel Brohl & Co." (1877). The last two were dramatized, but won little popular favor on the stage. He died in Paris, July 1, 1899.

Cheribon (sher'i-bon), a seaport in the island of Java, capital of the province of the same name. The province lies on the coast toward the N. W., produces coffee, timber, areca-nuts, indigo, and sugar, and has about 770,000 inhabitants. The town lies in a deep bay on the N. coast, and is the residence of a Dutch governor.

Cherimoyer, the fruit of the *Anona Cherimolia*, a native of South and Central America, allied to the custard-apple. It is a heart-shaped fruit with a scaly exterior, and numerous seeds buried in a delicious pulp. Both flowers and fruit emit a pleasant fragrance. This fruit is now cultivated in various tropical regions.

Chernigov, a government of Russia, situated in the basin of the Dnieper, which forms part of its boundary; area, 20,232 square miles; capital, Chernigov. The surface is mainly level, and the soil is fertile, being watered by numerous streams. The Desna, with its chief affluents, traverses this region. All grains grow in abundance, and vegetables are easily cultivated. Tobacco is also raised. Wood is plentiful. Saltpeter and porcelain clay are the principal mineral products. Brandy is largely distilled by the people. The interior trade is mostly confined to annual fairs. Cattle, corn, brandy, potash, honey, and wax are exported. Pop. (1897) 2,316,818.

Cherokee Indians, a tribe of the Appalachian family of North American aborigines, which occupied for centuries the country E. and S. of the Alleghanies. After the colonization of North America by the whites, a series of wars broke out at periods ranging from 1759 to 1793; when, by a treaty entered into with the United States, they ceded their territory in the Southeastern States, in consideration of a certain cash payment, and an annual subsidy being continued to them. In 1805 they made further concessions of their lands, and, in 1812, fought bravely on the American side. In 1838 all but a small remnant, who remained in North Carolina, were removed to the Indian Territory, now a part of Oklahoma, where they occupied an area of 7,861 square miles. They have a chief, an assistant, and a legislature, all chosen by vote; have an orphan asylum, seminaries, and private schools. Their capital is Tahlequah. In 1899 they numbered 32,161.

Cherry, a fruit-tree of the prune or plum tribe, very ornamental and therefore much cultivated in shrubberies. It is a native of most temperate countries of the Northern Hemisphere, and in Great Britain is quite common in the wild state, besides being cultivated for its fruit. The cultivated varieties probably belong to two species, *Cerasus avium* and *Cerasus vulgāris*, the genus *Cerasus* being considered a sub-genus of *Prunus*. They are numerous, as the red

or garden cherry, the red heart, the white heart, the black cherry, etc. The fruit of the wild cherry, or *gean*, is often as well flavored, if not quite so large, as that of the cultivated varieties. It is said that this fruit was brought from Cerasus, in Pontus, to Italy, by Lucullus, about B. C. 70, and introduced into England by the Romans about A. D. The cherry is used in making the liqueurs Kirschwasser and Maraschino (which see). The wood of the cherry-tree is hard and tough, and is very serviceable to turners and cabinet-makers. An ornamental but not edible species is the bird-cherry (which see). The American wild cherry (*Cerasus virginiana*) is a fine large tree, the timber of which is much used by cabinet-makers and others, though the fruit is rather astringent.

Cherry-laurel, an evergreen shrub, *Cerasus Laurocerasus*, common in nurseries. The leaves have a flavor resembling that of bitter almonds.

Chersonese (ker'zon-ēz), a peninsula; united by an isthmus to the main-land. There were many Chersonese, of which the most celebrated are the Peloponnesus; the Thracian, at the S. of Thrace and W. of the Hellespont, where Miltiades led a colony of Athenians; the Taurica, now the Crimea, situate near the Palus Mæotis; the fourth called Cimbrica, now Jütland, in the N. part of Germany; and the fifth, surnamed Aurea, now Malacca, in India, beyond the Ganges.

Chersonese. See GOLDEN CHERSONESE.

Chert, a variety of quartz, called also Hornstone or Rock-flint. It is less hard than quartz, and is usually amorphous, sometimes globular or in nodules. Siliceous concretions occurring as nodules and layers in limestone rocks are also called Chert.—Chert-stone, a patented preparation of the nature of cement, much used for pavements in cities in the United States.

Cherub, (Heb. *kerub*, or *kerubim*: sometimes written in the plural, improperly, cherubims), a celestial spirit which, in the hierarchy, is placed next in order to the seraphim. All the several descriptions which the Scripture gives us of cherubim differ from one another, as they are described in the shapes of men, eagles, oxen, lions, and in a composition of all these figures put together. The hieroglyphical representations in the embroidery upon the curtains of the tabernacle were called by Moses (Ex. xxvi: 1) cherubim of cunning work.

Cherubini, Luigi Zenobio Salvatore (ker-ö-bē'nē, or shār-ü-bē-nē), founder of the French Conservatory and instructor of hundreds of eminent musicians; born in Florence, Sept. 14, 1760. In his 13th year, by his early compositions—a mass and

an intermezzo — he attracted the attention of Sarti, who received him as a pupil. In the interval from 1780 to 1788, he composed eleven Italian operas, including "Ifigenia in Aulide," the most successful of the series. In 1784 he visited London. After 1786 Cherubini resided chiefly in Paris, whence his fame rapidly extended over Europe. Besides the "Ifigenia," his chief pieces are "Démophon" (1788); "Lodoiska" (1791); "Elisa" (1794); "Médée" (1797); the "Portuguese Inn" (1798); "Les Deux Journées," and "Anacreon." Cherubini also composed church music, chamber music, etc., of singular beauty, with success. He died in Paris, March 15, 1842.

Cherusci (châr-ös'chē), a German tribe first mentioned by Cæsar, whose exact locality is somewhat uncertain, save that they touched the Weser and lay N. of the Harz Forest. They are chiefly memorable in connection with their great leader Arminius.

Chervil, the popular name of umbelliferous plants of the genus *Chærophyllum*, especially of *Chærophyllum temulum*, the only British species, a hairy weed with longish grooved fruits. Garden chervil is *Anthriscus cerefolium*, an umbelliferous plant much used in soups and salads in some European countries. The parsnip chervil (*A. bulbosus*) has a root like a small carrot, with a flavor between that of a chestnut and a potato. Sweet chervil, sweet cicely, or myrrh is *Myrrhis odorata*, an aromatic and stimulant umbellifer formerly used as a pot-herb, growing in a semi-wild state in Great Britain.

Chesapeake Bay, in Maryland and Virginia, and dividing the former State into two parts, is the largest inlet on the Atlantic coast of the United States, being 200 miles long, and from 4 to 40 broad. Its entrance, 12 miles wide, has on the N. Cape Charles, and on the S. Cape Henry, both promontories being in Virginia. The bay has numerous arms, which receive many navigable rivers, such as the Susquehanna on the N., the Potomac, Rappahannock, and York on the W., and the James on the S. W. Unlike the shallow sounds toward the S., this network of gulfs and estuaries, with its noble feeders, affords depth of water for ships of any burden, virtually carrying the ocean up to the wharves of Baltimore and the arsenal of Washington.

Cheselden, William, an English surgeon and anatomist, born in Leicestershire, Oct. 19, 1688; went to London to prosecute his studies and at the age of 22 began to give lectures on anatomy. In 1713 he published a treatise on the "Anatomy of the Human Body," long esteemed a favorite manual of the science. In 1723 he pub-

lished a "Treatise on the High Operation for the Stone," and afterwards added to his reputation by operating for the stone. In 1733 was published his "Osteography, or Anatomy of the Bones," folio, consisting of plates and short explanations, a splendid and accurate work. He died in Bath, April 10, 1752.

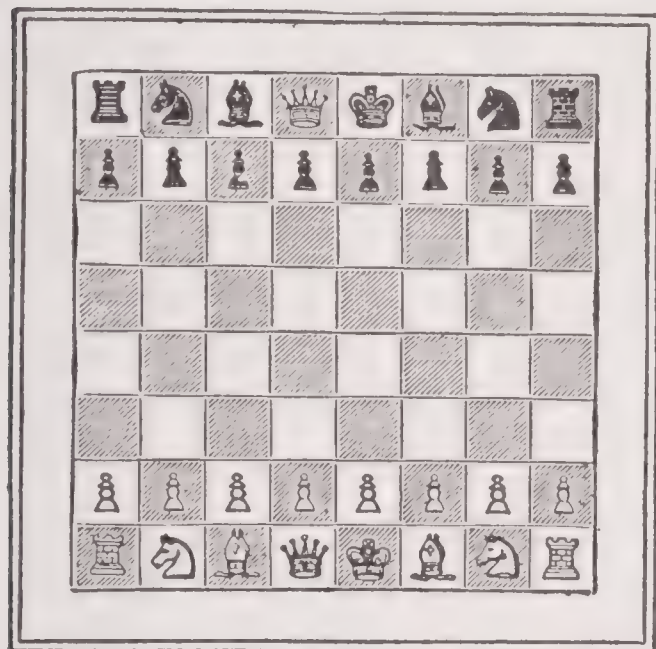
Cheshire, Fleming D., an American diplomatic officer, born in Brooklyn in 1857. He was educated in the public schools and went to China in 1870. In 1878 he was appointed United States Vice-Consul at Foo-Chow and from 1879 to 1884 was stationed at various consulates in China. Since 1885 he has been interpreter at the United States Legation in Peking.

Cheshire, Joseph Blount, an American clergyman, born in Tarboro, N. C., March 27, 1850. He was graduated at Trinity College in 1869, and practiced law from 1872 to 1878. He was ordained to the Episcopalian priesthood in 1880, and, after holding various rectorships, became Bishop of North Carolina in 1893.

Chesney, Francis Rawdon, an English explorer, was born in Annalong, County Down, Ireland, in 1789. He was gazetted to the Royal Artillery in 1805. In 1829 he inspected the route for a Suez canal, which he proved to be practicable. His first exploration of the route to India, by way of Syria and the Euphrates, was made in 1831, and he made three other voyages with the same object. The idea was taken up by government, who made a grant of £20,000 after his first expedition, but owing to the opposition of Russia it was never brought to a practical issue. He commanded the artillery at Hong-kong from 1843 to 1847. In 1850 he published his "Expedition for the Survey of the Rivers Euphrates and Tigris," and in 1868 a "Narrative of the Euphrates Expedition." He died in Mourne, Jan. 30, 1872. Gen. Chesney's "Life," by his wife and daughter, edited by Stanley Lane-Poole, was published in 1885. His nephew, Col. Charles Cornwallis Chesney (1826-1876), was the author of the well-known "Waterloo Lectures" (1861), which were delivered by him as professor at Sandhurst. A younger brother of the latter, Gen. Sir George Tomkyns Chesney, K. C. B. (1830-1895), was appointed member of the Council of the Viceroy of India in 1886, and became M. P. for Oxford in 1892. He was the author of the clever *jeu d'esprit*, "The Battle of Dorking" (1871), and of a remarkable novel, "The Private Secretary" (1881).

Chess, the most purely intellectual of all games of skill, the origin of which has been much disputed; this much may now be con-

sidered as certain, that, under the Sanskrit name of *Chaturanga*, a game, essentially the same as modern chess, was played in Hindustan nearly 5,000 years ago. In its gradual diffusion through the world in succeeding ages, the game has undergone many alterations and modifications, both in nature and in name; but marked traces of its early Asiatic origin and descent are still discerned by the learned in its nomenclature and other characteristics. From Hindustan, chess spread into Persia and thence into Arabia. The Arabs, it would appear, in the 8th century, introduced the game into Spain and the rest of Western Europe; and in England chess-play seems to have been known prior to the Norman Conquest. Into Constantinople, and probably some other cities of Eastern Europe, the game may have been imported from Persia at a period earlier than



CHESS.

Rook. Knight. Bishop. Queen. King.
Bishop. Knight. Rook.

its Moorish conveyance into Spain. The original Hindu game was played on a board of 64 squares, as now, but by four persons, two being allied against two, as in whist. These divisions are colored alternately black and white, in order the more clearly to determine and denote the respective movements of the several pieces.

In placing the board for play each player must always have a white corner square at his right hand. There are two sets of pieces of opposite colors of 16 men each, and of various powers, according to their rank. These sets of men are arrayed opposite each other, and attack, defend, and capture like hostile armies. The accompanying diagram will best explain the name, form, and place of each man at the commencement of the game. The superior officers occupying the first row on each side

are called pieces, the inferior men, all alike, standing on the row immediately in front of the pieces, are called pawns. Their moves and powers, with the peculiar terms used in chess, are as follows: A pawn, at his first move, may advance either one or two squares, straightforward; but after having once moved he can advance only a single square at a time. In capturing an adverse piece, however, a pawn moves forward to the next square diagonally either right or left; the pawn never moves backward. Taking is always performed by lifting the captured man from the board and placing the captor on his square. The pawn is the only man whose mode of taking differs from his ordinary move. On arriving at an eighth square, or the extreme line of the board, a pawn may be exchanged for any piece that his owner chooses to call for, except a king; so that a player may possibly have several queens on the board at once. If a pawn, on moving two squares at its first move, pass by an adverse pawn which has arrived at the fifth line, the advanced adverse pawn may take the other in passing in exactly the same manner as if the latter had moved but one square; but the adverse pawn is not compelled to take. A bishop moves any number of squares diagonally, but diagonally only; therefore a bishop can never change the color of his square. A knight moves two squares so as always to change the color—i. e., his move is one square forward or backward with one diagonally. On account of this crooked movement he can leap over or between any surrounding pieces; and therefore a knight's check—unless he can be taken—always compels the king to move. The rook, or castle, moves any number of squares forward, backward, or sidewise, but not diagonally. The queen is by far the most powerful of the pieces, and moves over any number of squares, either in straight lines or diagonals, forward, backward, or sidewise; so that her action is a union of that of the rook and bishop. At starting the queen always stands on a square of her own color—white queen on white square. The king is the most important piece on the board, as the game depends upon his safety. He moves only one square at once, in any direction, except when he castles—a term to be explained presently. The king cannot be taken; but when any other piece attacks him he is said to be in check, and must either move out of check or interpose some one of his subjects, unless the checking-piece can be captured. When there is no means of rescuing the king from check he is said to be checkmated, and the game is over. Of course the two kings can never meet, as they would be in check to each other.

Double-check is when a piece by being

Chess

moved not only gives check itself, but also discovers a previously masked attack from another. Castling is a privilege allowed to the king once in a game. The move is performed either with the king's rook or queen's rook—in the former case the king is moved to the king's knight's square, and the king's rook is placed on the king's bishop's square; in the latter case the king is played to the queen's bishop's square, and the queen's rook is played to the queen's square. But the king cannot castle after having once moved, nor at a moment when he is actually in check, nor with a rook that has moved, nor when he passes over a square attacked or checked by an adverse piece, nor when any piece stands between him and the rook with which he would castle, nor when in the act of castling either the king or rook would have to capture an adverse piece. A drawn game results from neither player being able to checkmate the other; thus, a king left alone on each side must of course produce a draw, as do also a king with a bishop, or a knight against a king. Stalemate, or the not being able to move either the king or any other piece, also constitutes a drawn game. Odds is a term applied to the advantage which a stronger player should give to a weaker; thus, the removal of a rook or knight from the better player's forces may be fair odds; or if the players are more nearly matched the one may give a pawn. When the odds of a pawn are given it is always understood to be the king's bishop's pawn. Gambit is a technical word implying the sacrifice of a pawn early in the game, for the purpose of taking up an attacking position with the pieces. Supposing the worth of a pawn to be represented by unity, the following is approximately an average estimate of the comparative value of the pieces: pawn 1, bishop 3, knight 3, king 4, rook 5, queen 9. The chessmen being placed, the players begin the engagement by moving alternately; each aiming to gain a numerical superiority by capturing his opponent's men, as well as such advantages of position as may conduce to victory. The rows of squares running straight up and down the board are called files, those running from side to side are called lines, and those running obliquely across are termed diagonals.

The accompanying diagram will show at once to the learner how each square is named; and by its aid he will speedily be enabled either to play over printed games, or to record his own. The playing over the following short game will serve him as a little initiatory practice:

WHITE.	BLACK.
1. King's Pawn two.	1. King's Pawn two.
2. King's Bishop to Queen's Bishop's 4th.	2. King's Bishop to Queen's Bishop's 4th.

Chest

3. Queen to King's Rook's 5th.	3. King's Knight to King's Bishop's 3rd.
4. Queen takes King's Bishop's Pawn, giving Black checkmate.	

The foregoing brief mode of giving a checkmate is called the Scholar's mate, and is often practiced upon young and unwary players. Any contractions used, such as "K" for king, "B" for bishop, etc., are readily understood by the use of the diagrams.

The Laws of Chess.—The following are the principal prevailing regulations of the game:

1. If any error has been committed in the placing of the board or men, either player may claim that the game shall be finished as it stands, after four moves have been made on each side, but not else.
2. A move once made, by your having moved a piece and let go of it, cannot be retracted.
3. If you touch a piece you must play that piece; but as long as you retain your hold you can play it where you like. If you touch a piece that cannot move, your opponent can compel you to play your king, unless the king be unable to move. When you touch a piece for the mere purpose of adjusting it, you are bound to say so.
4. If you make a false move your opponent may, at his pleasure, either cause you to retract it and move your king, or he may claim that the false move shall stand, or that you shall make a legal move with the same piece.
5. If you touch one of your opponent's men he may compel you to take that man; or, if that be impossible, to move your king, provided he can move without going into check.
6. If, on the king being checked, due notice is not given, the player whose king is attacked is not bound to notice it.
7. In every fresh game, except when one is drawn, the first move alternates.
8. Drawn games counting as no games at all, the player who had the first move in a drawn game is also entitled to it in the next. (This absurd regulation is fast becoming obsolete; and it is now a common agreement, in playing a series of games, that the move shall invariably alternate.)
9. A player who gives the odds of a piece is entitled to the first move.
10. The time for consideration of a move is not limited; but a player leaving a game unfinished, without his opponent's permission, loses such game.
11. When at the end of a game one player is left with just sufficient superiority of force to win—such as a king and rook against king, or king and two bishops against king, or king, knight, and bishop against king—he who has the greater force must give checkmate within 50 moves on each side, or else the game is adjudged drawn. This law is framed to prevent unskillful players from wearying their opponents by persisting in the attempt to accomplish what they are too untutored to effect; and it is perfectly just, since the allotted number of moves is ample enough and to spare.
12. In case of any dispute about the laws, both players are to agree as to an umpire, whose decision is to be considered final.

Chest, in man and the higher vertebrates, the cavity formed by the breast-bone in front and the ribs and backbone at the sides and behind, shut off from the abdomen below by the diaphragm or midriff. It contains the heart, lungs, etc., and the gullet passes through it.

Chester

Chester, an ancient and episcopal city, the capital of the county of Cheshire, England, 16 miles S. E. of Liverpool. The two main streets cross each other at right angles, and were cut out of the rock by the Romans 4 to 10 feet below the level of the houses. The houses in these streets were curiously arranged; the front parts of their second stories, as far back as 16 feet, form a continuous paved promenade or covered gallery, open in front, where there are pillars and steps up from the street below, with private houses above, inferior shops and warehouses below, and the chief shops of the town within. St. John's Church, now partially in ruins, is supposed to have been founded by Ethelred in 698. Pop. (1901) 36,281.

Chester, city and port of entry of Delaware county, Pa.; on the Delaware river, and the Philadelphia, Wilmington and Baltimore, the Baltimore and Ohio, and the Philadelphia and Reading railroads, 15 miles S. of Philadelphia. The favorable location and excellent shipping facilities of the city have given it a diversity of industries.

Business Interests.—Chester is the local trade center of a very prosperous agricultural and manufacturing district. It is the site of the Roach ship yards, where several vessels of the United States navy have been built. According to the Federal census of 1900 Chester had 315 manufactories, employing \$18,977,710 capital and 7,682 hands, and having annual products to the value of \$16,421,725. The principal industries were ship-building, foundry and machine shop work, and the manufacture of cotton, woolen and worsted goods. In 1900 there were 3 National banks with \$700,000 capital and a surplus of \$575,000, several private banking houses, daily and weekly newspapers, and an assessed property valuation of \$42,000,000.

Public Interests.—Chester is connected with Media, Darby, and other surrounding towns by electric railways. It is the seat of the Pennsylvania Military College and Crozer Theological Seminary, and Swarthmore College is nearby. The notable buildings are the United States Government Building, including the Post Office; the City Hall, erected in 1724, of great historic interest; Chester and Homœopathic Hospitals, and the Public Library. Besides the educational institutions mentioned, there were at the close of the school year 1897-1898, 23 public schools, with 125 teachers and 5,446 pupils, and public school property valued at \$500,000; a public high school, and Chester Academy.

History.—Chester was settled by the Swedes in 1643, under the name of Upland, and is the oldest town in the State.

Chestnut

It was incorporated in 1866. Pop. (1890) 20,226; (1900) 33,988; (1910) 38,537.

Chesterfield, Philip Dormer Stanhope, fourth Earl of, an English statesman and litterateur; born in London, Sept. 22, 1694.



LORD CHESTERFIELD.

After studying in his youth with a zeal of which he afterward thought proper to be ashamed, he learned on the Continent of Europe his polished smoothness of manners, his love of gaming, and his loose code of morality. He entered public life in 1715, and took an active part in the petty intrigues and party squabbles which make up the

parliamentary and court history of the reign of George II. His diplomatic skill was made useful in two foreign embassies; and his lord-lieutenancy in Ireland in 1745, though lasting only a few months, has always been mentioned with distinguished praise, which is more than can be said of his conduct toward Dr. Johnson, the lexicographer. The only writings of this accomplished person that are at all remembered are his "Letters" to his natural son, remarkable for their ease of style and their knowledge of society, but notoriously reprehensible for the principles of conduct which they inculcate. He died March 24, 1773.

Chestnut, a genus of plants, order *Cupuliferæ*, allied to the beech. The common or Spanish chestnut (*Castanea vesca*) is a stately tree, with large, handsome, serrated, dark-green leaves. The fruit consists of two or more seeds enveloped in a prickly husk. Probably a native of Asia Minor, it has long been naturalized in Europe, and was perhaps introduced into Great Britain by the Romans. The tree grows freely in Great Britain, and may reach the age of many centuries. Its fruit ripens only in some cases, however, and the chestnuts eaten in Great Britain are mostly imported. Chestnuts form a staple article of food amongst the peasants of Spain and Italy. The timber of the tree was formerly more in use than it is now; it is inferior to that of the oak, though very similar to it in appearance, especially when old. Two American species of chestnuts,

Chettik

C. americana and *C. pumila* (the latter a shrub), have edible fruits. The former is often regarded as identical with the European tree. The name of Cape Chestnut is given to a beautiful tree of the rue family, a native of Cape Colony. The Moreton Bay Chestnut is a leguminous tree of Australia, *Castanospermum australe*, with fruits resembling those of the chestnut. The water-chestnut is the water-caltrop, *Trapa natans*. The horse-chestnut is quite a different tree from the common chestnut.

Chettik, a tree of Java, the *Strychnos Tieute*, yielding a very virulent poison called by the same name, more powerful than that obtained from the upas-tree, and owing its virulence to the strychnine it contains.

Chettle, Henry, an English dramatist and pamphleteer of the 16th century; was editor of Greene's "Groat'sworth of Wit" (1592), wrote 13 plays of considerable merit, and was part author of 35 others, including "Robin Hood" in two parts, "Patient Grisel," "The Blind Beggar of Bethnal Green," and "Jane Shore." In Mere's "Palladis Tamia" (1598) he is mentioned as one of the "best for comedy amongst us." Of his other works, his "Kind-Hart's Dreame" (1593?), and "Englande's Mourning Garment" (1603), are of interest, the former as containing an apology undoubtedly intended for Shakespeare as one of those whom Greene had attacked; the latter, a stanza supposed to be addressed to Shakespeare as "silver-tongued Melicert." Chettle died about 1607.

Chevalier (she-vä-lyä'), an honorary title given, especially in the 18th century, to younger sons of French noble families. Brought up in comparative luxury, and left at the death of their fathers almost entirely unprovided for, these men generally lived at the expense of others, as a sort of aristocratic parasites, even when they did not prefer recourse to such less honorable means of livelihood as gave occasion to the synonym for swindler, *chevalier d'industrie*. In the plays of the 18th century the chevalier is a constant figure. Both the Old and Young Pretender were called the Chevalier by their partisans.

Chevalier, Michel, a French economist; born in Limoges, Jan. 13, 1806. He was educated as an engineer in the School of Mines, joined the St. Simonians, and suffered six months' imprisonment for promulgating the free doctrines of Père Enfantin's party. On his liberation M. Chevalier renounced his extreme doctrines, and was sent to the United States and to England on special missions. He became a councillor of state (1838), professor of

Chevy Chase

political economy in the Collège de France (1840), member of the chamber of deputies (1846), and member of the Institute (1851). By this time he had written a number of works: "Letters on North America," "On the Materials of Interest in France," "Essays on Industrial Politics," "Course in Political Economy," etc. He was known as a strong advocate of free-trade, and as a specialist on questions of currency. Along with Cobden and Bright he had a great part in the commercial treaty of 1860 between France and Great Britain. He died in Montpellier, Nov. 28, 1879.

Chevaux-de-frise (she-vō' de frēz; "Friesland horses," so called because first used at the siege of Groningen, in that province, in 1658), a bar traversed by rows of pointed stakes, and used to barricade an approach or close a breach.

Chevet, a variety of the apse, almost exclusively confined to French Gothic churches.

Cheviot (from the name of a border mountain range in Scotland—the Cheviot hills), (1) a variety of mountain sheep, named from the Cheviot hills, where they abound; (2) a kind of coarse woolen cloth used principally for men's clothing.

Chevreur, Michel Eugène (shev-rel'), a French chemist; born in 1786. In 1813 he became professor of physical science in the Charlemagne Lyceum, in 1824 director of dyeing in the Gobelins manufactory, in 1830 professor of chemistry in the Collège de France. In 1879 he retired. He wrote various works on chemistry and dyeing, and an important work on the "Principles of Harmony and Contrast of Colors," translated into English. He died in 1889.

Chevron, a bent bar, rafter-shaped, in heraldry. A chevron is, according to some, a third, and, according to others, a fifth of the field. A chevronel is half a chevron, and the couple close the fourth of the shield. A chevron coupé is that which does not reach the sides of the escutcheon. A chevron in chief is one which rises to the top of the shield. In architecture a chevron is a zigzag molding, characteristic of Norman work.

Chevrotain, a species of small musk-deer found in India and S. Eastern Asia and the islands.

Chevy Chase, the name of a celebrated British Border ballad, which is probably founded on some actual encounter which took place between its heroes, Percy and Douglas, although the incidents mentioned in it are not historical. On account of the similarity of the incidents in this ballad to those of the Battle of Otterbourne, the two ballads have often been confounded; but

the probability is that if any historical event is celebrated at all in the ballad of "Chevy Chase," it is different from that celebrated in "The Battle of Otterbourne," and that the similarity between the two ballads is to be explained by supposing that many of the events of the former were borrowed from the latter. There are two versions of the ballad bearing the name of "Chevy Chase," an older one, originally called "The Hunting of the Cheviot," and a more modern one. From the fact that the older version is mentioned in the "Complaynt of Scotland," written in 1548, it is clear that it was known in Scotland before that time. The age of the more modern version is believed to be no later than the reign of Charles II. This is the version which forms the subject of the critique by Addison in Nos. 70 and 74 of the "Spectator."

Cheyenne, city, capital of the State of Wyoming, and county-seat of Laramie county; on the Union Pacific, Denver and Gulf, and Burlington Route railroads, 150 miles N. of Denver. Cheyenne is situated on a plateau 6,075 feet above the sea and contains Fort Russell, a United States military post, and the main repair shops of the Union Pacific railroad. It has a fine State House, water works, electric lights, a public library, high school, and 2 National banks, and is the great beef growing center, the shipping point for beef-cattle to Eastern markets, and the supply depot for the trade of the Rocky Mountain region. Pop. (1890), 11,690; (1900), 14,087; (1910) 11,320.

Cheyennes, a tribe of American Indians, originally of Algonquin or Dakota stock, at one time settled in Wyoming. From 1861 to 1867 the United States government had "wars" with them. To the number of 2,069 (1899), they were settled in Oklahoma on a reservation of 529,682 acres, where they have a school. A remnant (56) in 1899 was at the Pine Ridge Agency, Montana, while the Northern Cheyenne tribe, numbering 1,349 (1899), was at the Tongue River Agency, in Montana, on a reservation of 371,200 acres, where they maintained a small day school. They are in a backward state of civilization and possess a primitive form of tribal government.

Cheyne, George, a Scotch physician; born in Methlick, Aberdeenshire, in 1671, and, after studying at Edinburgh under Pitcairn, started a London practice in 1702, in which year he was elected a Fellow of the Royal Society. Full living made him enormously fat (32 stone weight), as well as asthmatic, but from a strict adherence to a milk and vegetable diet he derived so much benefit that he recommended it in all

the later of his dozen medical treatises, which included "A New Theory of Fevers" (1701), "Philosophical Principles of Natural Religion" (1705), "Essay of Health and Long Life" (1725), and "The English Malady, a Treatise on Nervous Disorders" (1733). Cheyne died in Bath, April 13, 1743.

Chezy, Antoine Leonard de (shā-zē'), a French Orientalist; born in Neuilly, Jan. 15, 1773. For him the first chair of ancient Indian languages in France was founded in 1815. Bopp, W. von Humboldt, F. von Schlegel, Burnouf, Langlois, and other renowned scholars and Orientalists, were his pupils. His principal work is an edition, with French translation, of Kālidāsa's "Sakuntala" (1830). He died in Paris, Aug. 31, 1832.

Chezy, Wilhelm von, a German novelist and historical essayist; born in Paris, March 21, 1800. He acquitted himself creditably as a journalist, and wrote many popular tales: "The Wandering Pupil" (1835), "The Six Noble Passions" (1842), and "The Last Janissary" (1853), among them; as well as "Chivalry in Picture and Word" (1848), a study of much value. He died in Vienna, March 13, 1865.

Chhatisgarh, the S. E. division of the Central Provinces of India, with an area, including Feudatory States, of 39,761 square miles; pop., 3,115,997. It is mainly a vast fertile plateau, and has of late become a great center of the Indian grain trade. Dongargāon is the capital.

Chiabrera, Gabriello (kē-ä-brā'rä), an Italian lyric poet; born in Savona in 1552. Impatient of dependence on the great, he again and again abandoned the courts of noble patrons, and at last settled down in his native Savona. Pindar and Anacreon were his delights among the poets, and his countrymen named him "the Italian Pindar." But his Pindaric odes have little of the grace and force of Pindar; the poet labors too patently for effect in strophe and antistrophe, in bold inversions and composite epithets; he is not spontaneous; he is dull. Yet some of his little songs after Anacreon are models of elegance and grace. His epic and dramatic poems hardly rise above mediocrity. He wrote a charming autobiographical sketch, which shows him to have been ever an honorable man, good lover, good hater, and sincere Christian. He died in Savona, Oct. 14, 1637.

Chiana (kē-ä'nä; ancient, *Clanis*), a river of Central Italy, originally a tributary of the Tiber, watering the perfectly level Val di Chiana, which its overflow rendered once the most pestilential district of Italy. The bed was deepened in 1789-1816, and in 1823 extensive hydraulic works were

undertaken for further improving the river course, and for leading a N. branch, through canals, to the river Arno, a few miles below Arezzo, the S. stream reaching the Tiber through the Paglia at Orvieto. The double stream is 60 miles long, and $\frac{1}{2}$ to 1 mile broad; and the district has since become one of the most fruitful in all Italy.

Chiang-hsi, or **Kiang-si**, one of the 18 provinces into which China proper is divided. It is bounded N. by Hu-Pei (Hu-Peh) and Ngan-Hui (An-Hui); E. by Cheh-Chiang (Cheh-Kiang) and Fu-Chien (Fo-Kien or Fuh-Kien); S. by Kwang-Tung; and W. by Kwang-Si and Hu-Nan (Ho-Nan). The area is 72,176 square miles. Pop. (1900, estimated), 29,000,000, the last official census (1879) returning 24,534,118. The province contains the treaty port of Kin-Kiang or Chin-Chiang, on the Yang-tze-Kiang, a town of 53,000 inhabitants. The Nan Ling or Southern Mountains traverse the E. half of Chiang-Hsi, and in the N. is the large inland lake of Po-Yang-Hu. Here are established famous manufactories of porcelain. The principal river aside from the Yang-Tse-Kiang, is the Kin-Kiang. The province produces tea and silk, besides porcelain. The English have large railway concessions, but no tracks were down in 1900. There are telegraph lines connecting the treaty port with other centers of commerce.

Chiang-Su or **Kiang-Su**, an important maritime province of China proper, bounded N. by the province of Shan-Tung; E. by the Yellow Sea; S. by the province of Cheh-Chiang, and W. by the provinces of Ngan-Hui (An-Hui) and Ho-Nan. Chiang-Su has an area of 44,500 square miles (about that of Pennsylvania), and a population estimated in 1900 at 28,000,000, the last official census in 1882 returning 20,905,171. The great commercial importance of this province is denoted by its possession of four treaty ports Shanghai Nanking Su-Chow and Chin-Kiang. Chiang-Su was in fact the first province opened to foreign commerce by means of a treaty port. It is traversed almost its whole length by the Grand Canal, the ancient Chinese system of waterways. The British have valuable railway concessions and the Germans claim mining rights here. Half the foreign population of China (14,000, in 1900) is established in this province.

The Yang-tze-Kiang empties into the sea through this province and enables it to control the trade of all Southern China. There are large cotton mills. Vessels from all parts of the world touch at Chang-Hai (*q. v.*). The capital of the province is Nankiang, which was formerly the capital of the Chinese Empire. The Tai-Ping re-

bellion of 1853-1854 had its headquarters in this province. Chiang-Su is rapidly becoming the center of Chinese manufacturing industries, especially in textiles. Commercially, the province is controlled by the English, who have invested largely in railways, mills and government concessions.

Chianti (kē-än'tē), an Italian mountain-range, in the province of Siena, clothed with olive and mulberry trees and vines; the mountain gives name to an excellent red wine grown here.

Chian-turpentine, a kind of turpentine imported from Chios, produced by the *Pistacia terebinthus*.

Chiapas, a State of the Republic of Mexico, on the Pacific slope, having an area of 27,222 square miles and a pop. (1900), of 363,607. The capital, San Cristobal, is also the principal town. The State is in many parts mountainous, and is also in many parts traversed by noble streams, including the Rio Chiapas. At Palenque are the ruins of an ancient Aztec city of great beauty and magnitude. The valleys have a rich soil and produce maize, sugar, cotton, etc. Trade is, however, in a backward state for lack of roads. Education is free and compulsory, but the law is not strictly enforced. The State forms part of the Central American tableland, and has a fine climate, although the whole region is largely clothed in primeval forests.

Chiari (kē-är'ē), a town of Lombardy, 13 miles W. of Brescia by rail, with manufactures of silk. At one time strongly fortified, it is memorable for the victory here of the Austrians, under Prince Eugene, over the French and Spaniards, under Villeroi, Sept. 2, 1701.

Chiaro-oscuro (kē-är'ō os'kö-rō), that branch of painting which has for its object the combination and arrangement of the light and shadow of a picture to the best advantage. Relief and depth, and what is generally called the effect of a picture, are produced by Chiaro-oscuro. Leonardo da Vinci was the first who reduced the art to a system. Correggio afterward improved it practically, and it is said to have reached its perfection under Titian.

Chiastolite (kī-as'tō-lit), a mineral, a silicate of aluminum, having crystals arranged in a peculiar manner. The form of the crystals is a four-sided prism, whose bases are rhombs differing little from squares, but each crystal, when viewed at its extremities or on a transverse section, is obviously composed of two very different substances, and its general aspect is that of a black prism passing longitudinally through the axis of another prism which is whitish.

Chibchas, or **Muyscas**, a tribe of South American Indians who formerly lived E. of the Magdalena river, occupying the region from its head waters to the Sierra Nevada de Merida. They were partially civilized and excelled in weaving and pottery making, were skillful goldsmiths and also followed agriculture to a considerable extent. They were ruled by women as well as men in the line of succession, and believed in a Supreme Being, although they worshiped the sun and stars. They were conquered in a war with the Spaniards in 1537, and their descendants, who have intermarried with Europeans, constitute a large part of the present population of Colombia.

Chibouque (shē-bök'), a Turkish pipe with a long stem.

Chica, or **Chicha**, the name given in Brazil to a species of *Sterculia*, the seeds of which are eaten. They are about the size of a pigeon's egg, and have an agreeable taste.

Also a red coloring matter, extracted from the *Bignonia chica*. It is used by some tribes of North American Indians to stain the skin. It is extracted by boiling the leaves in water, decanting the decoction, and allowing it to settle and cool, when a red matter falls down, which is formed into cakes and dried. It is the *Sterculia chicha*. It is called also Carajuru.

Also a fermented liquor or beer, made of maize, etc., by the natives of South America.

The word is also used as the name of a dance popular among the Spaniards and the South American settlers descended from them. It is said to have been introduced by the Moors, and to have been the origin of the fandango, which some writers declare to be the chica under a more decent form. It is of a similar character with the dance of the Angrismene performed at the festivals of Venus, and still popular among the modern Greeks.

Chicago, a city of Illinois, county-seat of Cook co.; second city in population in the United States. It is situated in the N. E. part of the State, on the S. W. shore of Lake Michigan, about 710 miles W. by N. of New York, 807 miles N. by E. of New Orleans, and 1,805 miles E. by N. of San Francisco. It extends from N. to S. along the lake for about 26 miles, inland from E. to W. about 10 miles, and covers an area of nearly 191 square miles. Among the numerous suburbs are Evanston, to the N., on the lake; Park Ridge, to the N. E.; Oak Park, Maywood, Harlem, Melrose Park, Riverside, La Grange, etc., to the W.; and Blue Island, to the S. W., on the Calumet river.

Topography.—The site of the city is low

and level. Its elevation above the lake is from 15 to 75 feet, being highest in the N. E. The mean elevation is 25 feet above the lake and 582 feet above sea level. The main portion of the city occupies the alluvial plain of the Chicago river, which is formed at a point less than a mile from the lake by the junction of its North and South branches. The Chicago river and its branches divide the city into three parts, officially known as the North, South, and West sides. The North Side is comprised within the area N. of the Chicago river and E. of its North branch; the South Side is S. of the Chicago river and E. of its South branch; and the West Side is to the W. of both branches. These divisions are connected by numerous swinging and lift bridges, as well as by 3 tunnels used by the street car lines. Nearly 4 miles from the junction of the two branches, the South branch subdivides into a West and a South fork. The total frontage within the city on the Chicago river and its tributaries is nearly 60 miles. For one-third of this distance the river has been made navigable by dredging and is lined with piers and docks. The harbor at the mouth of the river is 16 feet deep and 450 acres in area, and has been formed by the construction of a break-water about a mile in length and a mile from the shore. A subsidiary harbor, 300 feet wide between piers, has been made at the mouth of the Calumet river, near the S. end of the city, which drains the only considerable bodies of water within its limits—lakes Calumet, Hyde, and Wolf, all of them in the S. E., the last mentioned being partly in Indiana.

Streets.—In 1906 there were 1,576 miles of paved streets and alleys, and 2,806 miles unimproved. The former were mostly paved with cedar blocks, macadam, asphalt, brick, and granite. Nearly all the streets run N. and S. or E. and W., crossing at right angles, but a few run diagonally, the most important of these being Milwaukee, Ogden, Blue Island, and Cottage Grove avenues. The average width of the streets is 66 feet, but a number of the boulevards reach a width of 120 feet. The longest thoroughfare is Western avenue, running the entire length of the city from N. to S. Ashland and Halsted avenues, E. of it, reach almost as great a length. The business center, fronting the harbor and confined within an area of about 1 square mile, is wholly on the South Side, being bounded by the Chicago river on the N. and Twelfth street on the S. Here are located a number of railroad passenger stations, the administration and other public buildings, newspaper offices, theaters, hotels, banks, and office buildings. Among the principal business streets are Wabash avenue, State, Dearborn, and Clark streets, Fifth avenue, and Market street, all running N. and S., and Randolph and Madi-

son streets, running E. and W. State street is the center of retail trade. Market street and Fifth avenue are the center of the wholesale dry goods business. Manufacturing is carried on in the angle formed by the Chicago river and its North branch, and in various sections of the West Side. The center of the meat industry is in the Union Stockyards, 5½ miles S. W. of the city hall. Among the finest residence streets are the Lake Shore drive, on the North Side, and Michigan avenue and Grand and Drexel boulevards on the South Side. Prairie avenue contains the houses of many millionaires; also a monument commemorating the Fort Dearborn massacre of 1812. The outlying portions of the municipal territory have a suburban and even rural character.

Parks, Boulevards, and Cemeteries.—The magnificent park system embraced in 1906 3,180 acres, distributed among about 80 parks and squares throughout the city. Lincoln (514 acres), Grant (211 acres), Washington (371 acres), Midway Plaisance (80 acres), Jackson (524 acres), Douglas (182 acres), Garfield (188 acres), and Humboldt (206 acres)—these parks, with connecting boulevards, form a nearly complete chain around the more settled portion of the city. Besides these there are a number of other parks of no inconsiderable size, such as Ogden and Sherman parks, each covering about 61 acres, and Marquette park (323 acres). The boulevards have an aggregate length of 48 miles, besides their extensions outside the city limits. Lincoln park, in the N. E., contains conservatories, lily ponds, a palm house, a zoölogical collection, boating lakes, an electrically illuminated fountain, and statues of Franklin, Lincoln (one of Saint Gaudens' masterpieces), Grant (by Rebisso), La Salle, Shakespeare, Linnaeus, Beethoven, Goethe, Schiller, Andersen, and Garibaldi. The Academy of Sciences is near the main entrance. Alongside the park, in the lake, is a breakwater carriage drive, which is prolonged to the N. by Sheridan boulevard to Fort Sheridan, 27 miles distant. The strip of water between this drive and the park is used as a regatta course for small boats. Grant park, which is E. of and adjoins the business district of Chicago, contains a bronze equestrian statue of Gen. John A. Logan, executed by Saint Gaudens, representing the general as rallying the troops before Atlanta. Michigan avenue, Grand boulevard, Drexel boulevard, in which is the handsome Drexel memorial fountain, and minor boulevards lead S. to Washington park, which has an equestrian statue of Washington at its entrance. The Midway Plaisance, a broad boulevard, leads eastward to Jackson park, the principal site of the World's Columbian Exposition in 1893 (see EXPOSITIONS AND FAIRS). Nearly all the exposition buildings have been re-

moved, but a Japanese temple and the reproduction of the convent of La Rabida, the latter used as a sanatorium for mothers and children, have been left intact. The Field Museum of Natural History is in the N. part of the park. A large part of the park surface is covered with picturesque lagoons, used for boating and spanned by pretty bridges. Piers have been constructed in the lake for the use of pleasure boats, and there are bath houses, a gymnasium, a casino, etc. In the W. part of the city are the Douglas, Garfield, and Humboldt parks, connected with the parks in the E. by Garfield, Western avenue, Jackson, Washington, Diversey, and other boulevards in the S., center, and N. Douglas Monument park contains the mausoleum and statue of Stephen A. Douglas. In Garfield park are statues of Burns and Queen Victoria. Here a magnificent conservatory was being erected in 1907. Humboldt park has statues of Humboldt, Reuter, Kosciusko, and Leif Ericson. Large pavilions, boat landings, and refectory buildings have been constructed in all three of these parks. A number of the smaller parks are provided with recreation buildings containing gymnasiums and shower and plunge baths for men and women, club rooms, assembly halls, and in some cases also reading rooms and public library branches. In Union park, about 1½ miles to the W. of the business district, is the monument in memory of the policemen killed with a bomb on May 4, 1886; and at Waldheim cemetery, 10 miles to the W. of the city hall, stands a monument to the anarchists executed for complicity in the bomb-throwing. Among the notable cemeteries are Graceland and Rosehill, in the N., and Oakwoods in the S., the latter containing the Confederate Monument. In all, the city has about 50 cemeteries.

Buildings.—Nearly all the prominent buildings are in the business district, which is dominated by the huge modern steel-frame "sky-scrappers." State street is lined with great department stores, that of the late Marshall Field having 1,000,000 square feet of floor space; several office buildings occupied mainly by physicians and dentists; and the Masonic Temple, 21 stories high. Dearborn street is lined with enormously tall buildings. On La Salle street, among other buildings of the modern type, are the Chamber of Commerce (14 stories), with a great central court roofed by an immense skylight; the oddly shaped Women's Temperance Temple (13 stories), French-Gothic in style, consisting of two great wings united by a narrow vinculum; the Romanesque Rookery (10 stories), with a splendid interior; the Illinois Trust and Savings Bank, a massive 2-story building with huge pillars and a fine central court; and the Board of Trade building, a substantial structure of granite. On Adams street are

the Rand-McNally building, one of the largest printing and publishing houses in the world, employing 700 hands, and the wholesale establishment of Marshall Field & Co., designed by H. H. Richardson, "massive, grimly utilitarian, and individual." The classical Ashland block (16 stories) is on Randolph street, 3 blocks to the S. of the Chicago river, where also is the city hall. The twin building of the latter, the county court house, was razed in 1906, and a new one costing \$6,000,000 has been erected. Adjacent is the Drake fountain, with a statue of Columbus. On Jackson boulevard, besides several tall hotel and office structures, is the Federal building, accommodating the post office, custom house, and Federal courts. It is in the Corinthian style, occupies an entire block, and has a large central dome 200 feet high. Near by is the home of the Union League Club. Most of the ornate buildings in the business district are on Michigan avenue. Here are the Public Library, an imposing classical edifice, completed in 1897 at a cost of \$2,000,000; the Art Institute, 320 by 208 feet, in semi-classical style; the Orchestral Association building; the beautiful Romanesque Chicago Club house; the palatial Fine Arts building, containing the Studebaker theater, concert, assembly, and lecture rooms and the meeting places of several art and literary societies; the huge Auditorium, 360 feet long on Congress street, with a tower 270 feet high occupied by the United States Signal-service station, and including a theater with over 4,000 seats and a large hotel, the latter joined by a marble-lined subterranean passage to an annex on the opposite side of Congress street; and the large and handsome Illinois Central station. To the N. of the Chicago river stands the huge and gloomy criminal court and county jail. Other notable buildings are mentioned under the two next heads.

Churches and Charities.—Among the more important churches are the First and Second Presbyterian, Plymouth, First Church of Christ (Chr. Sci.), Church of the Epiphany, and the Cathedral of the Holy Name (R. C.). Chicago is the seat of a Roman Catholic archbishop and two bishops, and in 1906 the Roman Catholic churches numbered 342, orphan asylums 7, and charitable institutions 43. The Roman Catholic population is estimated at 1,200,000. There are in the city about 70 hospitals, including the Cook County, United States Marine, Women's, Presbyterian, St. Joseph's, and St. Luke's; 35 dispensaries, and numerous asylums, homes, relief societies, day nurseries, etc. The Armour Mission, non-sectarian, contains a mission hall, a library, kindergarten, day nursery, free dispensary, etc. There are 22 social settlements, among which Hull House is the most famous. It was established in 1889, on the model of

Toynbee Hall in London, and is the oldest institution of its kind in the United States.

Educational Institutions.—The most famous of the educational institutions is the University of Chicago (*q. v.*). The Northwestern University has schools of law, medicine, pharmacy, and dentistry in the city, besides the schools of arts, theology (Meth.), and music at Evanston. The College of Physicians and Surgeons of Chicago, with about 700 students, a library of over 10,000 volumes, and a school of dentistry, and the Chicago College of Pharmacy, with about 200 students, are connected with the University of Illinois, located mainly at Urbana. Other professional schools include a homœopathic school, a veterinary school, etc. Chicago is the seat of St. Ignatius College (R. C.), of the McCormick Theological Seminary (Presb.), and of Congregational, Lutheran, and Protestant Episcopal seminaries. The Armour Institute of Technology, consisting of a preparatory school—the Armour Scientific Academy—and a college of engineering and architecture, has about 2,000 students and a library of over 20,000 volumes. The Art Institute maintains one of the largest and most comprehensive schools of art on the continent, with over 2,500 students, and contains valuable collections of paintings, sculpture, and other objects of art, and the Ryerson Library on art. The Lewis Institute is a polytechnic school for the training of young men and women at a nominal cost. The Public Library, with delivery stations throughout the city, had 328,520 volumes at the beginning of 1907. The Newberry Library, endowed by its founder with \$3,000,000, is housed in a handsome granite structure in Walton place, on the North Side, and is open to the public for reference purposes. At the beginning of 1907 it had 221,500 volumes. Its musical and medical collections are especially noteworthy. The John Crerar Library, designed for the benefit of the South Side, has an endowment of \$2,000,000. It is on Wabash avenue, and its collections are devoted mainly to natural science and the useful arts. The Field Museum of Natural History, incorporated in 1893, now housed in the Fine Arts building of the World's Columbian Exposition in Jackson park, probably will be permanently quartered in Grant park. It contains magnificent collections of natural history and anthropology, American ethnology and economic geology being especially well represented. There is a remarkable group of large mammals, and the exhibition of the evolution of means of transportation includes full-size reproductions of a Viking ship and of the caravels of Columbus. The funds for the establishment of the museum were originally secured from Marshall Field, who donated \$1,000,000, and George M. Pullman, H. N. Higginbotham, Mrs. George Sturgis, and

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others, who together donated \$500,000. On his death in 1906, Marshall Field bequeathed to the museum real estate and cash amounting to \$8,000,000, one-half of this to be used as a building fund and one-half as an endowment fund. Another important museum is that of the Academy of Sciences, near the main entrance of Lincoln park. The library of the Chicago Historical Society contained in 1907 about 50,000 volumes and 100,000 pamphlets, mainly bearing on the history of the Northwest.

The public school system of Chicago comprises a normal school, 17 high schools, 2 apprentice schools, primary and grammar schools, vacation schools and kindergartens, and schools for deaf, blind, crippled, and subnormal children. There is also a school for juvenile offenders in the city prison, a Detention Home school for delinquent and dependent children who are awaiting action by the Juvenile Court, and a Parental School for truant boys. In 1906-07 the total enrollment in all these schools was 286,776—533 in the normal school, 14,048 in the high schools, 90,471 in the grammar grades, 163,996 in the primary grades, and 19,131 in the kindergartens. The average daily attendance for all schools was 225,792. Besides these there were also evening schools with an enrollment of 17,295. The cost of maintaining all classes of schools was \$7,828,867, of which sum \$5,943,121 went to the salaries of the 5,997 teachers. The Catholic Church maintained in the city in 1906 3 seminaries, 10 boys' colleges, 23 girls' academies, and 189 parochial schools. The attendance in all its schools was 78,177.

In 1907 there were published in the city 26 daily newspapers, including 5 in German, 3 in Bohemian, 2 in Polish, 1 in Norwegian, and 1 in Yiddish, and 200 weekly and monthly periodicals. The theaters number about 40. The Chicago Orchestra is one of the most noted musical organizations in the country.

Industries.—Chicago is the second greatest manufacturing city in the Union, and about two-thirds of the manufacturing activity of Illinois is centered in its metropolis. The chief industry of the city, as of the State, is slaughtering and meat packing, centered in the famous Union Stockyards of "Packingtown," 5½ miles S. W. of the city hall. The yards proper cover about 475 acres, have 45 miles of feeding and watering troughs, and can accommodate 75,000 cattle, 300,000 hogs, 50,000 sheep, and 5,000 horses. The annual receipts are between 3,000,000 and 4,000,000 head of cattle, between 7,000,000 and 8,000,000 hogs, between 3,000,000 and 4,000,000 sheep, and about 100,000 horses, of a total value of over \$300,000,000. From two-thirds to three-fourths of the receipts are killed in the yards and sent out in the form of meat. The largest packing houses are those of

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Armour & Co. and Swift & Co., which employ together about 14,000 men and annually produce canned meats, butterine, glue, fertilizers, and other by-products to the value of about \$180,000,000. The horse market is held in a large pavilion seating 4,000. The handling of the live stock between the railways and the yards requires 30 locomotives and 245 miles of track. Another famous industrial center is the "model" town of Pullman, in the extreme S. of the city, on the W. shore of Lake Calumet, forming since 1889 a part of the 34th ward of Chicago. It was laid out in 1880 by the Pullman Palace Car Co. for the use of its workmen, and was well planned, with neat brick houses, good water and sewerage, wide streets, small parks, athletic grounds, an arcade containing stores, a theater, and a free library, a hotel, churches, etc. No workman could buy land in the town, the management being entirely in the hands of the company. A question being raised as to the power of the company under its charter to do these things, it was decided in the negative by the Supreme Court, and the company has disposed of all its real estate except that needed for carrying on its business. Here are produced every year about 150 palace cars, 500 ordinary passenger cars, and 12,000 freight cars. There are also foundries and other industrial establishments. Among the great industrial concerns of Chicago are the 3 plants, in different parts of the city, of the Illinois Steel Co., which has a capital of \$35,000,000 and employs 10,000 men. Its rolling mills in South Chicago cover 334 acres and are the largest in the world. The works of the Deering Harvester Co., in the N. E. part of the city, cover 60 acres and employ 3,500 men in the manufacture of harvesting machinery and binder twine. The works of the McCormick Harvesting Machine Co., in the S. W. part of the city, employ 3,000 men and turn out 150,000 machines annually. The Grant Locomotive Works, on the West Side, to the W. of Douglas park, is another great establishment.

According to the United States Census of Manufactures of 1905, the leading industries of Chicago, employing each over 5,000 wage-earners, were as follows: Bread and other bakery products, with 5,795 wage-earners (exclusive of salaried officials and clerks) receiving during the year \$3,240,000 in wages, using materials valued at \$11,132,000, and turning out a product valued at \$20,654,000; cars and general shop construction and repair by steam railroad companies, 8,592 wage-earners, \$5,792,000 in wages, \$4,993,000 of materials used, and \$11,172,000 of products; steam railroad cars, not including the above-mentioned operations of steam railroad companies, 7,059 wage-earners, \$4,897,000 in wages, \$15,761,000 of ma-

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terials, and \$23,799,000 of products; men's clothing, 18,979 wage-earners, \$9,430,000 in wages, \$26,001,000 of materials, and \$53,276,000 of products; women's clothing, 4,308 wage-earners, \$2,083,000 in wages, \$6,011,000 of materials, and \$11,637,000 of products; electrical machinery, apparatus, and supplies, 5,927 wage-earners, \$3,099,000 in wages, \$7,501,000 of materials, and \$16,292,000 of products; foundry and machine shop products, 21,728 wage-earners, \$13,492,000 in wages, \$20,858,000 of materials, and \$51,775,000 of products; furniture, 9,612 wage-earners, \$5,329,000 in wages, \$7,463,000 of materials, and \$17,488,000 of products; iron and steel works and rolling mills, 5,087 wage-earners, \$3,526,000 in wages, \$16,711,000 of materials, and \$24,840,000 of products; lumber and planing mill products, 5,024 wage-earners, \$2,796,000 in wages, \$8,163,000 of materials, and \$13,856,000 of products; printing and publishing, including newspapers and periodicals, 14,190 wage-earners, \$9,736,000 in wages, \$13,268,000 of materials, and \$48,378,000 of products; slaughtering and meat packing, 22,613 wage-earners, \$12,388,000 of wages, \$237,039,000 of materials, and \$269,581,000 of products. Other very important industries are book-binding and blank books, boots and shoes, fancy and paper boxes, wooden packing boxes, carriages and wagons, coffee and spice roasting and grinding, confectionery, cooperage, coppersmithing and sheet iron working, leather, leather gloves, hardware, malt liquors, marble and stone work, millinery and lace goods, musical instruments, particularly pianos and organs, patent medicines, plumbers' supplies, rubber and elastic goods, soap, structural ironwork, tinware, tobacco, cigars, and cigarettes, trunks and valises. The industrial growth of Chicago since 1880 is shown in the following table:

Year	Number of Establishments	Capital	Wage-Earners
1880	3,518	\$68,832,000	79,391
1890	9,977	359,740,000	190,621
1900	19,203	534,001,000	262,621

The special United States Census of Manufactures of 1905 was confined to industries carried on under the factory system, to the exclusion of neighborhood industries and hand trades. Compared with the corresponding figures for 1900, the results are shown in the following table:

Year	Number of Establishments	Capital	Wage-Earners
1900	7,668	\$511,249,000	221,191
1905	8,159	637,743,000	241,984
Per cent. increase	6.4	24.7	9.4

Chicago

Commerce and Transportation.—The original basis of Chicago's prosperity was its favorable position in regard to means of transportation by land and water, which made it the natural market for an enormous and immensely productive region. It is a natural station for railroads crossing the country from the East to the Northwest, and from the South to the Great Lakes. Thus it became the greatest railway center in the United States, being entered by over twenty railroad systems. Numerous lines of steamers connect it with the lake ports. Sea-going vessels now make their way to the city. The Illinois and Michigan canal, connecting the South branch of the Chicago river with the Illinois river and the Mississippi system, extends to La Salle, the head of navigation on the Illinois, a distance of 96 miles. A more important waterway to the Mississippi is in prospect through the extension of the Chicago Drainage canal (*q. v.*).

The importance of Chicago as a center of commerce may be illustrated by the traffic figures of a few leading commodities. In 1906 the receipts of grain totaled 240,065,225 bushels, including 28,249,475 bushels of wheat, 98,896,563 bushels of corn, 89,912,881 bushels of oats, 2,194,875 bushels of rye, and 20,811,432 bushels of barley. The shipments of grain amounted in the same year to 177,937,972 bushels. The grain elevators in the city, of which there are about 40, all situated along the river, have an aggregate capacity of about 30,000,000 bushels. An important commerce is also carried on in hay, flaxseed, wool, hides, butter, and cheese. The receipts and shipments of hogs in 1906 were 7,808,856 and 1,742,606 respectively; of cattle, 3,329,250 and 1,352,998 respectively; of calves, 413,269 and 23,325; of horses and mules, 127,979 and 106,604; of sheep, 4,805,449 and 1,341,273. The re-

ceipts and shipments of dressed beef were 353,287,000 pounds and 1,138,072,000 pounds respectively; of pork, 5,034 barrels and 182,906 barrels; of other meats, 204,641,000 pounds and 804,642,000 pounds; of lard, 80,397,000 pounds and 421,915,000 pounds. The lake traffic amounted in 1906

Year	Number of Establishments	Capital	Wage-Earners	Wages	Cost of Materials Used	Value of Products
1900	7,668	\$511,249,000	221,191	\$108,727,000	\$502,222,000	\$797,879,000
1905	8,159	637,743,000	241,984	136,405,000	589,914,000	955,036,000
Per cent. increase	6.4	24.7	9.4	25.5	17.5	19.7

Chicago

to 6,846 ships of 7,621,979 net tons entered, and 6,434 ships of 7,400,305 net tons cleared. The receipts of iron ore by lake amounted to 4,251,920 tons; of coal, 938,151 tons, mostly hard; of salt, 204,939 tons; of lumber, 405,422,000 B.M. feet. The shipments by lake of coal, nearly all hard, amounted to 2,820,241 tons. The total number of vessels entered in 1906 in both the coasting and the foreign trade was 7,017, of 7,969,621 tons; of those cleared, 7,056, of 7,668,430 tons.

There are in the city about 70 banks and trust companies. In September, 1906, there were 17 National banks, with total resources and liabilities of \$384,868,000. The clearing-house transactions amounted in 1906 to \$11,047,312,000. In February, 1908, there were 56 banks, with a capital of \$58,600,000; surplus and undivided profits, \$56,110,300; and deposits, \$659,991,000. Some idea of the immense amount of travel to and from the city may be gathered from the fact that about 1,600 passenger trains, through and suburban, arrive and depart every 24 hours at the 6 principal railway passenger stations. The total street railway mileage, single track, in Chicago and vicinity in 1905 was 1,352 miles for surface and 135 miles for elevated railways. The total number of passengers carried by the street railways in 1905 was 440,196,421. There is a subway for the distribution of freight in the business district.

Administration.—The head of the municipal administration is the mayor, elected biennially. Other elective officers are the city treasurer and clerk. The unicameral council consists of 70 members, 2 from each of the 35 wards, one-half of the members being elected each year. The mayor presides over the council, and has a casting vote and a veto; the latter may be overridden by a two-thirds vote. The city budget is prepared annually by the council. The mayor appoints, subject to the approval of the council, the heads of the departments of finance, law, public works, police, fire, health, and education, the last two departments being under the control of boards. The board of education consists of 21 members, of whom 7 are appointed each year for a term of three years. Besides the municipal government proper, there are in Chicago various other administrative bodies for purposes of local administration. There are 34 towns, the officers of which are elected in town meetings, as in rural districts. A board of 15 county commissioners is elected by the county for a term of 3 years, 10 of them being elected in Chicago. The small parks and playgrounds are under the municipal government, but the larger parks are administered by 3 distinct park boards, 1 for each of the 3 divisions of the city, created under a State law. The members of the Lincoln Park Board, on the North Side, and those of the West Park

Chicago

Board, are appointed by the governor of the State; those of the South Park Board are appointed by the judges in Cook county. The boards have the power to levy taxes and issue loans. Another administrative body distinct from the municipal corporation is the board of trustees of the Chicago Sanitary District, created in 1890 to supervise the construction and management of the Chicago Drainage canal, and consisting of 9 members elected by the people.

Municipal Finance.—The revenues of the municipal government, exclusive of the water works and public schools, amounted in 1906 to \$19,542,082, of which \$6,253,249 was derived from taxation and \$8,801,330 from licenses. The ordinary expenditure was \$14,092,392, distributed as follows: General government (including the executive, legislative, law, finance, and other departments, as well as \$1,125,460 interest on loans), \$2,338,403; public safety, \$7,223,190, of which \$4,071,202 was for the police department, \$164,170 for police and justice courts, \$246,944 for the House of Correction, \$2,193,537 for the fire department, \$329,379 for the health department, etc.; public works, \$4,190,326, including \$1,044,977 for the department of electricity, mainly lighting; recreation and art, \$77,870; and miscellaneous, \$266,597. Besides the ordinary expenditure, there was an extraordinary expenditure of \$1,255,374, and an expenditure from permanent improvement bonds of \$883,547; bringing up the total municipal expenditures, exclusive of water works and schools, to \$16,235,313. The revenue for school purposes amounted in the same year to \$10,657,259, of which \$9,484,358 was from taxes, and the expenditure for schools was \$11,911,671. The city owns the water works, as well as an electric lighting plant. The water supply is derived from Lake Michigan, the cribs being located at a distance of from 2 to 4 miles from the shore, and it was in order to preserve its purity that the Chicago Drainage canal—the greatest work of sanitary engineering in the country—was constructed. The water used in the city in 1906 amounted to 159,488,383,000 gallons. The revenue from the water works in the same year was \$4,520,980, and the expenditure on them \$5,445,923. The funded debt amounted on Dec. 31, 1906, to \$25,555,000, on which the annual interest was \$1,012,148.

Street Railway Controversy.—In 1865 the Illinois legislature extended the charters of certain Chicago street railway companies for a term of 99 years. Two of these companies were merged in the Union Traction Company, which was organized by Charles T. Yerkes in 1899 and went into the hands of receivers in 1903. In March of the latter year the legislature passed an act enabling the city to buy and own street railways on the expiration of their franchises. When the city

authorities sought to compel the companies to accept new franchises on terms more favorable to the city, the Union Traction Company appealed to the United States courts to enforce its claims under the law of 1865. The various cases were finally carried to the United States Supreme Court, which announced on May 12, 1906, its decisions, nullifying in effect the rights of the traction companies in most of the streets, confirming their rights to operate in certain streets for terms of various length, the maximum term not reaching beyond 1916, and making their rights to operate in other streets subject to purchase of the lines by the city. In the meantime the question of municipal ownership of street railways was made a political issue, and in 1905 Edward F. Dunne was elected mayor on a platform demanding immediate municipal ownership. On April 3, 1906, the city was authorized, by a vote of 110,225 against 106,859, approving an ordinance to that effect by the council, to issue street railway certificates, not to exceed in amount \$75,000,000, for the "construction, purchase, ownership, and maintenance" of street railways within its corporate limits; and by a vote of 111,955 against 108,087, to "proceed without delay to secure municipal ownership and operation of all street railways in Chicago . . . instead of passing the pending franchise ordinances or any other ordinances granting franchises to private companies." On the question whether the city should be authorized to proceed to operate street railroads the vote was yeas 121,916, nays 110,323; but as a three-fifths vote was required, the proposition was defeated. Subsequently the ordinance for the issue of certificates was held to be invalid. The controversy between the city and the companies was ended in 1907 by the acceptance by them of ordinances which had previously been ratified by the voters. The ordinances provide for a complete rehabilitation of the traction systems with universal transfers and through routes. The city is to get 55 per cent. of the net annual receipts, amounting at present to about \$1,500,000 a year. The companies are given the right to operate the lines for twenty years, unless the city shall sooner exercise its option of purchase. The Chicago Railways Co., which has succeeded the Union Traction Co., operates 485 miles and the City Railway Co. 219 miles out of the total surface mileage for the city and vicinity of 1,352.

History and Population.—The name of the city is derived from an Indian word of doubtful or various meaning. The Indians used the Chicago river for reaching the Mississippi by way of the South branch, a portage of 4 or 5 miles to the Des Plaines river, and thence by way of the Illinois river. The first Europeans reported to have visited the site were two French fur traders

in 1654. Joliet and Marquette passed down to Lake Michigan by way of the Chicago or Calumet river in 1673, and the latter spent part of the winter of 1674-75 in a cabin on the South branch of the Chicago. La Salle, Hennepin, and other French explorers and missionaries visited the site, and the prediction of La Salle has become famous: "This is the lowest point on the divide between the two great valleys of the St. Lawrence and the Mississippi. The boundless regions of the West must send their products to the East through this point. This will be the gate of empire, this the seat of commerce." The French established a trading post and a small fort or stockade, which is mentioned as early as 1685. By the Treaty of Paris in 1763 the country became British territory. The first permanent settler was probably Jean Baptiste Point de Saible, a mulatto refugee from Haiti, who arrived about 1777. He sold his cabin to a French fur trader in 1796, and the latter sold it in turn in 1803 to John Kinzie, the first white man of American birth to make his home here. By the Quebec Act (*q. v.*) of 1774 the country was included in the province of Quebec, but the conquest of the Northwest in 1778 by Col. George Rogers Clark, in command of Virginia militia, secured the region to the United States in the peace of 1783 that ended the Revolutionary War. In 1795 the Indians were forced to cede a tract of land 6 miles square about the mouth of the Chicago river, and in 1804 Fort Dearborn was erected on the S. bank, near the mouth. At the outbreak of the War of 1812 the garrison was ordered to evacuate the fort, and on Aug. 15, 1812, was ambushed by Indians, who massacred 38 soldiers, 2 women, and 12 children, besides capturing a number of others. The following day they burned the fort, which was rebuilt in 1816. In 1830 a town was laid out, with an area of $\frac{3}{8}$ of a square mile and a population of less than 100. In 1833 Chicago was incorporated as a town, with an area of 560 acres and 550 inhabitants. The first appropriation for harbor improvement was made by Congress in 1833, and the first schooner sailed up the river in 1834. In 1833 there was held here an assemblage of 7,000 Indians, who sold their lands and moved across the Mississippi in 1835. Fort Dearborn was consequently abandoned in 1837, and it was demolished in 1856. The site of the fort is marked by a tablet at the end of Michigan avenue. In 1837 Chicago, with 4,170 inhabitants, was chartered as a city. The Illinois and Michigan canal, begun in 1836, was completed in 1848, and in the same year the first railroad, between Chicago and Galena, was completed. The railroads to the East, the Michigan Central and Michigan Southern, entered the city in 1852. Henceforth the city grew with unparalleled

rapidity, and in 1855 a signal instance of the energy of the citizens was given, when the level of the entire city, buildings and all, was raised 7 feet without interruption to business. In 1860 Lincoln was nominated here for the presidency. On the evening of Sunday, Oct. 8, 1871, a fire broke out in a small barn on the West Side and soon spread over the three divisions of the city, resulting in one of the most destructive conflagrations on record. The flames were not extinguished till Monday night, Oct. 9, when rain fell. Nearly 18,000 buildings were destroyed over an area of 2,024 acres, and 70,000 people became homeless. The loss of life was estimated at between 200 and 300, while the loss of property amounted to \$187,000,000, for which only about \$46,000,000 was collected from insurance companies. Within two years the burned district was again covered with buildings, and these of a more substantial type.

The riots consequent upon the railroad strike of 1877 resulted in the calling out of militia and United States troops. Labor troubles again broke out on a large scale in 1885-86, and on May 4, 1886, while the police were attempting to disperse a meeting in Haymarket square, a bomb was thrown among them by an unidentified person, killing 8 of them and wounding many more. Shots were also fired by the mob, and in all the wounded policemen numbered 68. This led to the arrest, trial, and conviction of 8 anarchists, of whom 4 were hanged, 1 committed suicide in prison, 2 were sentenced to prison for life, and 1 for 15 years. The last 3 were pardoned in 1893 by Gov. John P. Altgeld. In 1894 labor troubles again disturbed the city as a result of the Pullman strike and the tying up of railroads by the American Railway Union, of which Eugene V. Debs was president. The militia was called out, and finally President Cleveland ordered United States troops into the city, despite the protests made by local authorities and Governor Altgeld. The President's action was based on the ground that it was his duty to prevent interference with the mails. On Dec. 30, 1903, during a matinee at the Iroquois Theater, flames started on the stage and soon enveloped the entire auditorium, causing terrible loss of life; 582 bodies were recovered, over 300 persons were missing, and about 160 were injured.

Population, 1840, 4,479; 1850, 28,269; 1860, 109,206; 1870, 306,605; 1880, 503,185; 1890, 1,099,850; 1900, 1,698,575; 1906 (Fed. est.), 2,049,185; (Chicago est.), 2,396,541; 1910 (Fed. census), 2,185,283. In 1900 the population consisted of 863,408 males and 835,167 females. Negroes numbered 30,150, making 1.8 per cent. of the total population, and there were also 1,277 Mongolians. The foreign born numbered 587,112, constituting 34.6 per cent. of the

total, the most numerous elements being 170,738 Germans, 81,013 Scandinavians, 73,912 Irish, 59,713 Poles, 53,123 Austrians and Hungarians, 41,473 English, Scotch, and Welsh, 34,779 Canadians, 24,178 Russians, and 16,008 Italians. The death rate in 1900 was 16.2 per 1,000 population for the entire city, being 16.1 for whites, 21.6 for colored, 15.8 for native whites, and 16.6 for foreign born whites. In 1906 the total number of deaths was 29,048, or 14.18 per 1,000 population. This is one of the lowest death rates among the great cities of the world.

Chicago Drainage Canal, a canal intended chiefly for carrying off the sewage of Chicago, also available for commercial purposes; begun in September, 1892; completed in January, 1900. The main channel is 28.05 miles long, extending from Robey street in Chicago, 5.8 miles from Lake Michigan, to Lockport on the Illinois river, into which stream it discharges. About 9 miles of the channel is cut through solid rock, with a minimum depth of 22 feet and a width of 160 feet on the bottom. Throughout the canal the width varies from 110 to 202 feet at the bottom, and from 162 to 300 feet at the top, and the depth reaches 36 feet, with a minimum water depth of 22 feet. The length of the waterway from the mouth of the Chicago river to its terminus S. of Joliet is about 42 miles. The cost of the canal to the date of opening was about \$33,000,000. The board of trustees in charge of the canal (see CHICAGO—*Administration*) were constructing in 1907 one of the largest electric power transmission plants in the country, to be utilized in lighting the streets of Chicago and furnishing power to industrial plants along the canal.

Chicago Heights, a village of Illinois, situated in Cook co., on the Chicago and Eastern Illinois, the Michigan Central, and other railroads, 25 miles S. of Chicago. It has many important industries, including manufactures of iron and steel, pianos and organs, fireproofing, chemicals, bricks, stoves, mining machinery, forges, blowers, and drills, woolen goods, roofing tile, heaters, etc. Pop. (1910) 14,525.

Chicago River. See CHICAGO.

Chicago, University of, a coeducational (non-sectarian) institution in Chicago, Ill., founded by John D. Rockefeller, dating from Sept. 10, 1890, when the university was incorporated under the laws of Illinois. An earlier institution known as the Chicago University had gone out of existence, owing to financial difficulties, in 1886. A number of members of the Baptist Church, which denomination had been interested in the old university, desired to have a college in Chicago, and succeeded in interesting John D. Rockefeller in the plan. He promised \$600,000 toward the establishment of the college if \$400,000 more should be raised by June, 1890. This amount was duly raised, and

Chicago

the plan was enlarged in scope so as to include a university instead of a mere college. Further large gifts were made by John D. Rockefeller and by others, and the doors were opened for instruction Oct. 1, 1892. The organization of the university and the remarkable growth of the institution are traceable in large measure to its first president, the late William R. Harper, who, after fifteen years of untiring service, died Jan. 10, 1906.

The site of the university includes many blocks of land, containing about 90 acres. It lies with a frontage of nearly three-quarters of a mile on both sides of the Midway Plaisance, between Washington and Jackson parks. A general architectural plan was adopted at the outset, and to this plan new buildings are successively adapted. The grounds are to be covered by a series of quadrangles, the buildings, in the English Gothic style, being constructed of gray Bedford stone, with red roofs. The foundations of the first building were begun Nov. 26, 1891. In 1908 there were on the grounds 31 permanent buildings. The Yerkes Astronomical Observatory, the gift of the late Charles T. Yerkes, is at Lake Geneva, Wis. The entire assets of the university June 30, 1908, including grounds, buildings with their equipments, and invested funds, amounted to \$23,476,601. Of this sum upward of \$16,000,000 had been given by John D. Rockefeller.

The plan of the university includes schools, colleges, and secondary schools. The schools organized up to March, 1908, were the Divinity School, the Graduate School of Arts and Literature, the Ogden School of Science, the Law School, and the College of Education. Courses in medicine (conducted in coöperation with Rush Medical College) and two preliminary years of engineering are provided pending the organization of medical and technological schools. A College of Commerce and Administration, affording preparation for higher commercial and industrial pursuits and for positions in the consular service, is also included in the organization of the university. Admission to the schools presupposes a bachelor's degree. The colleges provide the ordinary liberal education leading to the bachelor's degree, and the University High School (in the immediate vicinity) offers a college preparatory course.

Besides the work at the quadrangles, the university also conducts college classes, afternoons and evenings, for the benefit of teachers and others whose employments prevent attendance at the usual exercises. The university year is divided into four quarters of twelve weeks each, there being a recess of one week between successive quarters. Students may enter at the beginning of any quarter, at the quarterly convocation. No student or member of the faculty

Chickahominy

is ordinarily in residence for more than three quarters in any one year, but the system is one of great flexibility. The summer quarter, which is in no sense a "summer school," is largely attended by teachers from all parts of the country.

The university also conducts a division of Correspondence Instruction, and offers University Extension lecture courses in cities and towns throughout the upper Mississippi valley.

The number of students enrolled in 1892-93 (for three quarters) was 744; in 1906-07 (four quarters) it was 5,070. The distribution of this number was as follows: Divinity School, 418; graduate schools, 1,176; colleges, 2,726; Law School, 234; College of Education, 799; courses in medicine, 270; total (deducting repetitions), 5,070. The number of degrees given from the opening in 1892 to the end of 1907 was as follows: Doctor of Philosophy, 443; Master of Arts, Literature, or Science, 425; Bachelor of Divinity, 243; Bachelor of Arts, Philosophy, or Science, 2,852. The president in 1908 was Harry Pratt Judson, LL.D.

Revised by GEORGE E. VINCENT.

Chichen, or **Chichen-Itza**, the most remarkable of the many ancient ruined cities of Yucatan, Mexico; situated 18 miles S. W. of Valladolid. Its magnificent ruins appear to be of greater antiquity and are in better preservation than those found elsewhere in the same region. The remains of a lofty pyramid, great buildings, mural paintings, sculptures, etc., indicate the character of the civilization reached by the Itza tribe of Mayan stock, to whom archæologists attribute them. They became known to the world at the time of the Spanish conquest, and have been studied in recent times by Charnay, William H. Holmes, and others.

Chichester, a city of England, in Sussex, 17 miles E. N. E. of Portsmouth, and 28 miles W. of Brighton. It is a municipal borough and episcopal city. It stands on a plain between an arm of the sea and the South Downs, which rise gently to the N., is well built and has wide streets, and its old wall, still in good preservation and lined with lofty elms, gives it a picturesque appearance. Its principal edifice is the cathedral, a Gothic structure, erected in the twelfth and thirteenth centuries, which has one of the most graceful spires in England, and contains many monuments, including that of the poet William Collins, who was born and died here. The chief trade is in agricultural products and live stock. Brewing, malting, tanning, and wool-stapling are also carried on. Pop. (1891) 7,842; (1901, boundaries extended) 12,241.

Chickadee. See **TITMOUSE**.

Chickahominy, a river in Virginia, affluent of the James and running parallel to it

Chickamauga

for many miles from its source N. W. of Richmond. As it lay between the Union armies and Richmond, on and near it occurred many of the most important events of McClellan's Peninsula campaign in 1862, including the battles of Williamsburg, Hanover Court House, Fair Oaks, Mechanicsville, Cold Harbor, Savage's Station, Frazier's Farm, and Malvern Hill. The second battle of Cold Harbor, under Grant, took place in 1864.

Chickamauga, Battle of, a battle of the Civil War, fought on Sept. 19-20, 1863, near Chickamauga creek, Tenn., about 12 miles E. of Chattanooga, between a Confederate force of 70,000, commanded by Gen. Braxton Bragg (*q. v.*), and a Federal army of 55,000, under Gen. W. S. Rosecrans (*q. v.*). It has sometimes been styled "the Great Battle of the West." Bragg, compelled by Rosecrans to abandon Chattanooga, had started southward, and was believed by Rosecrans to be retreating toward Rome, Ga. The Federal army accordingly followed, through widely separated mountain passes. When Rosecrans perceived that the Confederate manœuvre was not a retreat, he speedily assembled his command and, despite Bragg's efforts, interposed it between the Confederates and Chattanooga. On Sept. 19, at 9 A. M., the battle was opened with an attack by Gen. Leonidas Polk (*q. v.*), commanding the Confederate right, upon the Federal left, commanded by Gen. G. H. Thomas (*q. v.*), the object being to gain control of the roads to Chattanooga. Thomas, however, maintained his ground. Early on Sept. 20 the Confederates renewed the attack. Owing to misinterpretation of an order from Rosecrans, the division commanded by Gen. T. J. Wood (*q. v.*) was withdrawn from the Federal center. Through the gap thus made poured the Confederate left, under the command of Gen. James Longstreet (*q. v.*), driving the Federal right and center in disorder toward Chattanooga. Thomas stood his ground, against great odds, and saved the army from utter defeat; hence his sobriquet, "the Rock of Chickamauga." During the night of Sept. 20 he fell back to Rossville, whence he withdrew to Chattanooga. Although the battle was nominally won by Bragg, Chattanooga remained in the possession of the Federal forces. The casualties were very heavy—16,179 killed, wounded, and missing for the Federals, 17,100 for the Confederates. With the coöperation of Georgia and Tennessee, about fifteen square miles, including Chickamauga battlefield and the scenes of other actions about Chattanooga, have been laid out as the Chickamauga National Military Park.

Chickasaw, an Indian tribe (nation) occupying a reservation in the S. portion of Oklahoma. The tribe has a chief and a legislature chosen by popular vote. Cotton

Chickweed

and corn are grown by the tribe. There are boarding academies and 15 schools, besides denominational mission schools. In 1899 the tribe numbered 8,730, although the total population of the reservation was 57,329. The trust funds aggregated \$1,308,685. The Chickasaw capital is Tishomingo. The tribe sends many youth to other parts of the country for higher education, and has enjoyed much material prosperity owing to the rich soil at its disposal.

Chicken-pox, the common name for varicella, a contagious and infectious disease which in some respects resembles modified small-pox, and is characterized by a specific eruption, which breaks out over the whole body, and runs a definite course in about eight or ten days. The disease appears to be the result of a specific poison which, after a period of latency or incubation, develops into one of more or less feverishness. This lasts for two or three days, when an eruption of pimples appears, at first on the body, then on the face and head, the fever subsiding as the rash appears. These pimples soon fill up with lymph, and become vesicles which in their turn, two or three days later, shrivel up and fall off in the form of crusts or scabs, seldom, however, becoming purulent or pitting as in the eruption of small-pox. Chicken-pox appears to have obtained its name partly from the pulse or pea-like (*Fr. chicke*) character of the rash in the first instance, and partly from the mild nature of the complaint as compared with small-pox. Swine-pox, bastard-pox, hives, horn-pox, pearl or stone-pox, are the names popularly given to this disease according to the character of the eruption, which varies somewhat in different cases. Adults seldom suffer from chicken-pox.

Chick-pea, the popular name of *Cicer arietinum*, which grows wild along the shores of the Mediterranean and in many parts of the East, producing a short puffy pod with one or generally two small wrinkled seeds. It is an important article in French and Spanish cookery, and the plant is cultivated in Europe, Egypt, Syria, India, Mexico, etc. When roasted it is the common parched pulse of the East. The herbage serves as fodder for cattle.

Chickweed, the popular name of *Stellaria media*, order *Caryophyllaceæ*, one of the most common weeds in cultivated and waste ground everywhere in Great Britain, flowering throughout the year. It has a procumbent more or less hairy stem, with ovate pointed leaves, and many small white flowers. It is much used for feeding cage-birds, which are very fond both of its leaves and seeds.

Chiclayo

Chiclayo, a city of Peru, 12 miles S. E. of Lambayeque; is the center of a valuable sugar district. Pop., 14,000.

Chicory, the root of the *Cichorium intybus*, wild succory or chicory. The plant is cultivated in various parts of Europe and



CHICORY.

America, growing well in a gravelly and chalky soil. The roots were formerly used medicinally, possessing properties resembling those of the dandelion. The root roasted has been employed as a substitute for coffee for more than a century. It is now used extensively as a mixture with genuine coffee. Its presence is easily detected by the microscope, and by the brown color which is im-

mediately produced when a few grains are thrown into cold water. Chicory root is heated in iron cylinders, which are kept revolving as in roasting coffee. Usually about two pounds of lard are added to every hundred-weight of the kiln-dried root during the roasting process. Sometimes butter is used. By this a luster and color resembling that of coffee is imparted to it. When roasted the chicory is ground to powder and mixed with the coffee. As in the case of many other adulterants chicory itself is sometimes adulterated, the adulterants being roasted pulse, damaged wheat, parsnips, carrots, logwood and mahogany dust, burnt sugar, dog-biscuit, and even baked livers of horses and bullocks. Venetian red and ruddle are used to color it.

Chicopee, a city in Hampden county, Mass., on the Connecticut and Chicopee rivers, and on the Boston and Maine railroad, 3 miles N. of Springfield. It is connected with Holyoke and Springfield by electric street railway lines and contains the villages of Chicopee Falls, Willamamsett and Fairview. It is an important manufacturing city, and has fine water power, obtained from Chicopee Falls. Its manufactures include bicycles, blankets, military equipments, brass and cotton goods, machine tools, etc. It has a high school, graded public schools, public library, news-

Chief=Justice

papers, a National and several savings banks, and an assessed property valuation of over \$6,000,000. Pop. (1890), 14,050; (1900) 19,167; (1910) 25,401.

Chief, in heraldry, an ordinary consisting of the upper part of the field cut off by a horizontal line. It is generally made to occupy one-third of the area of the shield. The expression "in chief" means not on a chief, but that the charge is borne in the upper part of the shield.

Chief=Justice, the title of the presiding Justice of the Supreme Court of the United States, and of the presiding Justice of the several State Supreme Courts. Various other courts in the United States are also presided over by a Chief-Justice. The following is a list of the persons appointed as Chief-Justice of the Supreme Court of the United States some of whom, however, never served:

John Jay, of New York, appointed by Washington, Sept. 26, 1789; resigned, 1791.

John Rutledge, of South Carolina, appointed by Washington, July 1, 1795; rejected by the Senate, Dec. 15, 1795.

William Cushing, of Massachusetts, appointed by Washington, Jan. 26, 1796; declined promotion from his associate justiceship.

Oliver Ellsworth, of Connecticut, appointed by Washington, March 4, 1796; resigned, 1800.

John Jay, of New York, appointed by John Adams, Dec. 19, 1800; declined.

John Marshall, of Virginia, appointed by John Adams, Jan. 31, 1801; died, July 6, 1835.

Roger Brooke Taney, of Maryland, appointed by Jackson, March 15, 1836; died, Oct. 12, 1864.

Salmon Portland Chase, of Ohio, appointed by Lincoln, Dec. 6, 1864; died, May 7, 1873.

George H. Williams, of Oregon, appointed by Grant, 1873; rejected.

Caleb Cushing, of Massachusetts, appointed by Grant, 1873; rejected.

Morrison R. Waite, of Ohio, appointed by Grant, Jan. 21, 1874; died March 23, 1888.

Melville W. Fuller, of Illinois, appointed by Cleveland, July 20, 1888; died July 4, 1910.

Edward D. White, of Louisiana, appointed by Taft, Dec. 12, 1910.

Chief-Justice, or **Lord Chief-Justice**, in England, the presiding judge in the Queen's Bench division of the High Court of Justice, and, in the absence of the Lord-chancellor, president of the High Court, and also, *ex officio*, one of the judges of the Court of Appeal. The Chief-Justice of the Common Pleas, previous to 1881, was the presiding judge in the Common Pleas division of the High Court of Justice, but the

office is now merged in that of the Chief-Justice of England. The title Chief-Justice is also generally given in the various British colonies to the heads of the different judicial establishments, as in Canada, Australia, etc. In Canada there is not only a Chief-Justice at the head of the Supreme Court of the Dominion, but also Chief-Justices in the separate provinces.

Chiff-chaff (*Sylvia* or *Phyllopneuste rufa*), a bird, so called from its cry, one of the warblers, a summer visitant to England from the Continent, 4 or 5 inches long; inhabits woods and thickets, and destroys many insect larvæ.

Chigi (kē'jē), a princely Italian family, whose founder was Agostino Chigi (died 1512), of Siena, who in Rome became banker to the popes, and was noted for his pomp and encouragement of art. See Cugnoni's "Agostino Chigi il Magnifico" (Rome, 1881). A descendant, Fabio Chigi, occupied the papal throne as Alexander VII. (1655-1667). Flavio Chigi, born in 1810, was, till 1848, in the papal guard, and then became Bishop of Mira *in partibus*, nuncio at Munich, and till 1873 at Paris, and died a cardinal, Feb. 15, 1885. The head of the family is Prince of Campagnano and Duke of Ariccia, and is also hereditary marshal of the Conclave.

Chignecto Bay, an inlet at the head of the Bay of Fundy, in British North America. It separates Nova Scotia from New Brunswick, is 30 miles long and 8 broad, and has an isthmus of only 14 miles in width between it and Northumberland Strait, in the Gulf of St. Lawrence.

In October, 1888, work was begun on the construction of a ship railway across the neck of land connecting Nova Scotia with the main land of Canada, under the encouragement of an annual subsidy from the Canadian Government. The promoters had spent nearly \$4,000,000 on the work, when in 1890 a financial depression in London prevented them from obtaining further capital. As the subsidy from the Canadian Government was to be payable on the completion of the work in a given time, the contractors were unable to secure any aid from that source. In March, 1901, the undertaking was revived with a prospect of sufficient capital to complete it. The scheme was described as one of the great engineering projects of the day. The railway was projected to be 18 miles long, and by uniting the Gulf of St. Lawrence with the Bay of Fundy and the waters of the Atlantic Ocean would save shipping a run of several hundred miles around the province, the railway being planned to carry vessels of all sizes overland.

Chignon (shēn-yōn'), (1) the back of the neck, (2) back 'lair; cognate with

chainon = the link of a chain; the back hair of women, a protuberance of artificial hair on the hinder part of the head, worn by women about 1866-1875.

Chigre, a name given to a species of apterous insects of the flea kind, *pulex penetrans*, which takes its name from its penetrating the skin and breeding there, unless speedily taken out. It is a source of great annoyance to its victims. It is common in the warmer parts of the United States.

Chihuahua (chē-whä'whä), the largest State of Mexico; bounded on the N. and N. E. by New Mexico and Texas; area, 87,802 square miles; pop. (1900), 327,784. In the E. is the *Bolson de Mapimi*, a vast desert of sand and alkali plains; in the S. and W. the surface is mountainous, and there are numerous rivers. The State is better adapted for stock-raising than for agriculture; the fertile districts are mainly confined to the valleys and river-courses. Cotton is grown in the S. The silver mines were for centuries among the richest in Mexico, and though many are now abandoned, mining is still the chief industry. The State is traversed by the Mexican Central Railway. The capital, Chihuahua, 225 miles S. of El Paso, rises like an oasis in the desert, among roses and orange groves. It is well built, with broad, clean streets, an imposing cathedral (1717-1789), a mint, and an aqueduct 3 miles long, and is the center of considerable trade with Texas. Founded in 1691, it had in the 18th century 80,000 inhabitants. Pop. (1910) 39,961.

Chilaw, a seaport town on the W. coast of Ceylon, 45 miles N. by W. of Colombo, formerly a place of greater importance than it is now.

Chilblain, a blain or sore on the hands or feet produced by cold, especially if the parts were previously much heated. There are three types of the disease. In the first or mildest, there are redness and swelling, with much heat and itching. In the second the affected part becomes greatly swollen, and of a red or blue, or even of a purple, hue. In the third, or severest type, vesicles rise on the swollen skin, which become sores, discharging irritating matter. The disease affects young people more frequently than adults, and girls oftener than boys. A cure of mild chilblains may sometimes be effected if they be rubbed with snow or ice water, and finally immersed in it till the pain and itching cease. This should be repeated several times a day, the affected parts being dried and inclosed in leather casings.

Child, Francis James, an American poet and educator; born in Boston, Mass., Feb. 1, 1825. He was Professor of Rhetoric and

Oratory at Harvard from 1851 till 1876, when he exchanged for the chair of English literature. His principal work, "English and Scottish Ballads," a subject on which he was the highest authority in this country, he improved and enlarged for publication in 1886. Among his other works are: "Four Old Plays" (1848), and a collection of "Poems of Sorrow and Comfort" (1865). He died in Boston, Sept. 11, 1896.

Child, Lydia Maria, an American prose-writer; born in Medford, Mass., Feb. 11, 1802. Her first novel, "Hobomok," was written and published in 1821. She was an ardent abolitionist, and published the first book written on that subject, entitled "Appeal for that class of Americans called African." Dr. Channing went over to Roxbury to thank her for it. Among her numerous works are: "Philothea," a romance of Greece in the days of Pericles (1835); "Fact and Fiction" (1846); "Looking Toward Sunset" (1864); "Miria: A Romance of the Republic" (1867); and "Aspirations of the World" (1878). A collection of her letters, with an introduction by John G. Whittier, and an appendix by Wendell Phillips, was published in 1882. She died in Wayland, Mass., Oct. 20, 1880.

Childebert (shēld-bār'), the name of three kings of the Merovingian dynasty, France. The first of this name was the third son of Clovis, and born about A.D. 495. On his father's death, in 511, he succeeded to the kingdom of Paris. Died in 558. Childebert II. was the son of Sigebert and Brunehaut, and born about 570. He died in 596. Childebert III., surnamed the Just, son of Thierry I., King of the Franks, was born about 683, and died in 711.

Childermas, or Holy Innocents' Day (Dec. 28), is observed by the Church of Rome with masses in commemoration of the children killed by Herod. It was long considered unlucky to marry or to begin any work on this day, and from Fenn's "Letters" we learn that the coronation of King Edward IV. was put off till Monday, because the preceding Sunday was Childermas Day. Innocents' Day is also a red-letter festival of the Church of England.

Children, Societies for the Prevention of Cruelty to, organizations that had their origin in New York City, and have since been adopted in most American and many European cities. Experience has proved that defenseless children, even within the range of our boasted civilization, are not infrequently grossly maltreated by parents or other legal protectors, and that therefore special legislation is necessary to secure their proper treatment. To ameliorate the condition of children has therefore entered largely into the scope of modern legislation. The operations of the societies

show in the strongest light the necessity for their action, though it is but a few years since this special agency was introduced. Under seven a child is supposed to be incapable of committing felony. Between seven and fourteen it is held to be *doli incapax*, i. e., incapable of crime, while above 14 it is *doli capax*, i. e., capable of crime. If, however, anything atrocious be done with obvious malice by a child, it may be held that *malitia supplet ætatem*, malice supplies (the want of) age. The age at which a child can be sworn as a witness depends on the education it has received and its apparent comprehension of the nature and obligation of an oath.

Children's Crusade, The, a singular movement in 1212, preached in France by Stephen, a peasant boy, and in Germany the same year by Nicholas, also a peasant boy. Some 90,000 children left their mothers and schoolmasters in the spring "to rescue the Holy Land from the infidels," and ships were placed at their disposal. The French contingent embarked at Marseilles in August; part perished the same month by shipwreck on the island of San Pietro, and the rest were sold into slavery to Mohammedans. The German contingent reached Genoa in August, and was utterly dispersed by various disasters before the next spring.

Childs, George William, an American philanthropist and publisher; born in Baltimore, Md., May 22, 1829. He published the Philadelphia "Public Ledger," 1864-1894. He gave a Shakespeare memorial fountain to Stratford-on-Avon, a memorial window in Westminster Abbey to Cowper and Herbert, and assisted in establishing a home for printers at Colorado Springs. He published: "Recollections of General Grant" (1885), and "Personal Recollections" (1889). He died in Philadelphia, Feb. 3, 1894.

Chile, a republic of South America, bounded on the N. by Peru, E. by Bolivia and the Argentine Republic, S. and W. by the Pacific Ocean; area, 307,620 square miles; pop. (1907) 3,871,000, of which the great majority was of European origin; capital, Santiago; pop. (1907) 389,000.

Topography.—The Andes extend in two parallel lines throughout nearly the entire length of the country. Between these two ranges of the "Cordillera" there is a central valley or tableland which attains its greatest breadth between 33° and 40° S. The streams in the N. are of little importance, being mostly shallow brooks; in the S. they are larger and more numerous, though most are navigable for only a few miles. The principal rivers are the Maipo, which waters the valley of Santiago; the Maule; the Biobio, the largest river in the

country; the Cautin, or Rio Imperial; the Bueno, and the Callecalle, or Rio de Valdivia (100 miles), the most important of all, because of the sheltered harbor at its mouth. In the S. are also many deep lakes, such as Llanquihue (30 miles long by 22 broad) and Ranco (32 by 18 miles). The most important islands are those constituting the province of Chiloe; Juan Fernandez also belongs to Chile. Owing to its great extension from N. to S., Chile comprises regions of very different nature and climate. The N. provinces are arid, rainless districts, where the principal industry is mining and extraction of saltpetre. The middle and S. provinces are agricultural and viticultural, and have also valuable coal fields. The Patagonian region is densely wooded and sparsely inhabited by a few Indians. The Andes are almost everywhere visible, covered with perpetual snow. The highest peak is Aconcagua, 22,867 feet. The average height of the range is 8,000 feet. There are many volcanic peaks, mostly extinct. Among these may be mentioned Tupungato, Descabezado, Chillan, Osorno, and Villa Rica. Chile is subject to frequent shocks of earthquakes, and occasionally to destructive floods. The most notable of seismic movements recorded was in 1822, when the coast near Valparaiso was thrown up permanently between 3 and 4 feet; this elevation extended over 100,000 square miles. In 1835 Concepcion and Talcahuano were destroyed by a fearful earthquake which produced disaster all over the Southern provinces.

Climate and Productions.—The climate of Chile is temperate. In the N. it is moderately hot and rainless, but banks of clouds always hang overhead, and heavy dew falls at night. In the S. it is dry for about eight months of the year, and rainy the other four. The temperature is remarkably even and pleasant, and always cool at night. The S. wind blows fiercely during many days of summer, dry and cold; the N. wind brings heat, tempest, and rain; other winds are unknown. Central Chile, between lat. 32° and 36°, is fertile. In Southern Chile generally the land is poor, and on account of excessive rain of hardly any value for agriculture, which, indeed, is carried on in a very primitive fashion, but the soil of the valleys, where large herds of cattle graze, is very fertile. Vines, also, grow well on the Maipu and Mapocho plains and on the hillsides, and the wines of the country are superseding in Chile the French red wines. Wheat and vineyard products are the chief staples, but maize, hemp, barley, beans, and various root edibles are extensively cultivated. Among the natural mineral products are gold, silver, quicksilver, copper, lead, iron, antimony, bituminous coal, and nitrate of soda,

the latter forming an important article of export. It is derived from large deposits in the N. desert tablelands, and is used in fertilizing, over 1,000,000 tons having been exported in 1890.

Commerce.—Official reports for 1899 showed imports to the value of \$106,260,358, chiefly sugar, coal, cattle, cotton goods, oil, tea, candles, and iron; exports, \$163,106,133, chiefly sodium nitrate (Chile saltpetre), copper, iodine, silver, wheat, and shoe leather. The import trade is mostly with Great Britain and Germany.

Finances.—The revenue for the year 1900 was estimated at \$122,401,572, and the expenditures, \$106,058,200. The principal expenditures were for finances, public works, public instruction, army and navy. The external debt in 1900 was \$229,333,300, the interest upon which amounts to \$12,872,733. The internal debt was \$20,500,000. In 1900 the State property consisted of movable property, \$29,899,422; credits on land and nitrate fields, \$15,000,000; registered National property, consisting of State railways, dry docks, and public buildings, \$176,363,137; and inventoried unregistered National property, consisting of railways in course of construction, public lands, guano deposits, and nitrate fields, \$450,000,000; making a total of \$671,262,559.

Communications.—Chile was the first South American State to construct railways. In 1898 there were 2,661 English miles of lines open to traffic, of which the State owned 1,233 miles. The revenue of the State railways in 1899 was 13,259,607 pesos, expenditures, 12,878,248 pesos. The cost of the State lines to the end of 1897 amounted to 82,269,660 pesos. A railway system crossing the Andes has 18 miles in Chile and 88 in the Argentine Republic, connecting the Atlantic and Pacific Oceans from Buenos Ayres to Valparaiso. There were 9,832 miles of telegraph lines with 229 offices, through which 1,255,806 telegrams were sent during the year. In 1896 there were 626 postoffices, transmitting 59,924,707 letters and newspapers, having a revenue of 951,816 pesos, and expenditure, 890,658 pesos.

Government.—The government is that of a republic, the chief magistrate being a President, elected for five years, who is thereafter ineligible to immediate reelection. The President has a cabinet consisting of six members and a Council of State of 11, six of whom are named by Congress. Legislation is conducted by a Chamber of Deputies, chosen by popular vote, one for each 30,000 or major fraction thereof, and who serve three years, renewable by thirds every three years; and a Senate, members of which are chosen for nine years, one for each three deputies, by direct popular vote. For administrative purposes Chile is di-

vided into 24 provinces and territories, and the provinces in turn into departments, sub-delegations, and districts. Each province is governed by an intendant (nominated by the President), who also acts as governor of the department in which the capital of the province is situated. The departments are governed by governors, the minor divisions by sub-delegates and inspectors. The established religion of Chile is Roman Catholic, but the constitution guarantees freedom of worship. Education receives much attention, but is not compulsory. In 1899 there were 1,403 public primary schools, with 106,348 pupils, 70,607 in average daily attendance, and 2,365 teachers. There were also 445 private schools, with 26,194 pupils; the National University of Santiago, with over 800 students; the National Institute at Santiago, 1,300 students; two lyceums for girls maintained by the government at Santiago, and public lyceums for men and women at the head town of each province. There are besides a free Catholic University at Santiago, a Catholic Seminary, several private colleges, an Academy of Mining in Copiapo, a School of Mechanic Arts, and a Conservatory of Music.

History.—The name of Chile is supposed to be derived from an ancient Peruvian word signifying "snow." The N. portion, as far as the river Maule, formed part of the dominions of the Incas of Peru, and the S. was held by the valiant Araucanians. The first European to land in Chile was the Portuguese discoverer Magellan, at Chiloe, in 1520. After the conquest of Peru by Pizarro, an expedition was made to Chile from that country overland, under the leadership of Diego de Almagro in 1535. This expedition penetrated as far as the Rio Clano, but returned unsuccessful. Another was sent under command of Pedro Valdivia in 1540, which succeeded in annexing the territory as far as the river Maipu. Santiago, the capital, was founded by Valdivia in 1542. During the colonial period the governors of Chile were appointed by the King of Spain, but were subordinate to the viceroys of Peru. In 1810 a revolt against the Spanish power broke out, in which Don Bernardo O'Higgins, son of one of the last viceroys of Peru, but a native of Chile, played a conspicuous part, and finally became the first dictator of the new republic. The conflict between the Spanish troops and the Republican army continued until 1826, when peace was definitely settled and Chile left to govern itself. The first constitutional president was Gen. Blanco Encalada. The government was unsettled till 1830. In 1833 the present constitution was adopted. Revolutions broke out in 1851 and 1859, but since then there has been no serious at-

tempt to overturn the government by force of arms. In 1864 Chile gave Peru very valuable support in her war with Spain. Valparaiso was bombarded by the Spaniards in 1866. In 1879 Chile declared war against Bolivia on account of an alleged violation of treaty rights, and immediately after against Peru, with which Bolivia was allied. For a time the Peruvian fleet kept the Chileans in check, but in August, 1879, the Peruvian ironclad "Huascar" was captured by the Chilean men-of-war "Cochrane" and "Blanco Encalada," both armor-plated. After this event the success of the Chileans was uninterrupted. Peruvian towns were bombarded, and their other warships captured. Finally Lima was taken by storm on June 21, 1881. The Chileans occupied Lima and Callao until Oct. 30, 1885, when a treaty of peace was signed between Chile and Peru. Up to 1900 no treaty of peace had been signed by Chile and Bolivia; a treaty of indefinite truce having been agreed to in 1884. In 1885 Jose Manuel Balmaceda, representing the Liberal party, was elected President. He undertook sweeping reforms and thereby aroused the hostility of the Conservative party, who accused him of plotting to name his successor. The hostile factions organized a rebellion, and formed a junta, or provisional government, under whose management the forces of Balmaceda were repeatedly defeated. He was finally shut up in Santiago, seeking refuge in the house of the Argentine minister, where he committed suicide, Sept 19, 1891. During these hostilities the United States Minister, Patrick Egan, aroused the hostility of the revolutionists by appearing to side with Balmaceda and to misrepresent the strength of the revolution in his dispatches. He afforded an asylum also to fugitives of Balmaceda's army. In a riot in Valparaiso some United States marines were set upon and wounded. Reparation was demanded and refused, and war between Chile and the United States seemed imminent. Two war vessels were sent to Chile to enforce the demands of the United States, when the new President, Montt, tendered an apology, and the Chilean government provided compensation for the wounded men, which ended the incident peacefully. SENOR DON CARLOS M. VICUNA.

Chi-Li, or Chih-Li, one of the 18 provinces into which China proper is divided. It has an area of 58,949 square miles and is bounded N. by Mongolia, E. by the gulf called Pe-Chi-Li, and by the province of Shang-Tung, and W. by the province of Shan-Hsi. Chi-Li is in many respects the most important of the Chinese provinces, containing as it does the imperial capital, Peking, the treaty port of Tien-Tsin, and the only completed line of railway in the Empire. The Great Wall runs across the

Chi-Li

whole of the N. part of Chi-Li, while on the coast are the forts of Taku, and the nearest approach to a naval station belonging to the Chinese government. The province is mountainous and traversed by important rivers, notably the Pei-Ho, the Lan, the Ho-Kien, and the Hu-to. The Yu-Ho is especially important because of the canal system developed throughout its course in Chi-Li. The provincial administration is in charge of a viceroy (Tsoung-tou) and a Fou-youden or sub-governor. There are numerous towns of the first, or Fu class, second or Chou class, and third or Hien class. These towns are surrounded by walls. There are Christian missionaries of many denominations throughout the province.

No census has been taken since 1879 when the population was returned as 17,937,000. In 1900 the population was estimated at 25,000,000, including a large Manchu element. They are engaged in commerce, Chi-Li having much communication with Russia by way of Siberia. The climate is at times severe, the Pei-Ho being generally frozen over from December to March. The Belgians, the Italians, and the English have important railway concessions in the province. There is a good system of telegraph lines. The exports are principally bristles, feathers, wool, skins, etc. The railway system open for traffic in 1900 was 290 miles in length, 79 miles from Peking to Tien-Tsin, 27 miles from Tien-Tsin to Tang-Kou (near Taku), 144 miles from Tang-Kou to Shan-hai-Kwan, a point where the Great Wall touches the sea, and an extension of 40 miles beyond toward Manchuria.

Chi-Li has valuable coal mines at Kai-Ping and other mineral resources. The soil is fertile. The provincial capital is Pao-Ting-Fu, 80 miles from Peking. Russian influence is believed to prevail in the finances, but the American China Development Company holds important concessions. See BOXERS: CHINA.

Chiliasm, the belief that Christ will come to earth and rule the world from Jerusalem for 1,000 years. The Latin word "millennium" means the same thing. The Revelation of John is the chief authority of the Chiliasts. Papias, Justin Martyr, Irenæus, Tertullian, and Lactantius were Chiliasts, but Origen was opposed to the notion. Papias, bishop of Hierapolis, says, in the millennium "every vine will bear 10,000 branches, every branch 10,000 shoots, every shoot 10,000 sprigs, every sprig 10,000 bunches, every bunch 10,000 berries, and every berry 36 times 25 gallons of wine; and if a saint comes to pluck a berry it will cry out, "Pluck me, O saint; I am better for being plucked, praise the Lord."

Chillianwallah

The Fifth Monarchy Men were, of course, Chiliasts, only they maintained that the golden age had begun, and that they were of it.

Chilkat Inlet, the W. arm of Lynn Canal, an inlet in Alaska, in about 50° 7' N. lat.

Chilkat, or Dalton, Pass, a route in Alaska traversed by miners in reaching the gold fields of the Klondike. It is an overland trail, which was used for many years by J. Dalton, a trader, as a pack train route and for driving in cattle. It follows a direct course, more or less independent of waterways, from Chilkat Inlet to Fort Selkirk, and is said to be less difficult than the road over Chilkoot Pass.

Chilkoot Inlet, the Eastern arm of Lynn Canal, an inlet in Alaska. It is again subdivided, its principal arm being called Taig, an inlet which stretches for 15 miles N. and S. in about 135° 20' W. lat.

Chilkoot Pass, a pass over the mountains in the Northern part of Alaska, traversed by thousands of gold-seekers in the Klondike gold fields' excitement in 1897-1898. By way of the Chilkoot Pass is the most direct route to Dawson City, the principal starting point to the Klondike region. The trail starts from Dyea, along the river of that name, and crosses the Pass at an elevation of 3,500 feet, to the head of Lake Lindeman, a total distance of 28½ miles. From the latter place to Dawson City is 548 miles. The Chilkoot Pass route is the old trail used for generations by the Indians, and for many years was the only one taken by miners and prospectors to reach the interior. It is by far the shortest route to the Yukon. The difficulties and dangers attending this route are many, and the steepness and roughness of the ascent have proved fatal in numerous instances, to those unaccustomed to endure hardships. The summit of the Pass is 13 miles from Dyea, the first 6 miles being traversed by a good wagon road. Owing to the winding of the Dyea river that stream must be crossed several times by ford or ferry. The trail then enters a narrow canyon with steep, rocky sides, which it follows to Sheep Camp, 4½ miles farther on, which point is the timber line. From Sheep Camp to the Summit the rise is from 1800 feet in three and a half miles, to 1,000 feet in half a mile, and here masses of broken rock make the ascent, which is in some places almost perpendicular, difficult and hazardous. It is at this point that the aerial tramway is built.

Chillianwallah, Battle of, an engagement in India between the Sikh forces in considerable strength, and the British commanded by Lord (afterward Viscount) Gough, fought Jan. 13, 1849. The Sikhs were completely routed, but the loss of the British was very severe: 26 officers were

Chillicothe

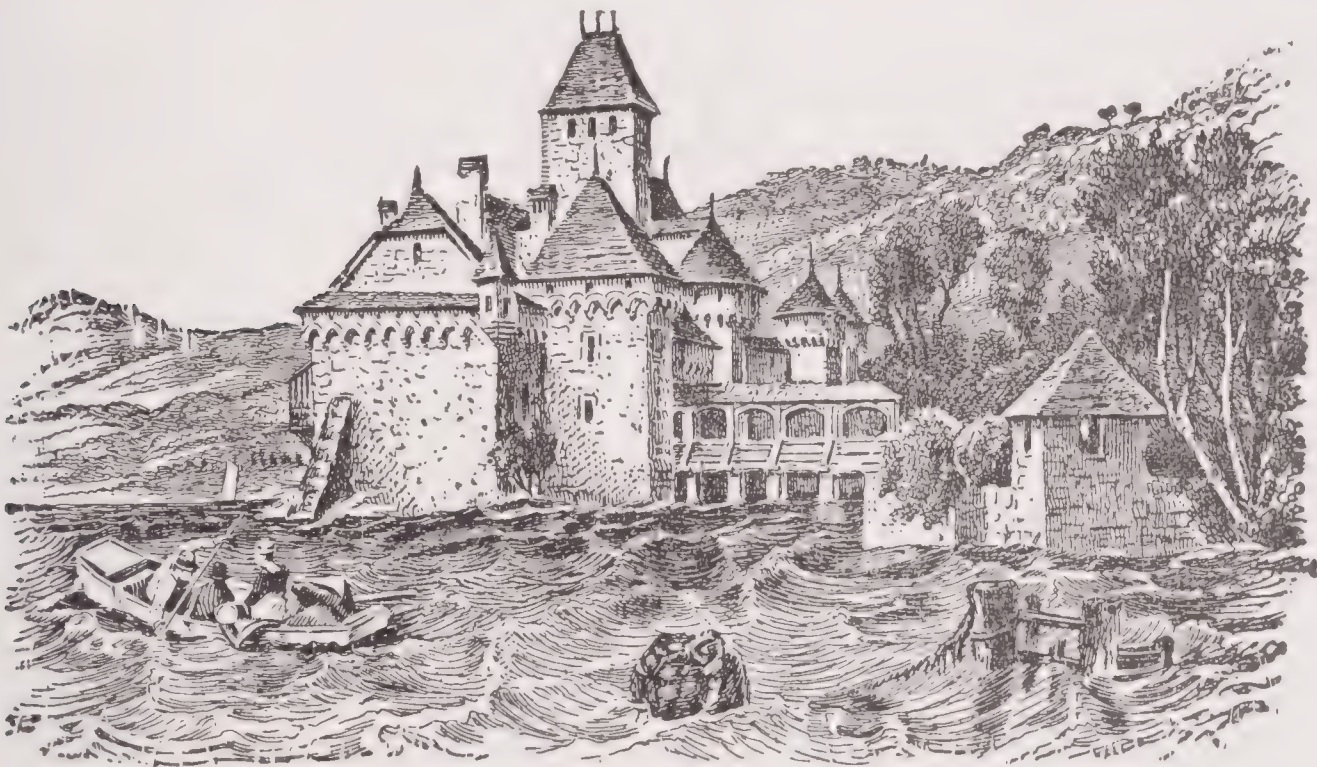
killed and 66 wounded, and 731 rank and file killed, and 1,446 wounded. The Sikh loss was 3,000 killed and 4,000 wounded. On Feb. 21, Lord Gough attacked the Sikh army, under Shere Singh, in its position at Goojerat, with complete success; and the whole of the enemy's camp fell into the hands of the British.

Chillicothe, a city and county-seat of Livingston county, Mo.; on the Wabash and Chicago, the Milwaukee and St. Paul, and the Hannibal and St. Joseph railways, 70 miles E. of St. Joseph. It is a farming trade center and has several manufacturing industries. It is the seat of the Chillicothe Normal School, State Hospital, State Industrial School for Girls, and St. Mary's Hospital, and is near the noted health resort, Laurel Mineral Springs. It has several daily and weekly newspapers, electric lights and

Chillon

black. The white color on the body, however, is artificially produced, the owner causing all spotted calves to be killed. They are now generally believed to be the descendants of the mountain bull or Urus, which was wild in Gaul at the time of Cæsar's invasion, and the stock whence modern breeds of domestic English cattle have been derived. Some writers have thought them descended from ordinary cattle which have become wild, and others have made them a distinct species, *Bos Scoticus*. Prof. W. Boyd Dawkins considers them the last surviving representatives of the gigantic Urus of the Pleistocene period, reduced in size and modified in every respect by their small range and their contact with man.

Chillingworth, William, an English clergyman; born in Oxford in 1602, and



CHILLON CASTLE.

street railroads, two National banks, and an assessed property valuation of \$6,000,000. Pop. (1900) 6,905; (1910) 6,265.

Chillicothe, a city and county-seat of Ross county, O.; on the Scioto river, Point Creek, the Norfolk and Western, the Cincinnati, Hamilton, and Dayton, and the Baltimore and Ohio railroads, and the Ohio and Erie canal, 50 miles S. of Columbus. It is in an agricultural and coal mining region, and has flour mills, foundries and machine shops, daily and weekly newspapers, three National banks, and an assessed property valuation of \$6,000,000. Pop. (1890), 11,288; (1900), 12,970; (1910), 14,508.

Chillingham Cattle, certain cattle of both sexes, preserved in a semi-wild state in Chillingham Park, England. They are pure white, except the muzzle, which is black, and the horns, which are tipped with

educated at Trinity College, where metaphysics and theology were his favorite pursuits. Subtle reasoning on authority and infallibility led him for a time into the Church of Rome, but he afterward returned to the English Church, and published in 1638 a great work in justification of himself, "The Religion of Protestants a Safe Way to Salvation." He was made Chancellor of the bishopric of Salisbury, and on the outbreak of the civil war supported the king's cause and was made prisoner at the surrender of Arundel Castle. He died Jan. 30, 1644. Sermons and other works were also published by him, but his "Religion of Protestants," which formed an epoch in English theology, is what has given him lasting fame.

Chillon, Castle of, a fortress of Switzerland, in the canton Vaud, 6 miles S. E. of

Chilo

Vevay. It stands on an isolated rock at the E. end of the Lake of Geneva, the waters of which are, according to Byron:

"A thousand feet in depth below."

It was built in 1238, by Amadeus IV. of Savoy, and was long used as a State prison. In 1859 it was occupied as an arsenal. Near this castle Rousseau fixed the catastrophe of his "Heloise," and in it, Bonnard, Byron's "Prisoner of Chillon," was confined for several years.

Chilo, one of the seven wise men of Greece. See CHILON.

Chiloe (chē-lō-ā'), the insular province of Chile; consists of the island of that name on the W. coast, which is separated from the mainland by a narrow strait on the N., and by a gulf 30 miles wide on the E., and has a length of 115 miles, and an extreme breadth of 43 miles, and of a number of neighboring islets, mostly uninhabited; total area, 3,995 square miles; pop. (1895), 77,750, almost all Indians living on the principal island. Chiloe proper is hilly in the interior, and everywhere covered, except immediately along the shores, with nearly impassable forest. The climate is mild and not unhealthy, although inordinately wet. The Indians belong to a subdivision of the Araucanian family; they are a gentle and honest race, mostly engaged in fishing and in lumbering, timber being at present the chief export from the island, though immense deposits of coal have been reported. The capital, Ancud, on the N. coast, has a good harbor, is the seat of a bishop, and has a population of (1895) 3,182.

Chilon, or **Chilo** (kī'lon), one of the so-called seven wise men of Greece. He flourished about the beginning of the 6th century B. C., and was a native of Sparta, and one of the Ephori, or chief magistrates. A collection of his sayings is extant.

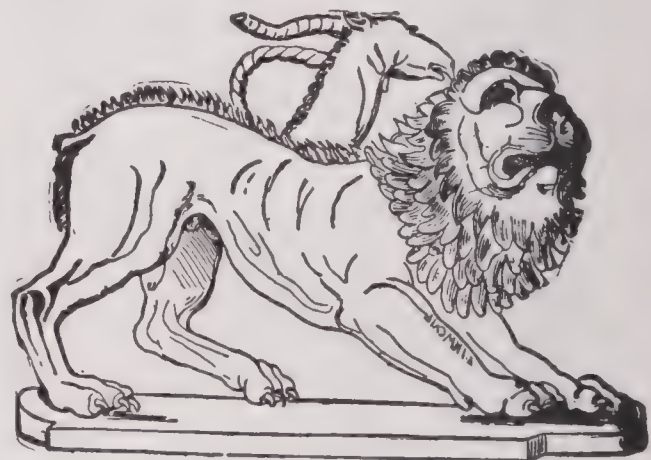
Chiltern Hills, a range of flint and chalk hills in England, extending through Oxford, Hertford, and Buckingham shires; loftiest summit 905 feet. These hills were anciently covered with forests, and were infested by numerous bands of robbers. The steward of the CHILTERN HUNDREDS is an officer of the crown, appointed to protect the people of Bucks from the robbers of the Chiltern hills. This office is now a sinecure, but as a member of Parliament can only resign his seat by accepting office, he accepts this sinecure, which he immediately vacates for the benefit of others. The stewardship of the manors of East Hundred, Northshead, and Hempholme, are other sinecure offices made use of for the same purpose.

Chimborazo, a conical peak of the Andes, in Ecuador, 20,517 feet above the

Chimes

sea but only about 11,000 above the level of the valley of Quito, to the N. The "silver bell" of perpetual snow and glacier was long erroneously regarded as the loftiest mountain not only in America, but in the whole world. In 1745 La Condamine ascended to 16,730 feet; no complete ascent had been made till Whymper in 1880 twice reached the summit. The peak gives name to the province of Chimborazo, to the S. with an area of 5,523 square miles, and a pop. of 122,300.

Chimera, a fabulous monster sprung from Echidna and Typhon. It had three heads, a lion's, goat's, and dragon's, and continually vomited flame. The fore part of its body was that of a lion, the middle a goat, and the hinder a dragon. Its usual abode was Lycia, and in the reign of Jobates it was conquered by Bellerophon, mounted on the horse Pegasus. This fabulous tradition is explained by the account given of a burning mountain in Lycia, whose top was a desolate wilderness, the resort of lions; the middle, being fruitful, was frequented by goats; and, at the bottom, the marshy ground abounded with serpents. Bellerophon is said to have conquered the Chimera because he first made his habitation on that



CHIMERA.

mountain. Plutarch says that by it is meant a pirate captain, who adorned his ship with the images of a lion, a goat, and a dragon.

Chimere (shī-mēr'), the upper robe to which the lawn sleeves of a bishop are attached.

Chimes, a number of bells attuned to each other in diatonic succession. A peal consists of three or more bells in harmonic succession, which may be rung successively or simultaneously, but will not admit of a tune being played upon them. Thus a set embracing the eight notes of the common scale will constitute a chime, while a set upon the first, third, fifth, and eighth of the scale would be a peal. The smallest number of bells that can be said to consti-

Chimney

tute a chime is five, but the number may be increased indefinitely. The usual number is at least nine, which number embraces the eight notes of the natural scale, with the addition of a flat seventh. Apparatus for ringing chimes is said to have been first made at Alost, in East Flanders (Belgium), in 1487. Pottheff, the chime-player of Amsterdam, in the latter part of the 18th century, played pianoforte music with facility. Each key required a force equal to two pounds' weight. See BELLS.

Chimney, the flue, vent, or passage through which the smoke escapes from the fire into the open air. The following are the names of the various parts of the chimney: The opening into the room is the fireplace. The floor of the fireplace is the hearth. The paved portion in front of the hearth is the slab. At the back of the fireplace is the fire-back. The flaring sides of the fireplace are the covings. The vertical sides of the opening, a part of the wall of the apartment, are the jambs. The chimney-place is the ornamental dressing around the jambs and mantel. The entablature resting on the latter is the mantel. The mantel-shelf, or mantel-piece, rests thereupon. The whole hollow space from the fireplace to the top of the wall is the funnel, or chimneyhood. The contracting portion of the funnel is the gathering. The narrowest part is the throat. The throat is closed (at times) by a damper. Above this is the flue. The wall above the mantel against the flue is the breast. The chimney above the roof is the shaft. This is sometimes surmounted by a chimney-pot, and that frequently by a hood, vane, or cowl. A cluster of chimneys is a stack. A chimney-board closes the fireplace in summer. A ciper-tunnel is a false chimney placed on a house as an ornament or to balance things.

Down to the 13th century the people seem to have been generally destitute of chimneys. The open hole for the emission of smoke is referred to in Herodotus, viii. 137: "Now it happened that the sun was shining down the chimney into the room where they were; . . . the boy, who had a knife in his hand, made a mark with it round the sunshine on the floor of the room." In the Middle Ages people made fires in their house in a hole or pit in the center of the floor under an opening formed in the roof; and when the family lay down for the night—for it can hardly be said that they went to bed—the hole was closed by a cover of wood. The laws of the feudal ages (*couvrefeu* of the French; curfew-bell of the English), ordered that such fires should be extinguished at a certain time in the evening. William I. introduced this law into England in 1068, and fixed the *ignitegium* at seven in the evening. The

China

law was abolished by Henry I. in 1100. Chimneys, in the modern sense, were not common before the reign of Elizabeth. Thus Harrison, in his "Description of England" (ed. Furnivall), i. 338, says: "Now have we manie chimnies; and yet our tenderlings complaine of rheumes, catarrhs, and poses (colds in the head); then had we none but reredosses (open hearths); and our heads did never ake." A tax, called chimney-money was imposed on each hearth or stove in a house in the reign of Charles II., and was abolished in the reign of William and Mary.

Chimpanzee, a name formerly applied to more than one of the larger man-shaped apes, but properly belonging to the *Trog-lodytes niger*, a native of the equatorial parts of Western Africa. Its associate in the genus *trog-lodytes* is the gorilla. The face is nearly hairless, the skin a dirty yellow ochre, teeth beautifully white, hair black and long. In the chimpanzee the arms are longer than the hind limbs, and when the animal is erect they reach below the knee. They are not, however, proportionately so long as in the gibbons and oranges. Its height is about five feet. The look is very much that of a very old child. In habits it is gentle and amiable, and easily makes friends. Little is known of the habits of the adults in their natural state.

China, or the **Chinese Empire**, a vast territory in Asia, comprehending five great divisions, viz: (1) Manchuria, (2) Mongolia, (3) Jungaria and East Turkestan, (4) Tibet, (5) China proper, or the Eighteen Provinces (Shih-pa-Shang), formerly including the island of Formosa. As a consequence of the Chino-Japanese War, Formosa was ceded to Japan by treaty. China proper occupies the E. slope of the tablelands of Central Asia. In form it approaches a square, and it covers a surface of 1,537,590 square miles. It is inhabited by at least (1903) 426,447,000 of the human race, living under the same government, ruled by the same laws, speaking the same language, studying the same literature, possessing a greater homogeneity, a history extending over a longer period, and a more enduring national existence than any other people, whether of ancient or modern times. When we consider its high antiquity, its peculiar civilization, its elaborate administrative machinery, its wondrous language, its philosophy and classic literature, its manufacturing industry and natural productions, China is perhaps the most remarkable country in the world. Counting its dependencies the total area is placed at 4,218,401 square miles. Estimates in 1900 gave the following areas and populations:

China

	Sq. M.	Pop.
China (proper).....	1,336,841	386,000,000
Manchuria.....	802,310	7,500,000
Mongolia.....	1,288,000	5,000,000
Tibet.....	651,500	6,000,000
Jungaria.....	147,950	600,000
East Turkestan.....	431,800	580,000
	4,218,401	402,680,000

The Board of Revenue reported the pop. (1903) at 426,447,000.

Principal Cities.—These are Peking (cap.), with 1,000,000 or more population; Canton, Tien-Tsin, Hankow, Nanking, Shanghai, Ning-po, Foochow, Amoy, Swatow, and 30 or 40 more with a population from 800,000 to 1,500,000. No census figures based upon official returns are obtainable, but the Imperial Customs estimates in 1905 gave the following as the population of the leading ports of entry:

Canton	900,000
Tien-Tsin	750,000
Hang-Chau	350,000
Hankau	870,000
Fu-Chau	624,000
Su-Chau	500,000

These are all treaty ports, accessible and open to commerce.

Physical Features.—A world-famous structure is the Great Wall, called Wan-li-chang-Cheng (myriad-mile-wall) by the Chinese, which was built by the first emperor of the Tsin dynasty about 220 B. C., as a protection against the Tartar tribes. It traverses the N. boundary of China, extending from 31½° E. to 15° W. of Peking and is carried over the highest hills, through the deepest valleys, across rivers and every other natural obstacle. The length of this great barrier is, according to McCulloch, 1,250 miles. The magnificent river-system of China is represented by the twin streams, the Hoang-ho, or Yellow river, and the Yang-tze-kiang, which, springing from the water-shed, the mountains of Tibet, are widely separated in their mid-course, but enter the sea within 2° of each other. The former is a "mighty, impracticable, furious stream" for the most part, and little adapted for navigation. But the river most beloved by the Chinese is the Yang-tze-kiang, or "son of the ocean," more correctly translated "the son that spreads," which name is only applied to it by the natives below the beginning of the delta; for above that it is called simply Ta-kiang, or Great river. The basin drained by it is estimated at 750,000 square miles. Of the other rivers that water the country, the Peiho, in the N. and the Choo-kiang in the S. are the most noteworthy. The principal lakes of China are the Tung-ting-hu, the Poyang-hu, the Hung-tseu-hu, in Kiang-su; the Tsau-hu, between Nganking-fu and Nanking; and the Tai-hu. There are four great mountain ranges and six or eight of lesser elevation; the Himalayas, Tian-Shan, Kuen-Lun and Altai. The

China

Kin-gan in the N., and the Peh-ling in North China, and Nan-king in South China, are prolongations of the Altai and Himalayas. The Grand Canal has very greatly facilitated the internal navigation of the country. Until lately the great annual grain-fleet, with its 430,000 tons of rice for the use of the capital, passed from the S. to the neighborhood of Peking by this great waterway, thus avoiding the storms and pirates of the coast. It connects Tien-Tsin in Chih-li with Hang-chow in Che-kiang, though the canal proper begins in Shan-tung, and its total length is about 650 miles.

Climate.—In a country of such vast area, extending from 18° to 40° N. lat., the climate must vary greatly, and accordingly we meet the most violent extremes. The heat of summer is greater than that at Cairo, and the cold of winter more severe than that of Sweden.

Productions.—Most famous among the minerals of China is jade, or yu-stone, obtained chiefly in Yun-nan. Coal, lime, and porcelain clays are abundant. Precious stones are said to be met with in some districts. In Yun-nan gold is washed from the sands of the rivers, and in the same province silver mines are worked; here, too, is obtained the celebrated pe-tung, or white copper. All the commoner metals are likewise found in China. Near the city of Ningpo are extensive stone-quarries. The tea-plant (*Thea viridis* and *Thea bohea*) is the most important vegetable production of China. The tallow-tree (*Stillingia sebifera*), the *Dryandra cordata*, or varnish-tree, the camphor-tree (*Laurus Camphora*), the China pine (*Pinus Sinensis*), the China banyan (*Ficus nitida*), the funeral cypress, and the mulberry are among the most important trees of China. The cocoanut and other palms flourish on the S. coast. Of the bamboo there are 63 principal varieties; and it is said that the bamboos of China are more valuable than her mines and, next to rice and silk, yield the greatest revenue. The various uses to which they are applied is truly astonishing. The fruits of both the tropical and temperate zones, apples, grapes, pomegranates, mangoes, pineapples, three species of orange, the lichi, etc., are found in the country; and camellias, azaleas, and gardenias are natives of the "Flowery Land."

Finances and Commerce.—China had no foreign debt till 1874, when a loan of \$3,135,000 was contracted at 8 per cent.; a second was contracted in 1878, and her foreign debt in 1900 was about \$270,000,000. This indebtedness arose almost wholly from the war with Japan, and is largely guaranteed by Russia. The most important source of revenue is the customs service, administered by a European inspector-gen-

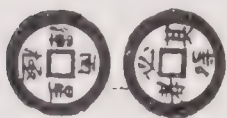
China

eral and a numerous foreign staff. The total annual revenues of late years have amounted to about \$150,000,000, and the expenditures have been generally less than the receipts. The exports are principally of tea, raw and manufactured silk, rice, fruits, bamboos and bamboo wares, lacquered goods, porcelain and pottery, paper and fans, etc.; the imports, cotton and woolen goods, metals, opium, petroleum, clocks and watches, and silver coin. The total amount of imports is about \$130,000,000, of exports about \$110,000,000. The United States import from China largely of tea and reeled silk, and send her cotton goods, woolen goods, petroleum, and clocks, with some specie. England sends her \$40,000,000 worth of opium every year. China

has now a steam mercantile marine as well as steam navy. Her steamships ply to San Francisco and other ports. Thirty Chinese ports are thrown open to the trade of civilized nations. An event of much importance to the future of Chinese commerce was the acceptance in 1900 of the "open door" policy. The Secretary of State of the United States, John Hay, addressed notes to the European powers, requesting a concession to this country of the privilege of freedom of commercial inter-

course with China within their respective spheres of influence. The replies were in every case favorable, the only limitation being the acceptance of the principle by other powers.

Manufactures.—The manufactures of the Chinese are silk, cotton, linen, and pottery, for which latter they are especially



MODERN
CHINESE
COIN.

celebrated. The finest porcelain is made in the province of Kiang-si. The Chinese invented printing in the beginning of the 10th century, and in 932 A. D. a printed imperial edition of the sacred books was published. The skill of the Chinese in handicraft is astonishing. Of the grand modern discoveries in the physical sciences the Chinese are profoundly ignorant, and the study of nature is altogether neglected.

Railways.—There are but a few hundred miles of completed railway in all China,

China

though thousands of miles were in projection in 1900. The railroad from Tientsin to Peking, a distance of 80 miles, was completed in 1897, but partially destroyed in 1900. The Shanghai-Woosung line is very short, as are the coal lines in the mining district.

Religion.—Three forms of belief, the Confucian, the Buddhist, and the Taoist, may be considered the National religions, as they are believed in, more or less, by the great mass of the people. Of these the Confucian and the Taoist are indigenous, but Buddhism was introduced from India. Confucianism is the basis of the social life and political system of the Chinese. It has been professed by all their greatest men, and is still the sole belief of the edu-



CHINESE WALL.

cated classes. It is, however, less a religion than a philosophy and does not pretend to treat of spiritual things; hence room was left for other creeds to supply its deficiencies in this respect. Temples belonging to the three religions are very numerous. Those dedicated to Confucius are funereal in character. The Buddhist temples are crowded with images, and Buddha is represented expounding his doctrine to attentive listeners. The many-storied tower takes the place of the bell-shaped pagoda or relic-shrine of other Buddhist countries.

Education.—This is very general; government officials must be educated; and most of the people read and write; methods and text-books are not of the best; many young men of higher classes are sent to Europe and the United States for instruction in English and the sciences. In 1898 an "Imperial University of China" was established by imperial decree. The first allowance for the building was \$112,000 and an allowance of \$150,000 is an-

nually made for its support. The sciences, arts, and philosophy are included in the curriculum. Dr. William A. P. Martin, an American missionary and educator, was appointed first president of this institution, and three of its professors are from the United States. There is also at Peking the "Tung Wen Kwan," a government school.

Government.—In the centralized autocratic government of China the Emperor is absolute in the empire, the governor in the province, the magistrate in the district. The Emperor claims no hereditary divine right, and is not always the eldest son of the preceding monarch; the ablest son is nominated, but his right to the throne as the *Teen-tze*, or *Tien-tze*, "son of heaven," the *Fung-tien*, "divinely appointed," can only be established by good government, in accordance with the principles laid down in the National sacred books. The administrative machinery of the Chinese is very perfect in its organization. In each of the 18 provinces is an imperial delegate or governor, who, besides being at the head of the civil jurisdiction, is commander-in-chief, and possesses the power of life or death, for certain capital offenses. Under the governor are the superintendent of provincial finances, the provincial criminal judge, and the provincial educational examiner; each communicates through the governor with his especial board in Peking. The Chinese executive system is based on those noteworthy competitive examinations, which are intended to sift out from the millions of educated Chinese the best and ablest for the public service. The legitimate sovereign was, in 1900, practically a prisoner in Peking, the Empress Dowager being in the ascendant. She was supported by Prince Tuan. The several provinces, however, maintained their local governments intact. Authority is so centralized under the despotism that possession of power at Peking carries with it control over the whole of China.

Military Forces.—China has a prodigious army, but in reality the greater part figures only on paper. Each province is provided with a military force varying from 8,000 to about 68,000 men. According to Captain Norman, the average for each province is about 34,500 men and 640 officers. The governor of a province is also commander-in-chief, and is assisted by a general-in-chief, as well as lieutenants and Major-Generals. It was never easy to ascertain facts concerning the Chinese forces. The *elite* of the army is composed of the *Shen-Che-Ying*, or foreign-drilled troops, and the *Pa-Ki*, or Eight Banner men. The former are said to number 50,000 men with the colors. These men more nearly approach the European standard in drill and arms than any other troops

in the imperial service. The nucleus of the foreign-drilled troops was trained largely by European officers, who spoke highly of their steadiness and efficiency in drill. Next in importance to the foreign-drilled troops are the Banner men and the army of Manchuria, composed of soldier-like troops, but some of them still armed with bow and arrows, or with the old gingall. The Banner men are estimated at something like 300,000. They consist largely of Manchus, Mongols, and Chinese or Han-chun. The army of Manchuria was raised from the Banner men of Fengtien, Kirin, and Heilung-chiang. These are all fighting men, perhaps 180,000 in all; but fully 100,000 have received no European training. Outside the ranks of the foreign-drilled troops and Banner men and other Manchurian forces, of whom perhaps 175,000 possess various modern arms, and are drilled somewhat upon the European plan, is the vast array of the *Luh-ying* or Green Flags, with a paper strength of 650,000 men, scattered through the empire, under the control of the local viceroys and governors. This heterogeneous force possesses little military value, and has proved of no real service.

Navy.—There is no effective Chinese fleet, and the future naval policy of China cannot be forecast. The "*Kang-Chi*" and the "*Chen-Hai*" were all that remained to her of the *Pei-Yang* squadron, and the southern squadron contains no ships of real value. A torpedo cruiser of 850 tons, the "*Fei-Ying*," has been added to the *Pei-Yang* force; and in 1897 the protected cruisers "*Hai-Yung*," "*Hai-Shen*," and "*Hai-Shew*" for the same squadron, were launched at the Vulkan yard, Stettin. They displace 2,950 tons, and are 315 feet long, with 41 feet beam and 16 feet draught. They carry three 5.9-inch, eight 4.1-inch, and six 1.4-inch quick-firers, six Maxims, and a light gun, and will have three torpedo tubes. Engines of 7,500 I. H. P. were expected to give a speed of 19.5 knots. Several sea-going torpedo boats, ordered before the war with Japan, have been added since to the fleet.

People and Customs.—Ethnologically, the Chinese belong to that variety of the human species distinguished by a Mongolian conformation of the head and face, and monosyllabic language. A tawny or parchment-colored skin, black hair, lank and coarse, a thin beard, oblique eyes, and high cheek-bones are the principal characteristics of the race. The average height of the Chinaman is about equal to that of the European, though his muscular power is not so great; the women are disproportionately small, and have a broad upper face, low nose, and linear eyes. The Chinese are, as a race, unwarlike, fond of peace and domestic order, capable of a high degree of or-

ganization and local self-government, sober, industrious, practical, unimagined, literary, and deeply imbued with the mercantile spirit. The worship of ancestors is a prominent feature in their social life, and is dictated by that principle of filial piety which forms the basis of Chinese society. The rich have in their houses a chamber, a kind of domestic sanctuary, dedicated to their forefathers. Tablets, representing the deceased persons, and inscribed with their names, are here carefully preserved; and at stated seasons prostrations and ceremonials are performed before them according to the "Book of Rites." In China, marriage is universal and within the reach of all; but there is a strict separation of the sexes, and betrothal is undertaken by the parents or by professional matchmakers.

Language and Literature.—The Chinese language belongs to those Asiatic languages commonly called monosyllabic, because each word is uttered by a single movement of the organs of speech, and expresses in itself a complete idea or thing. All Chinese words in the Peking tongue end either in a vowel, a diphthong (in which, however, each vowel sound is distinctly pronounced, making the word often to appear of more than one syllable), or a nasal. Of such simple words or roots there are about 450. But the accent of many of these words may be varied by the speaker in four or five different ways, so as to produce a corresponding variety in their meaning, by which means the number of simple words or roots amounts to about 1,200. The relations of words are ascertained by their position in a sentence. Hence Chinese grammar is solely syntax. In Chinese the written character, generally speaking, does not indicate the sound of the word, but gives a hieroglyphic or pictorial representation of the idea or thing to be expressed. Hence, there are required as many of these characters or symbols as there are ideas to be represented. Since many words similar in sound are different in signification, while in writing each idea has its peculiar symbol, the number of words represented by writing, without reckoning those peculiar to certain dialects, is perhaps 10 times greater than those distinguished by the ear. The number, in fact, is reckoned at 50,000. In writing and printing the characters are arranged in perpendicular columns, which follow one another from right to left. In its origin Chinese writing is hieroglyphic or picture-writing, with the addition of a limited number of symbolical and conventional signs; the larger number of Chinese characters are formed by the combination of such hieroglyphs and signs. But as one such character by itself seldom determines the sound, an additional word is conjoined

for the purpose; so that the great mass of Chinese written words consist of an ideographic and a phonetic element. Native grammarians divide their characters into six classes. The Chinese literature, from a geographical, ethnographical, and historical point of view, is unquestionably the most comprehensive and important of the whole of Asia. The printed catalogue of the Emperor Kien-lung's library is composed of 122 volumes; and a selection of the Chinese classics, with commentaries and scholia, which was begun by the order of the same emperor, is said to comprise 180,000 volumes, of which, in the year 1818, 78,731 volumes had already appeared. In the five canonical or classical books called "King" are contained the oldest monuments of Chinese poetry, history, philosophy, and jurisprudence, some portions of which belong, perhaps, to the most ancient writings of the human race. Confucius, in the 6th century B. C., collected them from various sources, and in this collection they have been pretty faithfully handed down. Amid all their scientific labors the Chinese have not neglected the art of poetry, in which they possess voluminous collections that have yet to be made known to Europe. In lyrical poetry the most distinguished names are Li-tai-pe and Tu-Fu, both of whom flourished at the beginning of the 8th century A. D. The romantic poetry of the Chinese, though void of poetic beauty, is valuable for the insight it gives into their domestic life.

History.—The legendary history of China would make it the oldest of nations. There is good reason to believe that it has an authentic history exceeding 4,200 years. The exact age when Fo-Hi, the benefactor of his country, and the founder of the silk industry, flourished cannot be told, but it was before 2375 B. C. The name of the country among all the W. nations has been always associated with silk. The Chinese of that early time were astronomers; they recorded phenomena which occurred 2375 B. C., and their record proved correct. The Emperor Yu (1991 B. C.) rendered the Great Plain habitable by running the Hoang-ho into a new channel. Confucius lived and taught 571–544 B. C. Shi Hoang-Ti (246–210 B. C.) is the greatest of their heroes; he expelled the Mongols, built the Great Wall, and burned most of the National literature. He was the founder of the Tsin dynasty. Buddhism was introduced A. D. 65. The next 1,200 years were prolific of wars between the Chinese and the Mongols, the latter conquering in 1279 and holding the country till 1368. Then the Ming (native) dynasty regained power, and held it till 1644. The Manchus succeeded, and have held the power till now. In the 19th century they had wars with Great

Britain and France (1857-1860); the great Tai-ping rebellion, lasting 14 years; a Mohammedan rebellion in Yun-nan lasting 23 years, and another in Eastern Turkestan lasting 11 years; war with France (1884-1885), and war with Japan (1894-1895). Russia's occupation of Port Arthur, early in 1898, was followed by the signing of the Russo-Chinese Convention at Peking on March 27, 1898. In substance it leased to Russia Port Arthur and Talien-Wan, together with their adjacent waters, for the term of 25 years from the date of signing of the convention, but provided that at the conclusion of the term it may be prolonged by mutual agreement between the contracting parties. The district (territorial and maritime) is to serve as a depot of military and naval supplies to Russia, and the principal officials administering its affairs are to be Russians. The contracting parties agree to regard Port Arthur as a naval station, to be used by Russian and Chinese ships only, and neither the men-of-war nor the merchantmen of any other power shall have access to it. In the same article (No. 6) it says: "Similarly, in the case of Talien-Wan Bay, one part shall serve as a naval station for the warships of China and Russia, but the rest shall be a commercial port, open for the ingress and egress of the ships of all nations." In view of the importance of Port Arthur and Talien-Wan, Russia undertook to construct, at her own expense, whatever barracks and forts might be required, and to adopt whatever other means were necessary for the defense of those places. Russia is permitted to construct a railway from a point on the Trans-Asian trunk road (for the building of which China gave her consent in 1896) to Talien-Wan, all the details of construction to be in accordance with the Chinese system of Manchurian lines; and a branch of the road may be carried from some place midway between New-Chwang and the Yalu river to a convenient point on the sea-coast.

Before the convention with Russia was signed France demanded that China should not cede any portion of the four provinces of Kwang-Tung, Kwang-Si, Yun-Nan, and Kwei-Chau, that the railroad from Lung-Chau-Ting, on the N. frontier of Tonquin, should be extended by way of Pase, Siam, into the Yun-Nan province, and that a coaling station be granted to France at Lei-Chau-Fu, in the Hen-Chau Peninsula (north of Hai-Nan).

Early in 1898 the British Minister, in conference with the Chinese foreign office, demanded a compensatory concession for the purpose of maintaining the balance of power in the Far East, and on April 2 he obtained a lease of the islands and waters of Wei-Hai-Wei on the same terms as those

by which Russia had secured Port Arthur; and on May 24, the English occupied the port. On June 9, China ceded to England territories on the main-land opposite Hong-Kong, including the island of Lau-Tao and all the peninsula to a line joining Mirs bay and Deep bay, both of which are included in the lease, China retaining the N. shores. In September, 1898, the emperor issued a number of edicts advocating reforms after European methods in the financial and general administration of the central and provincial governments. These met with the severe disapproval of Tsu-Hsi, the Empress Dowager, and her strong anti-foreign party in the Court. On Sept. 22, she obtained from Emperor Hwang-Su an edict restoring the regency, which she had held previous to his accession in 1889; retired him on a pretense of illness; assumed charge of the government, and decapitated the leaders of the reform party, degraded others, and kept the rest in fear of a similar fate.

In September, 1899, Secretary Hay instructed the United States representatives in England, France, Germany, Russia, Italy, and Japan to invite from those governments a presentment of their intentions in regard to the treatment of the commerce of foreign powers in the newly-acquired spheres of influence, with special reference to the treaties existing between China and the United States, advising that China be regarded as heretofore as an open market for the world's commerce, and that all possible steps be taken to establish much-needed administrative reforms and to preserve and strengthen the Imperial government in its integrity. On March 20, 1900, Secretary Hay announced that all the powers concerned had accepted the proposals of the United States, and that he would consider their consent final and irrevocable.

The intense anti-foreign sentiment among the Chinese reached a crisis in the uprising of the Boxers (*q. v.*) in 1900. The murder of many of the missionaries in the N. provinces, and finally the isolation of Peking and the siege of the legations, called for forceful intervention on the part of the powers. The first international relief expedition under Admiral Seymour left Taku on June 10; was unable to reach Peking, and was forced back by the Boxers. It was only able to retreat with the greatest danger and difficulty, and but for timely reënforcement would undoubtedly have been cut to pieces. On June 17 the Taku forts at the mouth of the Pei-ho river were reduced. On the 20th the German minister, Baron von Kettleler, was murdered in Peking. On July 14, the city of Tien-tsin was taken by the allies and made the base of the international expedition for the relief of the legations in Peking, which started on Aug. 4. Peking

was entered Aug. 15, after some hard fighting, and the foreign ministers, and their families, the legation guards, and the people who had made their way in safety to the legations for protection, were relieved. The raising of the siege, which had existed from June 11, was most timely, as the ammunition of the besieged was almost exhausted, and all of the foreigners were suffering greatly from confinement and the apprehension of a terrible fate in case they should be unable to hold out against the continuous attacks of the Boxers. The court fled into Shensi before the allies reached Peking. The subsequent military operations consisted chiefly of punitive expeditions to the S. and W. Negotiations for peace were at once begun. On Dec. 4, the powers sent a joint note to the Chinese peace commissioners, demanding among other acts, the execution of the leaders in the massacre of foreigners and the payment of an indemnity later fixed at \$735,000,000. On the ratification of the agreement, the foreign troops were withdrawn.

WU TING FANG.

The Court made a formal entry into Peking on Jan. 7, 1902; on the 28th the Dowager-Empress received the entire diplomatic body in audience; and on Feb. 1, she and the Emperor cordially entertained the ladies of the various Legations. On Jan. 30 an Anglo-Japanese agreement was signed, providing for the maintenance of the independence and territorial integrity of China and Korea, on which Russia and France declared that they reserved the right to consider eventually means of insuring the defense of their interests. A convention between China and Russia was signed April 8, which acknowledged Manchuria to be an integral part of China, and in which Russia agreed to restore the right of sovereign powers and to withdraw from Manchuria by districts at specified periods. In a commercial treaty with Great Britain (Sept. 5, 1902), China agreed to abolish the "likin" and kindred taxes for adequate considerations, to take effect Jan. 1, 1904, provided the other Powers entered into similar engagements. China also agreed to open four new treaty ports—Chang-sha, Ngan-kin, Wan-hsien, and Wai-chan. The chief events of 1903 were the guarantee to the United States that Mukden and Antung should be made open ports and those that led directly to the Russo-Japanese War (*q. v.*). The ending of that conflict saw China again in a state of unrest, notwithstanding which many reforms were begun and have continued. The revolutionary spirit has at times shown renewed activity, with anti-foreign demonstrations. In January, 1908, the United States remitted about \$13,000,000 of its share in the indemnity of 1901. In November, 1908, the deaths of the

Emperor and the Empress Dowager were announced. Pu-Yi, three years old, had been appointed emperor, and Prince Chun became regent. At the beginning of 1909 China appeared to be fully committed to a policy of progress along the lines of modern development.

Chinaware, or Porcelain, the finest and most beautiful of all the kinds of potteryware, and differing from other kinds in being slightly translucent, while it is also white, hard, and less fusible. It is made of kaolin (*q. v.*), or porcelain clay, and originated in China.

The Chinese are said to have been acquainted with the manufacture of porcelain upward of two centuries previous to the Christian era, but it was not till five or six centuries later that they appear to have attained to any great skill or perfection in the art. Since A. D. 422, as far as can be ascertained from the Chinese records, the town of King-te-chin, in the province of Kiang-si, has been renowned as producing the best porcelain in the empire, a pre-eminence which it is said to owe to the fact that kaolin was first discovered and utilized here. For upward of 1,000 years China was the only country in the world which possessed a knowledge of the manufacture of porcelain, so much so that the name china is still commonly applied to designate this species of ware, of which by far the greater quantity now is obtained from other places. Following out the principle of conservatism which seems so essentially characteristic of the Chinese, they appear, after attaining a certain degree of perfection in this beautiful art, to have made no further progress, and for ages to have continued without variation to produce chinaware of the same styles and qualities as that which had become celebrated. The acknowledged inferiority of modern Chinese porcelain is attributed by some to the circumstance of European merchants either not having the taste to choose works of merit, or being obliged to regulate their purchases by the demand in the home market, and the rage for cheapness so prevalent in the present age. But it would appear that the Chinese have now lost the art of fixing or producing in porcelain those beautiful colors which we admire so much on their ancient vases. Hence arises the great value set on ancient chinaware, both by the natives of the country and Europeans. Fragments of a deep sky-blue porcelain, made about A. D. 954, are said to be set by the modern Chinese as if they were rich jewels. Most of the modern ware produced in China is feeble or ugly in design and inartistic in ornamentation, the best being such as displays Persian influence. The art of making porcelain was introduced into Japan from China about 1513, or, accord-

Chinaware

ing to some, at a date considerably earlier. Much of the Japanese ware was made in imitation of the Chinese, and on the whole they are more successful with other kinds of pottery than with porcelain. In the 18th century much Japanese porcelain was exported to Europe, where it was often copied by the manufacturers.

Porcelain was known in Europe from the 13th century onward, and from its beauty and rarity commanded universal admiration and popularity. For a long period it was erroneously believed that China alone furnished the proper kind of clay necessary for its manufacture, and this circumstance, along with the then extremely rude state of the potter's art in Europe, long prevented any attempt towards the fabrication of this article in the West. Toward the end of the 15th and early in the 16th century porcelain is said to have been made in Venice, and it was also produced in Florence under the Medici, about 1580-1585, as well as in France in the following century; but the ware was not the true porcelain, but soft or artificial porcelain. At length John Frederick Böttcher, Böttger, or Böttiger, a native of Saxony who had long devoted himself to the futile pursuits of alchemy, working under the patronage of the elector, Augustus II., was led in the right direction in 1710. Having his attention accidentally attracted to a species of white earth used as a substitute for flour in the manufacture of hair powder, Böttcher renewed his experiments, and ascertained that by means of this substance a porcelain could be produced equal to that of China. This now led to the establishment by the government of the far-famed porcelain manufactory at Meissen, near Dresden, of which he was appointed director. The Saxon porcelain soon became celebrated over Europe, and rivalled that of China in the excellence of its quality and the beauty of its decorations. Every possible endeavor was made to prevent the secret of its manufacture being conveyed to other countries. The workmen at the factory were sworn to secrecy, and the exportation of the porcelain earth prohibited under the severest penalties. In this attempt the Saxon government was for some time successful, but the secret was at last gradually divulged, and porcelain works established in Vienna (1720), Munich, Berlin, and other places in Germany. In France the famous Sèvres manufactory was established by Louis XV., but hard or true porcelain was not made there till about 1770. In England a porcelain work was established in Chelsea for some years previous to 1745; porcelain was also made in Stratford-le-Bow about the same year, in Derby as early as 1750, and in Worcester in 1751; but it was not till after the discovery of kaolin clay in Cornwall, about 1755, that hard porcelain began to be manufac-

Chinchon

tured, first, it appears, at Bristol in 1766. In connection with the manufacture the names of Josiah Spode and Thomas Minton should be mentioned, both of them as belonging to the industry established in Staffordshire before the end of the 18th century.

Porcelain, when broken, presents a granular surface, with a texture compact, dense, firm, hard, vitreous, and durable; it is semi-transparent with a clear, smooth, glassy surface, and resisting uninjured sudden changes of temperature. In the properties of being semi-transparent and semi-vitrified, but in scarcely any of the preparatory processes and manipulations, is china-ware distinguished from good earthenware. See POTTERY.

Chincha Islands, three bare, rocky islets, with a joint area of $6\frac{1}{4}$ miles, rising 200 feet out of the sea off the coast of Peru, opposite the Bay of Pisco. From 1841 till 1874 they yielded millions of tons of guano; but the beds, originally some 100 feet thick, became exhausted.

Chinchay-cocha (chên-chi-kō'chä), a lake of Peru, in the department of Junin, 13,330 feet above the sea, is 36 miles long and 7 broad, with an area of about 300 square miles. It is the source of the river Jauga, and abounds in fish and wild-fowl.

Chinchilla, a genus of South American herbivorous rodents very closely allied to the rabbit, which they resemble in the general shape of the body, in the limbs being longer behind than before, in the conformation of the rootless molars, and by the nature of the fur, which is more woolly than silky; but differing from the rabbit in the number of their incisors and molars, in a greater length of tail, and also in having broader and more rounded ears. *C. lanigera*, a species about 15 inches long, is covered with a beautiful pearly-gray fur.



CHINCHILLA.

which is highly esteemed as stuff for muffs, pelisses, linings, etc. The Chinchilla lives gregariously in the mountains of most parts of South America, and makes numerous and very deep burrows. It is of a gentle nature, very sportive, losing none of its gaiety in captivity, and very cleanly.

Chinchon, a town of Spain, 25 miles S. E. of Madrid. After a Countess of Chinchon, wife of the Governor of Peru in 1638,

Peruvian bark was named "Chinchona," now habitually misspelled "Cinchona."

Chinese Architecture, a style of architecture which had its rise from Indian art introduced with the worship of Buddha. Diversities of treatment soon appeared, and instead of the Indian dagoba arose a tower-like construction of many stories, growing gradually smaller toward the top, with each stage distinctly marked, and covered with many-colored curved roofs, to which bells were attached. These edifices were, for the most part, octagonal, and were constructed for religious purposes. Chinese structures have nothing durable about them, wood forming an essential element in their construction. They are more remarkable for their elegance and slender proportions than for size. The roofs are especially characteristic, the most striking peculiarities being that they are always curved, and have figures on them in high relief, as well as at the corners, from which hang bells, and that they are decorated with fantastic embellishments, such as dragons, etc. The Chinese do not possess the art of arching large spaces, and consequently numerous columns are introduced for the support of the ceilings and roofs; these are of wood, sometimes carved, but always painted.

Chinese Bible, The, a work compiled and partly composed by Confucius, divided into five books:

1. Called the "Yih-King," a treatise on cosmogony.
2. Called the "Shu-King," the acts and maxims of Yaou, Shun, and other ancient kings held in religious veneration.
3. Called the "Shi-King," which contains 311 sacred poems.
4. Called the "Ee-King," or book of rites, containing maxims and directions for everyday life and all conditions of men.
5. Called the "Chun-tsien," a history of Confucius' own times.

Chinese Cæsar, Tne, Kao-hoangti, founder of the Han dynasty, one of the most illustrious that ever occupied the Chinese throne. Dynasty lasted B. C. 202-A. D. 226.

Chinese-fire, a pyrotechnic composition, consisting of gunpowder, 16; niter, 8; charcoal, 3; sulphur, 3; cast-iron borings (small), 10.

Chinese Glue, a superior glue and varnish, obtained from a species of *Algæ* which abounds on the shores of China. When once dried it resists the action of water, and is used by the Chinese to fill up the lozenge-shaped interstices in the network of bamboos of which their windows are frequently constructed, as well as to strengthen and varnish the paper of their lanterns.

Chinese Lantern, a lantern made of thin paper, usually variously colored and much used in illuminations.

Chinese Olive, the fruit of *Canarium commune*, order *Amyridaceæ*, a tree of the Asiatic archipelago yielding an oil which is used as a condiment and for lamps.

Chinese Pavilion (so called from the usual shape), a pole with several transverse brass plates of some crescent or fantastic form, generally terminating at top with a conical pavilion or hat. On all these parts are hung small bells, which the performer causes to jingle by shaking the instrument held vertically up and down. It is used only in military bands, and more for show than use.

Chinese Stones, certain stones consisting chiefly of silicate of alumina altered by heat so as to adapt the material to be used in making grotesque statuary.

Chinese Swallows' Nests, curious productions, which sell at a high price in China, though they have no special points of recommendation beyond many other gelatinous ingredients in soups. They were formerly supposed to be made of some species of the rose-spored *Algæ*, as *Sphærococcus lichenoides*; but this is now ascertained to be a mistake, and it is known that they are formed of a secretion from the mouth of the bird itself.

Chinese Tartary, an old name of Turkestan.

Chinese Terms, expressions in general use in referring to places and institutions. The principal ones include:

Chekiang, central sea, the name of a province.

Chow, a city subject to the ruler of a greater city.

Foo, or Fu, a city ruled by an official directly responsible to the head of a provincial government.

Foo-tai, or Fu-tai, the governor of a province.

Godown, the place for storing goods.

Haikwan, the customs duties.

Hien, the city of a dependent province.

Hwang, emperor, yellow.

Li, a Chinese mile, equals $\frac{1}{4}$ English mile.

Likin, an inland tax on foreign goods in transit.

Ngan-Hui, an inland province.

Nui Ko, privy council.

Shan, hill or mountain.

Shan-Tung, province E. of the mountain.

Shih, imperial.

Tael, a coin equal to $1\frac{1}{3}$ ounces silver in weight.

Tao-tai, governor of a city.

Ting, a city of a department or small province.

Chinese Windlass

Tituh, chief military officer of a province.
Tsin, a prince.

Tsin-wang, a prince of the blood.

Tsung, clan, family (sometimes board).

Tsung-li-Yamen, a cabinet council of advisory powers having charge of official relations with foreigners.

Tsung-tuh, viceroy or ruler of more than one province.

Yamen, office (for official business).

Yunnan, most westerly province.

Chinese Windlass, a differential windlass, in which the cord winds off one part of the barrel and on to the other, the amount of absolute lift being governed by the difference in the diameters of the respective portions. It is a good contrivance in the respect that great power may be attained without making the axle so small as to be too weak for its work.

Chinese White, the white oxide of zinc, a valuable pigment introduced into the arts as a substitute for the preparations of white-lead.

Ching, a Chinese prince; born in Peking about 1840. He is related to the Chinese imperial family and has held important civil and military posts, although he boasts that he has never been outside of Peking. He was at the head of the Tsung-li-Yamen, but was deposed in 1900 for his efforts to protect the legations in Peking, during which he attacked the BOXERS (*q. v.*).

Ching-hai, or **Chin-hai**, a seaport of China, in the province of Cheh-Chiang (Cheh-Kiang), 9 miles from the treaty port of Ning-Po. Ching-hai has no foreign commerce of its own, not being a treaty port; but it is a resort of native traders from the Chusan Archipelago, and it sends Chinese merchandise to Ning-Po. There is a missionary station and a native academy for students who compete in the civil service examinations at Ning-Po. Pop. (1900) estimated 150,000, mostly Chinese.

Chingleput (ching'gl-put), or **Chengalpat**, a coast district and its capital, Hindustan, Madras presidency. The district, which lies S. of Arcot and Madras—area, about 2,842 square miles—has generally a bad soil, broken up frequently by granite rocks. Pop. 981,381. This tract of country was in 1750 and 1763 obtained by the East India Company from the Nabob of Arcot. The town is 15 miles W. from the Bay of Bengal, and 35 miles S. S. W. Madras, and has a pop. of 5,617.

Chinkapin, the American dwarf chestnut.

Chin-Kiang, or **Chin-Chiang**, a city of China in the province of Kiang-Su (or Chiang-Su) about 490 miles S. of Tien-Tsin. Chin-Kiang was declared a treaty port in 1861. The main port fronts on the

Chiococca

Yang-Tse-Kiang, about 50 miles from its mouth, being accessible to large ships. The place was formerly well fortified, but has been dismantled in recent years. The foreign imports reached \$9,695,570 in 1897, and the exports were \$3,910,480. Pop. (1900) estimated 150,000.

Chinoline (C_6H_7N), a tertiary monamine formed by the distillation of quinine, cinchonine, strychnine, etc., with a concentrated solution of potash. It is a colorless, oily basic liquid, boiling at 235° . It is slightly soluble in water, and dissolves in alcohol and ether.

Chinon (shē-nôn'), an antique town in the French department of Indre-et-Loire, beautifully situated on the Vienne, 31 miles S. W. of Tours. Crowning a lofty rock are the ruins of its vast old castle, the "French Windsor" of the Plantagenets, the deathplace of Henry II.; and later the residence of several French sovereigns, where, in 1429, Joan of Arc revealed her mission to the Dauphin. A farmhouse across the Vienne is pointed out as Rabelais' birthplace.

Chinooks, a tribe of Indians, now nearly extinct, on the Columbia river, or in Oregon. Their language was very difficult to learn and to pronounce, and this led to the formation of the *Chinook jargon*, a trader's *lingua Franca*, consisting of words from French, English, and Hawaiian, as well as Chinook and other Indian tongues.

Chins, a savage tribe living in the mountainous region between Lower Bengal and Upper Burmah, of very primitive habits.

Chintz, a cotton cloth gaily printed with designs of flowers, etc., in five or six different colors. It was a favorite in the time of Queen Anne, long before cotton prints became cheap. The name, being highly respectable, has since been applied to goods lacking the graceful and artistic character of the genuine article. The Chintzes of the Coromandel coast were celebrated in the time of Marco Polo, 13th century. They are mentioned also by Odoardo Barbosa, a Portuguese, who visited India soon after the passage of the Cape of Good Hope by Vasco da Gama: "Great quantities of cotton cloths admirably painted, also some white and some striped, held in the highest estimation."

Chin-Wang, a city of China, in the province of Chili (or Chih-Li). It was declared a treaty port and opened to foreign commerce in 1898. Pop. (1900) estimated 39,000.

Chiococca, the snow-berry, a genus of the *cinchonaceous* family, consisting of small shrubs with a funnel-shaped, yellow-

ish corolla, concealing the five stamens, which are provided with hairs. Ovary two-celled, with two inverted ovules. Fruit a berry with two seeds. The root of *C. angulfaga*, a trailing herb, and that of *C. densifolia*, a woody bush, are held by the people of Brazil to be a remedy for snake-bite.

Chioggia (hē-ōj'yä), or **Chiozza**, an important seaport town of Northern Italy, 15 miles S. S. W. of Venice, on an island at the S. end of the Venetian Lagoon, connected with the main-land by a stone bridge of 43 arches. It is founded on piles, and has a cathedral; its harbor, the deepest in the lagoon, is guarded by forts and batteries. Pop., inclusive of Sottomarina, 25,084, most of them engaged in the coasting trade, lace-making, weaving, shipbuilding, and fishing.

Chione, the daughter of Dædalion, who was killed by Diana for boasting of her beauty.

Chios (now called by the natives *Chio*, Italianized into *Scio*), one of the most beautiful and fertile islands in the Ægean sea, belonging to Turkey, 7 miles off the coast of Asia Minor, at the entrance to the Gulf of Smyrna; about 30 miles long from N. to S., by 8 to 15 miles broad, with a coast-line of about 110 miles, an area of 320 square miles, and a population of about 70,000, almost all Greeks. The larger N. part is more mountainous than the S. The climate is delightful and salubrious. Earthquakes are, however, not rare, and one in 1881 caused the death of 3,558 persons, and the destruction of property to the value of over \$15,000,000. The wine produced on the N. W. coast, the *Vinum Arvisium* of ancient times, is still esteemed. Other products are figs, also noted in classical days; mastic, silk, lemons, oranges, and olives. Goats' skins are also exported. The capital, Chios, about the middle of the E. coast, contains about 13,000 inhabitants, and has a haven touched by various services of steamers, and doing a good trade. On the W. coast is a rich monastery, Nea-Moni, founded in the 11th century. In ancient times excellent marble and potters' clay were quarried in the mountains, and recently pits of antimony and ochre have been worked.

Chios is one of the places which contended for the honor of giving birth to Homer. It formed in early times one of the most flourishing of the Ionian States, and contributed 100 ships to the Greek force defeated by the Persians in the sea-fight off Miletus (494 B. C.). After the Persian victory the town and temples of Chios were burnt and many of the people enslaved. In more recent times the island was taken by the Genoese (1346), and by

the Turks (1566), in whose hands it has since, except for a short interval, remained. It was conferred as private property on the sultana. After a long period of prosperity, Chios suffered a terrible blow during the war of Greek independence. A number of the Chiotes having in 1821 joined the revolted Samians, a Turkish fleet and army in 1822 inflicted dreadful vengeance; 25,000 Chiotes fell by the sword, 47,000 were sold into slavery, and only some 5,000 escaped. A second rising in 1827 was likewise unsuccessful. The island has since been gradually recovering.

Chipmunk, a small animal much like a squirrel, of the genus *Tamias*, known as the striped squirrel. Chipmunks are sometimes called ground squirrels because they live in the ground, striped squirrels on account of the marks on their fur, and cheeping squirrels on account of the cheeping noise they make. The common Chipmunk has a body five to six inches long, and a tail which is not so bushy as in other squirrels, and a little shorter. The fur is yellowish-brown mixed with gray above and white below, and the back and sides are marked with five black stripes running lengthwise. The feet are large and fitted with strong claws for digging. They burrow deep into the ground, usually under the roots of a tree or under a stone wall, and make a round nest at the bottom, generally with two entrances. During July and part of August chipmunks do little but play, seeming to spend all their time from sunrise to sunset in galloping over the ground, fences, and walls, chasing each other like children playing tag, and trying to bite each other's tails. Chipmunks are easily caught in traps, but are not easily tamed, and do not make as good pets as gray squirrels.

Chippendale, Thomas, an English cabinet-maker; went to London from Worcester-shire before 1750. The style of furniture named from him was less heavy and severe than that of his successors, and was rather elaborate, delicate, and baroque, with classical tendencies. He wrote a "Cabinet-maker's Director" (1752). It often happens that all 18th century furniture is (ignorantly) called "Chippendale."

Chippenham, a municipal borough of England, in Wiltshire; 12½ miles N. E. of Bath; on the Avon river; here crossed by a fine old stone bridge of 22 arches. It consists of one principal street, with others diverging from it. It contains two large churches with lofty spires, several other places of worship, an old and a new town hall, etc. New secondary schools have been erected. The station of the Great Western Railway here is a very large one. The town is an important mart for cheese, and

Chippewa Falls

contains a woolen factory, a silk factory, large condensed milk factory, railway works; boot factories, a bacon factory, etc. The town is supplied with good water from an artesian well. Pop. (1901), 5,074.

Chippewa Falls, a town and county-seat of Chippewa Co., Wis.; on the Chippewa river, and the Chicago, Milwaukee and St. Paul, the Chicago, St. Paul, Minneapolis and Omaha, and the Wisconsin Central railroads; 12 miles N. E. of Eau Claire. It is the seat of the County Insane Asylum and the State Home for the Feeble-Minded, and has important manufactures, large water power from the river, electric lights and street railways, daily and weekly newspapers, two National banks, and an assessed property valuation of \$2,000,000. Pop. (1890) 8,670; (1900) 8,094.

Chippeways, or **Ojibways**, a tribe of North American Indians in the United States and Canada. They are distributed in bands round both sides of the basin of Lake Superior, where they once owned vast tracts. They are of the Algonquin stock, tall, active, and well formed, subsist chiefly by hunting and fishing, and number about 18,000.

Chiquichiqui Palm (chē-kē-chē'kē) (*Leopoldinia Piassaba*), the piassaba of the N. of Brazil, and one of the palms which yield the piassaba fiber so much used for making brushes.

Chiquimula (chē-kē-mō'lä), a small town in the E. of Guatemala, which gives name to a province and to the Isthmus of Chiquimula, with a breadth from the Gulf of Honduras to the Pacific of about 150 miles.

Chiquinquira (chē-kēn-kē-rä'), the largest town in the department of Boyacá, Colombia, near the Suarez, 30 miles W. of Tunja; was an Indian place of pilgrimage before the conquest; and the Spaniards having found here a miraculous image of the Virgin, the church where this is preserved is now visited by some 60,000 pilgrims annually.

Chiquitos (chē-kē'toz), or **Naquinoneis** ("men"), an Indian stem of Bolivia, dwelling between the Paraguay and the Madeira. Bronze-colored and well built, with large round heads, low foreheads, and small bright eyes, they are cheerful, hospitable, fond of music and dancing, but of a low morality, and live (about 20,000 in all) in villages founded by the Jesuits.

Chiragra (kī-rag'ra), that species of gout which attacks the joints of the hand (the wrist and knuckles) and hinders their motions. It gradually bends, distorts, and finally stiffens the fingers.

Chirata, or **Chiretta**, the stem of *Agathotes chirayta* or *Ophelia chirata*, a plant

Chiru

belonging to the order *Gentianaceæ*, growing in the N. parts of India. The stems are smooth, pale brown, and about the size of a goose-quill, with numerous small flowers and parts of the root attached; and have a yellow pitch. They contain a bitter substance; are used as a stomachic tonic.

Chiriqui (chē-rē-kē'), an administrative division of the department of Panama, Colombia, adjoining Costa Rica; area, 6,500 square miles; pop. 43,000. It is well wooded, and has rich pasturage, especially on the Atlantic coast, where the climate is very moist. The Cordilleras that occupy the interior reach their highest point in the volcano of Chiriqui (11,265 feet). Chief town, David.—On the N. coast is a spacious lagoon of the same name, with a depth of water for the largest ships, which receives an unimportant Rio Chiriqui.

Chiron (kī'ron), a centaur, half man and half horse, son of Philyra and Saturn, was famous for his knowledge of music,



CHIRON AND ACHILLES.

medicine, and shooting. He taught mankind the use of plants and medicinal herbs, and he instructed in all the polite arts, the greatest heroes of his age, such as Achilles, Esculapius, Hercules, etc. Having received from Hercules an incurable wound in the knee, he begged Jupiter to deprive him of immortality. His prayers were heard, and he was placed by the god among the constellations, under the name of Sagittarius. In the ancient works of art, the features of Chiron, instead of expressing mere savage and sensual strength, as those of the Centaurs generally do, are marked by a mild wisdom in harmony with its character.

Chiru (chē-rö), *Antilope Hodgsonii*, a fine large species of antelope found in Tibet, somewhat larger than the chamois.

Chisel

Chisel, an edged tool for cutting wood, iron or stone. It is operated by striking its upper end with a hammer or mallet, or by pressure. It is one of the most ancient of tools. Chisels of sharp flint have always been used by savages to cut wood, and in very early times bronze ones were made which would cut the hardest stone. The ancient Egyptians carved most of their granite monuments with copper or bronze chisels, which are said to have cut as well as the best steel chisels of the present day. Chisels are now made in many different forms, and for many kinds of work. Those used by sculptors, masons, and other workers in stone, are merely short pieces of steel with sharp edges. The tool is held in the left hand and is made to cut by striking it on the end with a broad hammer called a mallet, made usually of wood. Blacksmiths and other iron-workers use chisels much like those of stone-cutters, for cutting off bars of iron and like work. Carpenters and joiners' chisels are much finer tools, and usually have handles. They are made out of bar iron by forging, or hammering it while hot, and the edge, of tool steel, is put in in the same way as the edge of an axe. Such chisels are made of many sizes, from an eighth of an inch up to several inches in width, and are used for different kinds of wood cutting and carving. Dovetails, mortises, and other such work are usually cut with chisels. A kind of chisel with a rounded blade, used for cutting grooves and round places in wood, is called a gouge.

Chiselhurst, a village in Kent, England, 11 miles S. E. of London. Camden Park estate (now built over) was the residence of Camden, the antiquary. Napoleon III. died at Camden Place in 1873; his remains along with those of the Prince Imperial were removed to Farnborough in January, 1888. There are an Orphanage and a Governesses' Benevolent Institution here.

Chisleu (kīs'lū) the ninth month of the Jewish year, commencing with the new moon in December or the latter part of November. The modern Jews fast on the sixth day of this month.

Chitaldrug, a district and town of India, in the Native State of Mysore. The district, which is arid and stony, has an area of 4,571 square miles; pop., 376,310. The town has fortifications constructed by Haider Ali, and was a station for British troops. Pop., 4,271.

Chitine ($C_9H_{15}NO_6$), the horny substance which gives firmness to the tegumentary system and other parts of the *crustacea*, *arachnida* and insects; probably also the *carapace* of the *rotatoria* consists of it. It is left when the above structures are exhausted successively with alcohol, ether, water, acetic acid, and alkalies, retaining

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the original form of the texture. It is dissolved by concentrated mineral acids without the production of color. It is not dissolved by solution of potash, even when boiling; neither does it give the characteristic reactions with Millon's or Schultze's tests. It contains nitrogen.

Chiton, a genus of mollusca, the shells of which are boat-shaped, and consist of a series of symmetrical plates, folding over each other, and implanted in the mantle or zone of the animal. It is the typical genus of the family *Chitonidæ* or Chitons. The species occur in all climates. More than 200 recent species are known, and 37 fossil, the latter from the Silurian period onward.

Chittagong, a district of Hindustan, in the S. E. of Bengal, having the Bay of Bengal on the W.; area, 2,567 square miles; pop. 1,290,167. The level lands, chiefly on the coast and the valleys, are very fertile. A considerable majority of the inhabitants are Mohammedans. Chittagong is also the name of a commissionership or division of Bengal. Area, 12,118 square miles; pop., 4,190,081. The city of Chittagong, chief town of the district and second port of Bengal, is on the Karnaphuli river, about 12 miles from its mouth. Though very unhealthy, its trade has been steadily increasing. Pop. 24,069.

Chittagong Wood, a wood of several Indian trees, especially of *Chickrassia tabulāris*, order *Cedrelaceæ*, a light-colored, beautifully-grained wood used by cabinet-makers. Also *Cedrēla Toona*.

Chitral, a small mountain State in the upper basin of the Kashkar or Kunar, a tributary of the Kabul river, and bordering on Kashmir and Kafiristan, is 5,200 feet above sea-level. Major Biddulph, the first European to enter it, described it in "Tribes of the Hindoo Koosh" (1800). The people are Moslems, but mostly speak a language closely akin to that of their pagan neighbors in Kafiristan. Upper Chitral, with its capital Mastuj, is closely connected with Gilgit. Lower Chitral enjoyed till lately undisturbed independence; but in 1894 an English resident and small body of troops were surrounded and besieged in Chitral, the consequence of which was that in March, 1895, an expedition was sent (the main body by the Swat valley, the other from Gilgit), which after some sharp fighting advanced triumphantly through extremely difficult country, relieved the besieged, and annihilated all opposition.

Chittenden, Russel Henry, an American educator; born in New Haven, Conn., Feb. 18, 1856. He was graduated at Yale in 1875, and took a course at Heidelberg. He became Professor of Physiological Chemistry at Yale in 1882, and since 1896 has

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been director of the Sheffield Scientific School. He has written "Digestive Proteolysis" and similar works.

Chittenden, Thomas, an American colonial and State governor; born in East Guilford, Conn., Jan. 6, 1730. He was one of the pioneers of Vermont, settling upon the New Hampshire grants in 1774, and acquiring a fortune from his lands. In 1778 he became governor of Vermont, before its formal separation from New York was recognized. During the Revolutionary War the British and the Continental Congress received overtures from him, his terms being recognition of Vermont's statehood. He retired from public life in 1796 and died in Williston, Vt., Aug. 24, 1797.

Chittim, or Kittim, in the Old Testament, is usually identified with Cyprus.

Chitty, Joseph an English lawyer and legal writer; born in 1776. He achieved eminence as a barrister in London, and enjoyed a large practice. His celebrity rests mainly upon his legal works, especially "Precedents in Pleadings," "Medical Jurisprudence," "Practice of Law," and others. He died in London, Feb. 17, 1843.

Chiusi (kē-ös'ē), a town of Central Italy, 102 miles N. N. W. of Rome, on an olive-clad eminence in the Val di Chiana, not far from the small Lago di Chiusi. In ancient times, under the name of Clusium, it was one of the 12 republics of Etruria, and the residence of Porsenna. When Italy was overrun by the barbarians, it fell into decay, the whole valley was depopulated, and became the pestilential pool described by Dante. Since the improvement of the course of the Chiana, Chiusi has begun to flourish again along with the whole district. It is in connection with the discovery of Etruscan antiquities, however, that the place is chiefly heard of. During the 19th century immense quantities of these remains were found in the neighborhood in the grottoes that served the ancient Etruscans as tombs. They consist chiefly of sun-dried black earthenware vases, ornaments, relievos, and carved stonework, and are preserved in the museums at Chiusi and Florence. Pop. (1901) 5,974.

Chivalry, the uses and customs pertaining to the order of knighthood. The general system of manners and tone of sentiments which the institution of knighthood, strictly pursued, was calculated to produce, and did in part produce, during the Middle Ages in Europe, is comprehended in ordinary language under the term of chivalry. The rise of chivalry has been placed by some as late as the crusades, but at that time it was in an advanced stage of development. From the 9th to the 12th century, a "miles," that is, one bearing a designation which in classical times meant simply a

Chizerots

soldier, and in the mediæval period a knight, was one who held land in fee from a superior, and was in consequence bound to render him military service. When a young man who was heir to these responsibilities came of age enough to formally pledge himself to discharge them honorably, a ceremony of investiture took place. The Church, as was natural and right, sought to add solemnity to the interesting event, and made the investiture of a youthful knight an imposing religious ceremony, holding up, moreover, before him a high moral and religious ideal to which he was exhorted to aspire. Mercy to vanquished foes and purity in the youthful knight's relations to women were earnestly pressed upon him; and there was undoubtedly more of both than if the Christian Church had not interfered. Yet withal the ages of chivalry were marked to a frightful extent by cruelty and impurity. While the Church counseled and poets celebrated the religious and moral elevation of the true knight, that individual himself manifested little of either; his principles and his practice were wonderfully different. Chivalry declined and fell with the feudal system, of which it was a normal growth. The institution of the military orders, the Knights Templar, the Knights of St. John, and the Teutonic Knights, was an interesting development of chivalry. To a certain extent also it has a place in the present, its ceremonies being retained in the creation of modern knights, though some of them are all but meaningless. Whatever in the days of its vigor it effected in making society braver, more compassionate, and more pure, created for it a title to gratitude which should never pass away.

A Court of Chivalry was a court held before the Lord High Constable and Earl Marshal of England, having cognizance of contracts and other matters relating to deeds of arms.

Chive, or Cive, a small perennial garden plant (*Allium Schœnopräsum*) of the same genus as the leek and onion, and used for flavoring soups, etc. It is a rare native of Great Britain, where it is often cultivated as an edging for garden plots.

Chizerots and Burins, one of those peculiar races in France that live isolated in the midst of the rest of the population, and are despised and hated by their neighbors. They are found in the arrondissement of Bourg-en-Bresse, in the department of Ain; and the communes of Sermoyer, Arbigny, Boz, and Ozan belong to them. According to tradition, they are descended from the Saracens. Though industrious and prosperous, they are held in the utmost contempt and detestation by their peasant neighbors, often themselves indolent and

destitute. They are looked upon as covetous and malicious, and scarcely would the daughter of a small farmer or well-to-do day-laborer become the wife of one of them, so that they mostly marry among themselves. From time immemorial, they have been field-laborers, cattle-dealers, butchers, and the like. Many of them are very good-looking, the young women in particular being handsome and clear-complexioned, with large black eyes.

Chladni, Ernst Florens Friedrich (chlad'nē), a German physicist; born in Wittenberg, Nov. 30, 1756. He investigated the laws of sound and made important experiments on the vibration of metallic and glass plates of various forms. His works include "Discoveries Concerning the Theory of Sound" (1787), "Acoustics," (1802), "Contributions to Practical Acoustics, with Remarks on the Making of Instruments" (1822). He died in Breslau, April 4, 1827.

Chladni's Figures, the figures formed by sand strewn on a horizontal glass or metal plate, or even a slip of wood, when it is clamped firmly at one point, and set in vibration by means of a violin-bow.

Chlamydosaurus, a genus of Saurians, founded on a specimen, *Chlamydosaurus Kingii*, found in Careening Bay, Port Nelson, Australia, in 1820. In color it is yellowish-brown, variegated with black. Head depressed with the sides erect, leaving a blunt ridge on the upper part wherein the eyes are placed. Toes long, compressed, scaly, and very unequal; claws hooked and horn-colored; neck covered with small scales, and furnished with a large plaited frill, rising from each ear. Each frill has four plaits which converge on the under part of the chin, and fold it up on the side, and a fifth where the two are united in lower part of the neck. Length, 22½ inches.

Chlamyphorus, a genus of mammals of the order of *Edentata*, consisting of a single species, *Chlamyphorus truncatus*. It resembles the mole in some respects, and in others the beaver or sloth. Its length is 5¼ inches. The body is covered with a shell of a consistence somewhat more dense and inflexible than sole-leather, of an equal thickness, and consisting of a series of plates of a square, rhomboidal, or cubical form, each row containing 15 to 22 plates. The superior semicircular margin of the truncated surface, together with the lateral margins of the shell, are beautifully fringed with silky hair.

Chlamys, a military cloak or mantle, worn especially by horsemen. Also the name of a genus of coleopterous insects, belonging to the sub-tribe *Cyclica*, and the family *Chrysomelidæ*.

Chlopicki (klō-pits'kē), **Joseph**, a Polish general; born in Galicia, March 24, 1772. He served under Kosciuszko, during the first revolt of the Poles (1794), and then engaged in Napoleon's service, under whom he took part in the battles of Eylau, Friedland, Smolensk, and Moskowa. After the fall of Paris in 1814, he conducted back to Poland the débris of the Polish-French contingent, and was created general of division by the Czar. On the outbreak of the Polish revolution of 1830, he was elected Dictator, but soon resigned that office, fought at Grochow and Wavre, and after the cessation of hostilities, retired into private life. He died in Cracow, Sept. 30, 1854.

Chloral (C_2HCl_3O) seems to be aldehyde, in which chlorine has been substituted for hydrogen (see ALDEHYDES). It was discovered by Liebig in 1832, who got it by passing dry chlorine gas through absolute alcohol till all action ceased. The quantity of chlorine required for 1 pound of spirit is nearly 40 cubic feet, and the action must be continued for some days. A very large bulk of hydrochloric acid is evolved at the same time, and this must be disposed of by means of a good draft. The crude product is agitated with four or five times its bulk of sulphuric acid, allowed to stand, and the layer of chloral which forms drawn off. It is then rectified over finely divided lime. These operations have in general to be repeated several times to get the chloral quite pure. Chloral is an oily liquid, which boils at about 201° F. It has a pungent odor and slightly astringent taste. The vapor acts strongly on the skin. It has a specific gravity of 1.5. When dropped into water it falls to the bottom in oily drops, which dissolve on heating; it is readily soluble in alcohol and ether, and it acts itself as a solvent of iodine, sulphur, and phosphorus.

When brought in contact with a little water chloral combines with it, forming a hydrate C_2HCl_3O, H_2O , which is white and crystalline, and dissolves on addition of water. When preserved in a stoppered bottle the hydrate sublimes; when heated, it volatilizes without decomposition. Kept in contact with oil of vitriol for a considerable time, chloral passes into an insoluble state, but by heat it again becomes soluble. It is decomposed by alkalies, chloroform being one of the products.

For a number of years chloral was a body of no particular interest to anyone but a chemist, but the discovery of its physiological effects by Dr. O. Liebreich in 1869 soon engaged the attention of the whole medical profession, and chloral (or rather chloral hydrate) has since been very extensively employed in medicine. When it is given internally in doses of 20 grains or thereby it quickly induces sleep of a natural and re-

Chloral

freshing character, the awakening from which is unattended by the headache, sickness, confusion or feeling of stupidity that usually follows sleep procured by opium. In larger doses the sleep is deeper and more prolonged, the person can with difficulty be awakened from it, pain is abolished, breathing becomes slow and shallow, and the pulse, quickened at first, is afterwards slowed; the pupils are much contracted, and there is complete muscular relaxation. The result of poisonous doses is a great fall in bodily heat and paralysis of the heart. Death by chloral poisoning has been prevented by means which maintain the bodily heat, and the treatment of chloral poisoning consists in the use of warm blankets, hot bottles, hot stimulants such as hot coffee, hot toddy, etc. The taste for chloral hydrate is apt to grow on a person so that its use cannot readily be given up. With constant use larger doses require to be taken, and persons who are accustomed to its use are apt some day, owing to their familiarity with the drug, to take an overdose, a very slight increase of an accustomed dose being sometimes sufficient to cause death. Chloral hydrate is chiefly used to procure sleep when a person is suffering from nervous excitement, overstrain or worry, feverishness, delirium, and delirium tremens. It is not nearly so useful for the relief of pain, and is useless for relieving neuralgia. It acts as an antidote to strychnine.

Chlorine. The discovery of this gas was made in 1774 by Scheele, who named it dephlogisticated marine acid. The term dephlogisticated had exactly the same import as that of oxygenated, soon afterward introduced by Lavoisier. It was afterward proved by Davy to be not a compound of oxygen, but a simple body, and from its peculiar yellowish green color the appellation of chlorine (from Greek *chlōros*, green) was given to it. Chlorine gas is obtained by mixing concentrated hydrochloric acid contained in a glass flask, with finely powdered peroxide of manganese. On the application of a moderate heat the gas is evolved, and can be collected either in bottles over warm water in the pneumatic trough, or by simply leading the delivery tube to the bottom of a bottle, and allowing the heavy chlorine to displace the air. The reaction between the peroxide of manganese (MnO_2) and the hydrochloric acid (4HCl) consists in the formation of water ($2\text{H}_2\text{O}$) and manganous chloride (MnCl_2) and the consequent liberation of chlorine (Cl_2). The following method is also employed: Three parts of common salt (chloride of sodium) are intimately mingled with one of the peroxide of manganese, and to this mixture two parts of sulphuric acid diluted with an equal weight of water are added. By the action of sulphuric acid on the chloride,

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hydrochloric acid is disengaged, which reacts as above explained on the peroxide of manganese; so that instead of adding hydrochloric acid directly to the manganese, the materials for forming it are employed.

Deacon's process consists in passing a mixture of hydrochloric acid gas and hydrogen over tiles soaked in a copper salt, dried and heated to from 700° to 750° F. At this point water is formed and chlorine is liberated; the copper salt appears to be unaffected by the action. Another chemist's process is to act on peroxide of manganese with a mixture of nitric and hydrochloric acids; chlorine is evolved; water and nitrate of manganese are produced, and this last is converted by ignition into peroxide of manganese and peroxide of nitrogen, both of which can be utilized for the decomposition of a fresh quantity of hydrochloric acid. The economic working of the different processes depends to some extent on the utilization of the by-products, and especially of the manganese salt, and several plans for its recovery and conversion into the peroxide have been devised and are used in large works. (See MANGANESE.)

Chlorine is gaseous at the common atmospheric pressure, but if at the ordinary temperature it be exposed to a pressure of four atmospheres, it condenses to a mobile yellow liquid, which has never been solidified. It is two and a half times heavier than atmospheric air, and 35.5 times heavier than hydrogen. The gas has a yellowish green color, and has the most insupportable suffocating odor. When pure it occasions immediate death to an animal immersed in it; but even when largely diluted with common air it cannot be respired with safety. It occasions a severe sense of stricture at the breast, which renders it impossible to make a full inspiration. This feeling continues for a considerable time, and permanently injurious effects have even been produced. Chlorine is somewhat soluble in water, the solution having the color and odor of the gas. If the solution be cooled, long yellow crystalline needles deposit, consisting of a hydrate of chlorine. This solid body fuses to a yellow oil at the ordinary temperature, which is liquid chlorine. When exposed to sunlight the solution gradually loses its color, oxygen is liberated, and the water contains hydrochloric acid in solution. The great affinity of chlorine for hydrogen is one of its most characteristic properties, and is exhibited in a number of reactions. If a mixture of equal volumes of hydrogen and chlorine gas be made in the dark and then exposed to diffused daylight, combination takes place; but if it be exposed to direct sunlight, the gases combine at once with an explosion, and produce hydrochloric acid. This is the only compound these substances form with one another, and it is one of the most important of the acids. When a lighted taper is immersed in a jar

Chlorine

of chlorine, it burns with a smoky flame; this is due to the combination of the chlorine with the hydrogen only, and the liberation of the carbon. Similarly, when hydrocarbons like turpentine and olefiant gas are mixed with chlorine and a light applied, a ruddy flame with a copious deposition of carbon shows that the hydrogen and chlorine are alone combining. Several of the elements catch fire when immersed in chlorine, for instance, phosphorus, arsenic, antimony, and copper; while others combine with it at a higher temperature, sometimes with vivid combustion as in the case of potassium. The compounds of chlorine with the other elements are termed chlorides, and next to the oxides they are the most abundant and widely distributed substances in the earth, many of them besides being of great importance for manufactures. Common salt, the chloride of sodium, is the most plentiful of all, and is met with forming large rock masses in various parts of Europe, and dissolved in the waters of the ocean, of many salt lakes in Asia, America, and elsewhere, and of brine springs. It is the ultimate source of all the hydrochloric acid and chlorine of commerce. Other chlorides, as of potassium, calcium, etc., are met with, but in no case nearly so abundantly as common salt. As a class, the metallic chlorides are crystallizable salts, readily soluble in water, some being even deliquescent. The chloride of silver, the subchloride of mercury, and one or two others are, however, insoluble in water, while a few are decomposed by water with the precipitation of an insoluble powder. From its wide affinities and great activity in the free state, chlorine is one of the most useful and powerful instruments with which the chemist deals. By it such metals as platinum and gold are attacked and made soluble in water, while its power over organic substances is very great, and has resulted in the formation not only of a number of compounds by simple union with it, but of a great number into which the chlorine has entered more intimately and produced what are called substitution compounds.

Chlorine is largely consumed in the arts. Thus it is used in the manufacture of potassic chlorate for making lucifer matches; in the conversion of the yellow to the red prussiate of potash, in the preparation of chloride of sulphur for the vulcanizing process, and above all as a bleaching and disinfecting agent. This last property is exercised by chlorine by virtue of its power, already referred to, of decomposing water by combining with the hydrogen and liberating oxygen, which is the true agent in the operation, and which converts the coloring matter into colorless compounds. Berthollet was the first who applied this agency of chlorine to the process of bleaching. The

Chlorine

method of using it has been successively improved. It consisted at first in subjecting the thread or cloth to the action of the gas itself; but the effect in this way was unequally produced, and the texture was sometimes injured. It was then applied in a dilute aqueous solution. The thread or cloth was prepared as in the old method of bleaching, by boiling first in water and then in alkaline lye; it was then immersed in the diluted chlorine; this alternate application of alkali and chlorine was continued until the color was discharged. The offensive suffocating odor of the gas rendered this mode of using it, however, scarcely practicable; but the odor was found to be removed by a weak solution of potash; lime immersed in water, being more economical, was afterwards substituted. Later a compound of chlorine and lime was employed, prepared by exposing slaked lye to chlorine gas; the gas is quickly absorbed by the lime, and the chloride of lime, or bleaching powder as it is called, being dissolved in water, forms the bleaching liquor now generally employed. In using it the cloth is first commonly steeped in warm water to clean it, and is then repeatedly washed with an alkaline solution, so diluted that it cannot injure the texture of the cloth; the cloth is then washed and steeped in a very weak solution of chloride of lime, again washed, acted on by a boiling lye as before, and again steeped in the solution; and these operations are performed alternately several times. The cloth is lastly immersed in very dilute acid, which reacts on the bleaching powder and liberates chlorine; this then attacks the coloring matter, and the cloth soon acquires a pure white color. It is next repeatedly washed with water to remove the last traces of the lime salts, and then it is exposed to the action of a hyposulphite in order to render any chlorine inoperative that may remain. The cloth is finally washed, dried, and dressed. When sulphuric acid is used to liberate the chlorine it is found more difficult in the subsequent washing to remove the calcic sulphate formed on account of its sparing solubility in water. To avoid this chloride of magnesia has been substituted for the chloride of lime. It is easily prepared by adding sulphate of magnesium to a solution of chloride of lime and straining off the clear fluid. It has the same bleaching power, is easily removed by washing, and it is said to leave the cloth in a more supple state than when ordinary bleaching solution has been employed. Another important application of chlorine gas and of bleaching powder is to the destroying or neutralizing of contagion. Acid vapors, sulphurous acid in particular, under the form of the fumes of burning sulphur, are often employed for that purpose; but chlorine, from the facility with which it decom-

Chlorine

poses the different compound gases that contain the elements of vegetable and animal matter, and which may be supposed to constitute noxious effluvia, is superior to any other agent, and is now universally employed for the purposes of fumigation. It can be used to destroy sulphuretted hydrogen, and it has been found useful among such persons as are obliged to frequent places where contagious effluvia are constantly developed, to bathe the hands and arms with its solution.

The compounds of chlorine with oxygen are of considerable importance. They are all artificial, and can be prepared only by indirect means. They are all somewhat unstable, and some of them decompose readily, even with explosive violence. The known oxides of chlorine are three in number. Two of them are anhydrides; that is, they are capable of combining with water to form acids; there are, besides, other acids, corresponding to oxides, which have not yet been procured in the free state. The following table exhibits their composition and relations:

Hypochlorous anhydride, Cl_2O	Hypochlorous acid, HClO
Chlorous anhydride, Cl_2O_3	Chlorous acid, HClO_2
Chloric peroxide, Cl_2O_4	No corresponding acid.
Chloric anhydride, hypothetical, unknown, Cl_2O_5	Chloric acid, HClO_3
Perchloric anhydride, hypothetical, unknown, Cl_2O_7	Perchloric acid, HClO_4

The hypochlorous anhydride (or oxide, as it is sometimes called) is a heavy yellowish gas, with a peculiar smell. By a sufficiently low temperature it condenses to a deep red liquid. Both the gas and the liquid are liable to explode. By solution in water hypochlorous acid is formed, which is distinguished by its yellow color and peculiar sweet smell. The acid is very unstable, and is a powerful bleaching agent, in fact, bleaching powder, according to some, contains hypochlorite of calcium, and it is in consequence of the acid being liberated that the oxidizing and bleaching effect is produced. Chlorous anhydride is a greenish yellow gas, and the acid is a liquid of the same color. They are powerful oxidizing agents. The peroxide of chlorine is a deep yellow heavy gas, with a powerful odor, so explosive that it is not safe to work with any but the smallest quantities. It is a powerful supporter of combustion; so that phosphorus burns when in contact with it, even if under water. Chloric acid is obtained by decomposing potassic chlorate with hydrofluosilicic acid. Sulphuric acid cannot be employed, as the peroxide may be produced. By decanting from the precipitate and evaporating, a syrupy solution of the acid is obtained. It is a colorless

Chlorodyne

strongly acid fluid with a strong smell. It is decomposed at high temperatures, but it is not stable even at the common temperature. It is a powerful oxidizing agent, and at once destroys organic matter when brought in contact with it. Perchloric acid is a colorless liquid, which remains so even at -31°F. (or 63° below the freezing point of water). It cannot be preserved, however, for after a time it explodes. When brought in contact with organic matter, the acid decomposes with the greatest violence. These acids by combining with bases form the hypochlorites, chlorites, chlorates, and perchlorates respectively. The more important of these are mentioned in connection with the metals. Chlorine combines with nitrogen. By passing chlorine gas into a solution of sal-ammoniac, oily drops are formed which sink to the bottom, and consist of a compound of the two elements. It is perhaps the most explosive substance known. See NITROGEN.

Chlorine forms four compounds with carbon, represented by the formulæ, CCl_4 , C_2Cl_2 , C_2Cl_4 , C_2Cl_6 . The union can be effected only indirectly by decomposition of hydrocarbons. Part of the chlorine combines with the hydrogen, and simultaneously another part combines with the carbon. Chlorine forms important compounds with sulphur, phosphorus, and other non-metallic elements. These as well as the more important metallic chlorides will be found under the respective titles.

Chlorite, a mineral of a grass-green color, opaque, usually friable or easily pulverized, composed of little spangles, scales, prisms, or shining small grains, and consisting of silica, alumina, magnesia, and protoxide of iron. It is closely allied in character to mica and talc. There are four subspecies — chlorite earth, common chlorite, chlorite slate, and foliate chlorite.

Chlorite Schist, a green slaty rock, in which Chlorite is abundant in foliated plates, usually blended with minute grains of quartz or sometimes with felspar or mica. It is often associated with or even graduates into gneiss and clay-slate.

Chloritic Marl, a thin bed of white or pale-yellow marl, sometimes indurated, containing dark-green glauconitic grains, phosphatic nodules, and iron pyrites. It belongs to the Cretaceous system, coming between the Upper Greensand and Chalk Marl. It is characterized by the abundance of *Scaphites æqualis*, a species of ammonites. It is confined to the S. districts of England occupied by the Cretaceous rocks.

Chlorodyne, a popular patent medicine used in allaying pain and inducing sleep, and containing morphia, chloroform, prussic acid, extract of Indian hemp, etc. There are several makes of it, but all have to be used with caution.

Chlorophyll, the name given to the green-coloring matter of plants. Its nature is still doubtful. It is ordinarily stated that it exists under the form of globules or granules, and occasionally as an amorphous granular substance. It presents itself in the form of distinct corpuscles in the cells of the flowering plants generally. Chlorophyll exists in *Hydra viridis*, the green fresh-water polype, one of the *Cœlenterata*, and in *Stentor*, an infusorian animalcule.

Chmelnizkij, Nikolaj Ivanovich (chmelnits'skē-ē), a Russian writer; born in 1789. He contributed largely to the reformation and elevation of the Russian stage, both by his original productions and by his translations of Regnard, Molière, and other great masters. Among his comedies are: "The Babblers," "Air Castles," "The Waverer." He wrote also a historical drama: "Zenobius Bogdan; or, The Incorporation of Little Russia." He died in 1846.

Chloroform (CHCl_3 , trichloromethane, methenyl chloride, terchloride of formyl), is formed by the action of the sun's rays on a mixture of chlorine and marsh gas; also by the action of caustic potash on chloral or chloracetic acid, or by the action of nascent hydrogen on tetrachloride of carbon. It is prepared by distilling water with bleaching powder and alcohol or acetone, the latter being preferred. Chloroform is a colorless, mobile, heavy, ethereal liquid. Specific gravity, 1.5. It boils at 62° ; its vapor density is four times that of air; it is nearly insoluble in water, but dissolves readily in alcohol. It has a sweet taste. It dissolves caoutchouc, resins, fats, alkaloids, etc. If exposed to the light, it may decompose, hydrochloric acid and chlorine being set free.

Chloroform is used in medicine, dissolved in alcohol, under the name of chloric ether, as a stimulant. Chloroform taken internally acts as a narcotic, sedative, and antispasmodic, and is given in cases of asthma, colic, and cholera, also for neuralgia. *Lini-mentum Chloroformi*, equal parts of Chloroform and camphor liniment, is used externally to allay pain and irritation in neuralgia and itching.

The vapor of Chloroform, when inhaled for some time, produces a temporary insensibility to pain. Inhaled in small doses it produces pleasurable inebriation, followed by drowsiness; in larger doses it causes loss of voluntary motion, suspension of mental faculties, with slight contraction of the muscles and rigidity of the limbs; then if the inhalation is continued a complete relaxation of the voluntary muscles takes place, but if carried too far it causes dangerous symptoms of apnœa or of syncope, and the patient must be restored by artificial respiration. Chloroform should not be administered to persons suffering from

cerebral disease or organic cardiac affection. Dr. Simpson, of Edinburgh, in 1847, began to employ the vapor as a means of producing anæsthesia or insensibility, partial or complete, in certain surgical operations and painful diseases, as well as in ordinary obstetric practice. Its use in the latter class of cases, unless in extreme instances, is to be reprobated.

Chlorosis, one of the most formidable diseases to which plants are liable, and often admitting of no remedy. It consists in a pallid condition of the plant, in which the tissues are weak and unable to contend against severe changes, and the cells are more or less destitute of chlorophyll. It is distinct from blanching, because it may exist in plants exposed to direct light on a south border, but is often produced or aggravated by cold, ungenial weather and bad drainage. The most promising remedy is watering them with a very weak solution of sulphate of iron. Many forms of the disease exist, of which those of clover, onions, cucumbers, and melons are best known.

In medical practice, an affection in which the skin of the body, and especially that of the face, assumes a peculiar greenish cast, and hence is popularly known as green-sickness. The condition is closely allied to anæmia and menstrual disturbances of variable nature, sometimes assuming the form of amenorrhœa and again that of menorrhagia, and is due to deficiency of the coloring matter of the blood. Chlorosis occurs chiefly among young and delicate women who lead sedentary lives under unwholesome conditions.

Choate, Joseph Hodges, an American diplomatist; born in Salem, Mass., Jan. 24, 1832. He is a descendant of John Choate,



JOSEPH H. CHOATE.

who came from England in 1640. He was graduated at Harvard College in 1852; ad-

Choate

mitted to the bar in Boston in 1855; removed in 1856 to New York, where he became a partner in the law firm of Evarts, Choate and Beaman. His ability as a lawyer and public speaker soon gave him a reputation which has seldom been equaled among the leaders of the New York bar. On Jan. 12, 1899, he was appointed by President McKinley ambassador to England. The appointment was promptly confirmed by the Senate and gave great satisfaction throughout the country and in England.

Choate, Rufus, an American lawyer; born in Essex, Mass., Oct. 1, 1799; was graduated at Dartmouth College in 1819; taught there for one year; was admitted to the bar and began practice in Danvers in 1823; removed to Salem in 1828; was a member of Congress in 1830-1834, resigning in the latter year; removed to Boston; was successor of Daniel Webster in the United States Senate in 1841-1845; returned to Boston in the latter year, and resumed practice. He traveled in Europe in 1850; was a delegate to the Whig National Convention in Baltimore in 1852. After Webster's death Mr. Choate was acknowledged the leader of the Massachusetts bar. He made many political speeches, the most brilliant, while a United States Senator, including those on the Oregon Boundary, the Tariff, the Fiscal Bank Bill, the Smithsonian Institution, and the Annexation of Texas. He gave much attention to literary studies. He died in Halifax, N. S., July 13, 1858.

Chocolate, a preparation of the seeds of *Theobroma Cacao*, made by grinding the seeds mixed with water to a very fine paste. The mill is usually constructed of heavy metal rollers turning in a circular course upon a flat metal plate. A curved knife or scoop is attached to the rollers in such-wise that it shall return the paste continually to be crushed and recrushed by the rollers until it becomes almost impalpable. The object of this is to render the nut, otherwise difficult of solution, readily diffusible in water or milk when used as a beverage. The paste when unmixed, or mixed only with flour or other farinaceous material, is usually called cocoa, but when much sugar or spices such as vanilla, cinnamon, etc., are added, it bears the name of chocolate. The two names are much confounded commercially. Chocolate is molded into cakes or sold in powder or flakes formed by simply drying the paste as it comes from the mill. The seeds or nuts contain a large proportion (30 to 50 per cent.) of oily matter (cocoa butter). This may be partially removed or all retained in the chocolate. In the latter case much of it is mechanically adherent to the sugar or farinaceous matter. Chocolate is a favorite beverage in Spain, Italy,

Choir

and other S. countries, especially for breakfast; the cake or powder is heated and diffused in water or milk with much stirring. The Italian rarely uses butter, but cuts his bread into sippets and dips them in his chocolate, the oily matter of which performs the same nutritive functions as the butter we spread on our bread. It is sometimes mixed with coffee in Italy, and there known as *mischiata*. It is also made into a paste with cream and sugar and frozen as Chocolate ice. Vanilla is the favorite flavoring. The name appears to be Mexican, *Chocolatl* (*choco*, "cocoa," and *latl*, "water."). It was introduced from America to Europe by the Spaniards. It is highly nutritious, containing a large proportion of nitrogenous flesh-forming material. On this account it is used as portable food by many mountaineers. An excessively rich food is obtained by preparing it with milk and then whisking in a raw egg. The waiters at certain Italian coffee-houses call this *la gloria*, and the ordinary infusion "Aurora." In the solid form, mixed with much sugar, cream, and various confections, chocolate is largely used as a sweetmeat, and is introduced in pastry.

Choctaws, an Indian tribe (nation) occupying a reservation in the S. E. portion of Oklahoma; area, 10,450 square miles. The chief and legislature are chosen by popular vote. Grain, cotton, and fruit are raised by the tribe, which maintains schools and orphan homes. In 1900 they numbered about 20,000. A number of denominations maintain mission schools. In 1899 the tribe's trust funds aggregated \$549,594. There are numerous Choctaw physicians, lawyers, and clergymen, but the tribe is not as civilized as some others.

Chœrilus (kēr'i-lus), a tragic poet of Athens, who wrote 150 tragedies, of which 13 obtained the prize. An historian of Samos. The name of two other poets, one of whom was very intimate with Herodotus, and wrote a poem on the victory which the Athenians had obtained over Xerxes. On account of the excellence of the composition, he received a piece of gold for each verse from the Athenians, and was publicly ranked with Homer as a poet. The other was one of Alexander's flatterers. It is said that that prince promised him as many pieces of gold as there should be good verses in his poetry, and as many slaps on the forehead as there were bad. On examination, six of his verses were found entitled to the coins, while the rest were rewarded with castigation.

Choir, an organized body of singers in church services. In ceremonial Christian religions, and more particularly in the ordering of services in the Church of En-

Choir

gland, the minor canons, choral vicars, and choristers, or other singers taken collectively, are spoken of as the choir. The choral body in the latter church is usually divided into two sets of voices, the one sitting on the N. and the other on the S. side of the chancel, and are known by the respective titles of *Cantoris* and *Decani*, from their nearness to the Cantor (or Precentor) and to the Decanus (or Dean). In most cathedrals and collegiate chapels, the *Decani* side is held to be the side of honor, the best voices are placed there, and all the "verses" or soli parts, if not otherwise directed, are sung by that side, which is also considered the "first choir" (*coro primo*) in eight-part music. In ecclesiastical architecture, the choir is the part of the building in a cathedral or collegiate chapel set apart for the performance of the ordinary daily service. The choir is generally situated at the E. end of the building, and is frequently inclosed by a screen, upon which the organ is placed.

Choiseul (shwäz-el'), an ancient French family which has furnished many distinguished individuals. One of the best known is Étienne François, duke of Choiseul-Amboise, born in 1719, died 1785. He entered the army in early life, and after distinguishing himself on various occasions in the Austrian war of Succession, returned to Paris, where his intimacy with Madame de Pompadour furnished the means of gratifying his ambition. After having been ambassador at Rome, and at Vienna, where he concluded with Maria Theresa the treaty of alliance against Prussia, he became in reality prime minister of France, and was very popular through a series of able diplomatic measures. He negotiated the famous Family Compact which reunited the various members of the Bourbon family, and restored Corsica to France. His fall was brought about in 1770 by a court intrigue, supported by Madame du Barry, the new favorite of the king. He was banished to his estate, but his advice in political matters was frequently taken by Louis XVI.

Choke-cherry, a species of cherry, *Cerasus hyemalis*, or *borealis*, so called from the astringent nature of the fruit.

Choke-damp, the name given by miners to the fire-damp resulting from an explosion of gas in mines. The following diagram is illustrative of the combustion of fire-damp, or carburetted hydrogen, of which the product is choke-damp, called also after-damp and black-damp:

Before Combustion.	Elementary Mixture.	Products of Combustion.
Wght.	Atoms. Wght.	Wght.
8 carburetted hydrogen...	{ 1 carbon	6 22 carbonic acid.
	{ 1 hydrogen	1 9 steam.
	{ 1 hydrogen	1 9 steam.

Choking

144 atmosph'ic air.....	{ 1 oxygen 8	
	{ 1 oxygen 8	
	{ 1 oxygen 8	
	{ 1 oxygen 8	
	{ 8 nitrogen 112	112 uncombined nit
152		152 152 choke-damp.

Choking, in its slighter forms, a very familiar occurrence, resulting from a morsel of food or other solid, or even a drop of liquid, passing into the larnyx or upper opening of the windpipe, instead of the gullet. It is generally caused by a breath being suddenly drawn in coughing or laughing, while food or fluid is in the mouth; and a violent fit of coughing follows till the offending substance is expelled from the windpipe. Sometimes, however, a larger mass—*e. g.*, a half-chewed piece of meat—is drawn into the opening of the windpipe, completely blocking the opening of the windpipe, completely blocking it and arresting respiration altogether. This condition is one of extreme danger; the sufferer becomes purple in the face, and if not at once relieved will certainly and quickly die of suffocation. The obstructing substance is usually within reach, and may often be dislodged if a bystander promptly pushes his forefinger to the back of the throat and attempts to draw the obstruction forward. A child may sometimes be saved by holding it up by the heels and shaking it, or slapping its back. If these measures fail, a sharp-pointed knife, a penknife, for instance, must be promptly pushed into the windpipe to admit air to it below the obstruction.

In cattle the causes fall under two heads: those that depend on the material swallowed; and those that depend on the animal swallowing. Under the first head we find sharp-pointed objects which become fixed into or entangled in the membrane lining the throat and gullet; solid masses too large to pass on to the stomach; dry farinaceous materials which clog in the passage. The second class of causes consists in inflammation of the throat, or irritation of the organs of deglutition; constrictions of the passage; ulceration of the œsophagus, which is apt to follow choking, and is the cause of a relapse; lastly, without any disease of the deglutitory organs, an animal may be choked by eating too greedily, and imperfectly masticating or salivating its food. The symptoms vary according to the position of the obstruction. Many of the most alarming symptoms arise from the paunch becoming distended by gas. Remove the obstruction with the hand when possible. Cause the animal to swallow the substance, if possible, by giving it water, oil, or Belladonna solution. Carefully push the offending agent down by a probang, if it is possible to effect this, and if withdrawal by the mouth is imprac-

Cholera

licable. In some cases the gullet has to be cut into by a surgeon. After a case of choking, keep the animal on soft food, and attend to its general health, in order to avoid a relapse, which is of frequent occurrence in cattle. Cattle are most frequently choked by sliced turnips and potatoes and these should consequently be pulped or mashed.

Cholera, a Greek term used in the Hippocratic writings, but of indeterminate etymology, being derived perhaps from *chole*, bile, or from *cholera*, a water-spout, or gutter. It is now universally employed in medicine as indicating one of two or three forms of disease, characterized by vomiting and purging, followed by great prostration of strength, amounting in severe cases to fatal collapse. The variety called *cholera sicca* (dry cholera), by ancient writers, in which collapse and death take place without discharges, is comparatively rarely observed. The milder forms of cholera occur almost every summer and autumn, even in temperate latitudes, while the more devastating and fatal forms of the disease are generally supposed to originate only in tropical countries—especially in India—and thence to be propagated epidemically over vast populations, and in a somewhat regular geographical course. The very fatal forms of the disease are commonly called Asiatic, Oriental, or epidemic cholera; sometimes cholera morbus, or pestilential cholera. The great Hindu festivals take place every 20 years, and always commence on April 12. The danger of the conveyance of cholera to the countries of Europe is largest at these periods. Cholera never originates at Mecca, but is always conveyed there from Hindustan; but fortunately the Mecca festivals rarely coincide in date with those of India. The Mohammedan year consists of 12 lunar months of 28 days each, or of 336 days instead of 365. Hence the great Mohammedan festival at Mecca varies in the time of its occurrence 36 days in every year, and cholera only breaks out there when Hindu pilgrims with cholera arrive in Mecca when the festival falls in the latter part of April, or in May, or perhaps in June. At all other periods the great Mecca festivals take place comparatively harmlessly. What is called cholera morbus is a bilious disease, long known in most countries, and is characterized by copious vomiting and purging, with violent griping, cramps of the muscles of the abdomen and lower extremities, and great depression of strength. It is the most prevalent at the end of summer or the beginning of autumn. Cholera infantum (infants' cholera) is the name sometimes given to a severe and dangerous diarrhoea to which infants are liable in hot climates or in the hot season.

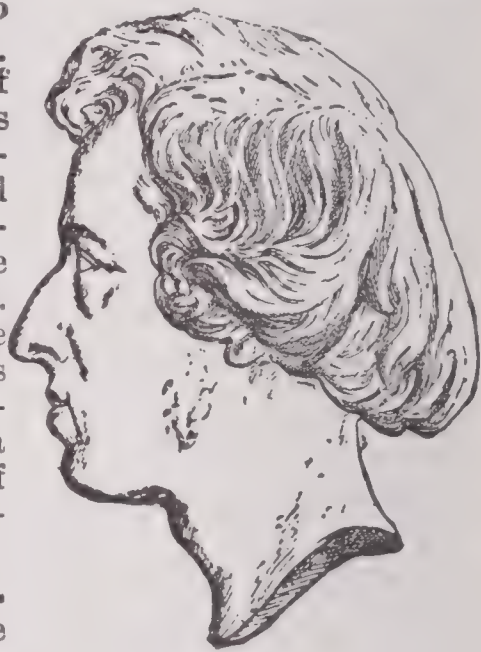
Chopin

Cholesterine (kō les'ter-in; $C_{26}H_{44}O$), a substance found in bile, blood, etc., which may be obtained in the form of beautiful pearly crystalline scales, without taste and odor. It is widely distributed in the animal economy, being essential to the brain and nerve substance, and having been found in milk and many portions of the body, both as a normal and a pathological constituent.

Cholochrome (kō'lō-krōm), or **Cholophæin** (kō-lo-fē'in), the brown coloring matter contained in bile and in the intestines, and the substance coloring the faeces and the skin in jaundice.

Cholos (chō'los), in Peru, the name for those who are partly of white, partly of Indian parentage, the most numerous class of the community.

Cholula (chō-lō'lā), a decayed town of the Mexican State of Puebla, stands nearly 7,000 feet above sea-level, on the tableland of Anahuac, 55 miles E. S. E. of the city of Mexico. Cortes found in it 40,000 houses and 400 temples, including the great Teocalli. Now the place only contains 9,000 inhabitants. It was a great center of the Aztec religion.



FREDERIC F. CHOPIN.

Chondropterygii, the name given by Cuvier to one of the great sections into

which the class Pisces or fishes are divided. It includes all those species, the bones and fin spines of which are cartilaginous, or formed of gristle, such as the sturgeon, shark, ray, lamprey, etc.

Chondrus, the genus of sea-weeds to which carrageen or Irish moss belongs.

Chonos Archipelago, a group of islands lying off the W. coast of Patagonia, mostly between lats. 44° and 46° S., and lon. 74° and 75° W. Two are large, but they are all barren and scantily inhabited.

Chopin, a Scotch liquid measure containing two imperial pints or one quart.

Chopin, Frederic Francois (shō-pan), a Russian pianist and musical composer, of French extraction; born in Warsaw, March 1, 1809; went to Paris in 1831 on account of the political troubles of Poland. He wrote numerous pieces for the piano.

Chopine

forte, chiefly in the form of nocturnes, polonaises, waltzes and mazurkas; all of which display much poetic fancy, abounding in subtle ideas with graceful harmonic effects. He died in Paris, Oct. 17, 1849.

Chopine (chōp-ēn'), a very high shoe or elevated clog, introduced into England from Venice, in the reign of Queen Elizabeth, and which became the fashionable wear of court ladies during that reign. They were made of wood covered with leather of sundry colors, white, red, yellow, and sometimes gilt. Some of them were of great height, as much as 18 inches, the height of the chopine being seemingly regarded as a mark of the rank of the wearer.

Chop-sticks, the Chinese substitute for a knife, fork, and spoon at meals, consisting of two smooth sticks of bamboo, wood, or ivory, which are used for conveying food to the mouth with wonderful dexterity.

Chopunnish, or **Nez Percés** (nā-pěr-sā'), a tribe of North American Indians, also known as Nimapu, or Shaptin, the principal tribe of the Shahaptian stock, who now live on the Nez Percé reservation, in Idaho, and number 1,515. The name Nez Percé originated from the custom formerly followed of piercing the nose. In the Nez Percé war the tribe was under the control of Chief Joseph, who forbade his men to interfere with any white non-combatants.

Choragic Monument, in ancient Greece, a monument erected in honor of one who had gained a prize as "choragus," or organizer of the play and chorus. The remains of two very fine monuments of this sort are still to be seen at Athens, viz.: those of Thrasyllus and of Lysicrates, the last popularly called the Lantern of Demosthenes.

Choragus, the person who, among the ancient Athenians, superintended, or paid the expenses of, a chorus.

Chorale (kō-rā'lé), or **Choral**, the psalm or hymn tune of the German Protestant churches, a simple melody to be sung in harmony or in unison by a number of voices to sacred words.

Choral Music (kō'ral), vocal music in parts; music written or arranged for a choir or chorus, and including oratorios, cantatas, masses, anthems, etc.

Choral Service, a service with intoned responses, and the use of music throughout wherever it is authorized. The service is said to be partly choral when only canticles, hymns, etc., are sung; wholly choral, when, in addition to these, the versicles, responses, etc., are sung.

Chorazin, one of the cities in which Christ's mighty works were done, but named only in his denunciation (Matt. xi: 21 Luke x: 13). It was known to St.

Chord

Jerome, who describes it as on the shore of the lake, 2 miles from Capernaum. Robinson locates it at the modern Tell-hûn, 3 miles N. E. of Capernaum, but without good authority.

Chord, in music, the simultaneous and harmonious union of different sounds, at first intuitively recognized by the ear, and afterwards reduced to a science by the invention of the laws or rules of harmony. Chords may consist of from two to five parts. Absolute chords of two parts are produced only by thirds or sevenths. Chords of more than two parts are either fundamental chords or inversions of them, and are divided into concords and discords. The union of sounds in all chords will be found, on analyzing their component parts, to be an admixture of major and minor thirds. The common chord of *Trias harmonica perfecta*, is the basis of all harmony, and consists of a base note, or prime, with its third and fifth above. These three sounds are the distance of a third from each other. When the lowest third is the greater third, as above, the chord is a major chord; but when the lowest third is the lesser, the chord is called a minor chord. A chord of two minor thirds combined is called diminished, as the interval from the lowest note to the highest is less than a perfect fifth, the common chord admits of two inversions, according as one or other of its notes is made the base, or lowest note of the chord.

By adding another third above the common chord, a chord of four parts is produced, which is called the chord of the seventh, because the highest note is a seventh above the bass. When the chord of the seventh is produced on the fifth of the scale it is then called the dominant seventh, which is the most perfect species of the chord. It then consists of a major third, perfect fifth, and seventh, the minor, which is the next harmonic produced by nature above the fifth. The chord of the seventh may be formed also on any of the notes of the major or minor scale taken as a bass note, which produces the varieties of major, minor, and diminished seventh. The chord of the seventh admits of three inversions, according as the notes above the fundamental note are used as bass notes. From its nature, it requires a resolution, and is therefore always followed by a common chord, whose fundamental bass is a fifth below that of the seventh.

In geometry, a chord is the straight line which joins the two extremities of the arc of a curve; so called from the resemblance which the arc and chord together have to a bow and its string, the chord representing the string. The chord of a circular arc is obtained by multiplying the radius

Chorea

by twice the sine of half the angle which the arc subtends at the center. Tables of chords are given in some of the older works on trigonometry; but they have been superseded by the tables of sines, which are much more convenient for trigonometrical calculations.

Chorea, more fully *Chorea Sancti Viti*, St. Vitus' dance, a disorder of the nervous system characterized by a peculiar convulsive and irregular action of the voluntary muscles, especially those of the face and extremities. The name is derived from St. Vitus, who is said to have had the power of curing persons afflicted with that disease.

Choron, Alexandre Etienne (shō-rôn'), a French musician; born in Caen, Oct. 21, 1772. He labored assiduously to promote musical education in France, founding his famous "Conservatory" in 1818. He wrote many valuable text books on music. He died in Paris, June 29, 1834.

Chorus, originally an ancient Greek term for a troop of singers and dancers, intended to heighten the pomp and solemnity of festivals. During the most flourishing period of ancient tragedy (B. C. 500-400) the Greek chorus was a troop of males and females, who, during the whole representation, were spectators of the action, never quitting the stage. In the intervals of the action the chorus chanted songs, which related to the subject of the performance. Sometimes it even took part in the performance, by observations on the conduct of the personages, by advice, consolation, exhortation, or dissuasion. In the beginning it consisted of a great number of persons, sometimes as many as 50; but the number was afterward limited to 15. The exhibition of a chorus was in Athens an honorable civil charge, and was called choragy. Sometimes the chorus was divided into two parts, who sung alternately. The divisions of the chorus were not stationary, but moved from one side of the stage to the other; from which circumstance the names of the portions of verse which they recited, *strophe*, *antistrophe*; and *epode*, are derived.

In music, the chorus is that part of a composite vocal performance which is executed by the whole body of the singers, in contradistinction to the solo airs, and concerted pieces for selected voices. The judges who join in the chorus are also called the chorus. The term is also applied to the verses of a song in which the company join the singers, or the union of a company with a singer in repeating certain couplets or verses at certain periods in a song.

Chose (shōz), a thing, a chattel, a piece of property; the subject-matter of an action. Chose is used in divers senses, of

Chough

which the four following are the most important: Chose local, a thing annexed to a place, as a mill; chose transitory, that which is movable, and may be taken away, or carried from place to place; chose in action, otherwise called chose in suspense, a thing of which a man has not the possession or actual enjoyment, but has a right to demand it by action or other proceeding.

Cho=Sen, new name given by Japan to KOREA (*q. v.*) on the annexation of the latter in 1910.

Chosroes I., (chos'rōz), or **Khosrou the Great**, King of Persia, succeeded Cabades, A.D. 551. He was fierce and cruel, but possessed many good qualities, and encouraged the arts and sciences. He concluded a peace with the Romans, but afterward invaded their territories, and was repulsed by Belisarius. In the reign of Justinian II., he attacked the Romans again, but was defeated by Tiberius. He died in 579.



CHOSROES I.

Chosroes II., ascended the throne in 590, on the deposition of his father Hormidas, and is accused of having murdered him. His nobility conspired against him on account of his cruelties, and obliged him to fly to the Romans, who replaced him on the throne. He afterward carried his army into Judea, Syria, and Egypt, and made himself master of Carthage, but was defeated by the Emperor Heraclius, and thrown into prison by his son, where he died in 627.

Chota Nagpore, or Chutia Nagpur, a division of British India, presidency of Bengal, divided into the districts of Lohardaga, Hazaribagh, Singbhum, and Manbhum; and nine feudatory States. Total area, 26,966 square miles. Pop. (1901) 4,900,429.

Chouans (shō-än'), the name popularly given, during the Vendéan civil war in France, to the peasants of Brittany and Lower Maine. This name was gradually extended to all the Vendéans, and was originally derived from the cry of the screech-owl (*chathuant*), an imitation of which was a signal used during their nightly meetings.

Chou Caraibe. See BRAZIL CABBAGE.

Chough, a bird, *Fregilus graculus*, belonging to the *fregilinæ*, the second sub-family of the crows. It is generally called the Cornish chough. The bill is long and gently curved, and the nostrils are low down in the upper mandible, and hidden by a dense tuft of bristles. The color is black.

Chouteau

It is found plentifully in the rocky parts of the coasts of the Atlantic.

Chouteau, Auguste, an American pioneer; born in New Orleans, La., in 1739. He was from his early youth a fur trader, and in 1763 set out with his brother Pierre to establish trading stations in the regions W. of the Mississippi. On this trip they founded the city of St. Louis in 1764. Auguste acquired a fortune, and died in St. Louis, Feb. 24, 1829.

Chouteau, Pierre, an American pioneer; born in New Orleans, in 1749. He had few early advantages, but, becoming a fur trader, decided, in 1763, to extend his operations to the region beyond the Mississippi. With his brother Auguste he set out in 1763, joining a government expedition. He stopped in the heart of an unsettled country and founded, with his brother, the city of St. Louis. He died in St. Louis, July 9, 1849.

Chouteau, Pierre, Jr., an American capitalist, son of the preceding; born in St. Louis, Jan. 19, 1789. He worked for his father and began trading in fur early in life. After establishing posts for the sale of skins throughout the trans-Mississippi region he purchased the fur-trading interests of John Jacob Astor. He died in St. Louis, Sept. 8, 1865.

Chretien de Troyes (kret-yen de trwä), the greatest of the early French romancers, flourished in the 12th century. Though he won high fame as a lyrist, his renown is based on his epic compositions, especially on his stories of King Arthur and the Round Table. His epic of "King Marcus and the Fair Ysault" is lost; but these remain: "Irec and Enid"; "Cligés"; "The Knight of La Charette"; "The Knight with the Lion"; "Perceval the Welshman." The last is his most considerable work, but it does not come from his hand alone, being continued and completed by Gautier de Denet and Menassier. In this piece are wrought into one story the legend of the Holy Grail and that of Arthur, which thereafter were not divorced. His language and versification were models for troubadours and romancers for a long time; and from him the Arthurian poets to the end of the 13th century borrowed episodes, themes, situations, characters, and all manner of poets' devices. Chrétien was a master of invention, fashioned for himself a competent literary vehicle, and made most effective use of his large knowledge of men and manners.

Chrism, the name given to the oil consecrated on Holy Thursday, in the Roman Catholic and Greek Churches, and used in baptism, confirmation, ordination, and extreme unction. There are two kinds of chrism — the one, a mixture of oil and bal-

Christ

sam, is used in baptism, confirmation, and orders; the other, which is merely plain oil, is used in extreme unction.

Chrisome, the name of the white linen cloth laid by the priest on the child in Roman Catholic baptism, to signify its innocence. By olden usage it was generally presented by the mother as an offering to the Church, but if the child died before the mother was "churched" again, it was used as a shroud. By a common abuse of words, Chrisome came to mean the child itself, being first applied in the old bills of mortality to denote such children as died within the month of birth.

Christ, the name given as a title of eminence to Jesus our Saviour, whom, in the words of St. Peter (Acts x: 38), "God anointed," as king, priest, and prophet, "with the Holy Ghost and with power." The two names, Jesus Christ, are not analogous to a modern Christian name and surname; in reality the great Being so designated had but one personal appellation — Jesus: Christ being superadded at a later period to designate His office, function, or mission. It was borne by the military leader in the wars of Canaan (Josh. i.-xxiv., actually called Jesus in the authorized version of Acts vii: 45, and Heb. iv: 8), by Jesus surnamed Justus, a fellow-laborer with Paul (Col. iv: 11), and by about a dozen of other persons figuring in the pages of Josephus; in fact the name seems to have been not uncommon among the Jews. We learn from St. Matthew that in this particular case the appellation was given previous to birth by Divine authority. ". . . thou shalt call his name Jesus, for he shall save his people from their sins." The year, the month, and the day when the child Jesus was born are matters of more or less uncertainty, not having been recorded with precision at the time. The salient features, however, of the life thus begun were narrated by four evangelists, who are believed by the majority of Christians to have written with infallible accuracy and trustworthiness under the guidance or inspiration of the Spirit of God.

The circumstances heralding or attendant upon the birth of John, afterward the Baptist, and the miraculous conception and nativity of Jesus, the last-named event at Bethlehem, are told at length by St. Luke (Luke i.-ii.); while St. Matthew relates the visit of the Magi, the slaughter of the infants at Bethlehem, and the flight of the holy family to Egypt (Matt. ii.).

These occurrences took place while Augustus, the Roman emperor, was upon the throne (Luke ii: 1). Thirty years later, under the reign of Tiberius, John, now grown to full manhood, appeared in the wilderness of Judea, as an ascetic and preacher

of repentance, the necessity of which he urged on the ground that the kingdom of heaven was at hand. Those who confessed their sins he baptized in the river Jordan, and thus a new religious community arose, separated to a certain extent from the ordinary professors of Judaism (Matt. iii: 1-10, Luke iii: 1-14). Some suspected that he might be the "Christ" or "Messiah" of ancient prophecy, but he disclaimed the honor, indicating that he was but the forerunner of another who should baptize with the Holy Ghost and with fire, that is, as with fire. (Matt. iii: 11, 12; Luke iii: 16; John i: 20-23.)

Meanwhile, Jesus, now about 30 years of age, had come forth from the obscurity in which he had hitherto resided at Nazareth. (Luke ii: 51, iii: 23.) Having sought and obtained baptism from John, with Divine recognition as the Son of God, and having overcome temptation in the wilderness, He without further delay addressed Himself to His life-work in the world. (Matt. iii: 13-17, iv: 1-11; Luke iii: 21, 22, iv: 1-14). He claimed to be the Messiah spoken of by holy men of old (Dan. ix: 25, 26, etc.), nay, more, to be, in one sense, the subordinate (John x: 29), and in another the equal of His Heavenly Father (v: 30). His ministry, while not ignoring repentance (Luke xiii: 3-5), was one chiefly of faith (John iii: 14-19) and love (John xiii: 34; Matt. v: 43-46). Twelve apostles (Matt. x: 1-6), and afterward 70 other disciples, were chosen to aid Him in His ministry (Luke x: 1, etc.), the former baptizing converts as they arose (John iv: 2). John the Baptist saw his own reputation pale away under the greater glory of his Divine successor, but never allowed this to evoke jealousy within his breast (Matt. iii: 11; Luke iii: 15; John i: 15, 27, 29, iii: 28-31), and when his faithfulness in reproving sin, even in high places, led to his suffering a martyr's death (Matt. xiv: 3-12), his baptized followers, either at once or gradually, transferred themselves to Jesus (John i: 35-37; Acts xix: 1-5).

The latter holy teacher thus left alone, continued His ministry, it is believed, for about three years in all, chiefly at Capernaum and other places near the Lake of Galilee (Matt. iv: 13; Luke vii: 11), as well as in other places of that province (Luke vii: 11, etc.; Matt. xvi: 13), in Perea beyond Jordan (Matt. xix: 1; Mark x: 1; Luke viii: 37), in Samaria (John iv: 1-42), beyond the Holy Land in Phenicia (Mark vii: 24), and chiefly on occasions of great festivals, at Jerusalem, which necessitated His visiting other parts of Judea (Matt. xx: 29; John ii: 23, vii: 1, 2, 10). He supported His claims to be the Messiah by miracles of knowledge, *i. e.*, prophecies (Matt. xx: 19, etc.; Luke xix:

41-44) and miracles of power, such as healing the sick (Matt. ix: 35, etc.), nay, even raising the dead (Mark v: 22-43; Luke viii: 41-56; John xi: 1-44).

The chief priests and other dignitaries who held sway in the Jewish synagogues, were stirred up nearly to madness by jealousy of His success, and eagerly accepted the offer of an unworthy apostle, Judas Iscariot (*i. e.*, apparently of Kerioth in Judea) to betray his Lord. A manufactured charge of His blasphemy led to the condemnation of Jesus by His deadly foe, the high priest, but as the power of His life and death rested not with the Jewish authorities, but with the Roman governor, Pontius Pilate, a charge of disaffection to the imperial government was manufactured, as it was felt that the heathen Roman would not attach any weight to the alleged blasphemy. The procurator had discernment to see clearly that what he was required to do was to sanction a judicial murder, and for some time refused to become partner in the Jewish ruler's guilt. But as the cry, "Crucify him," "crucify him," continued to rise from the multitude, he resolved to avoid unpopularity at the expense of moral principle, and gave sentence that it should be as the Jews required. The crucifixion therefore took place (Matt. xxvii; Mark xv; Luke xxiii; John xix). Friday was the day when the nefarious deed was done, and three days later, or early on Sunday morning, news was brought to the Apostles, and the Church generally by certain women of their company who had visited the sepulcher, that a resurrection had taken place (Matt. xxviii; Mark xvi; Luke xxiv; John xx, xxi). At a subsequent interview with their risen Lord He gave the Apostles and their successors a commission to make disciples of all nations, baptizing them in the name of the Father, and of the Son, and of the Holy Ghost (Matt. xxviii, 19, etc.); and about 40 days after the crucifixion He led them out as far as Bethany and lifted up His hands and blessed them. "And it came to pass, while He blessed them, He was parted from them, and carried up into heaven" (Luke xxiv: 50, 51). He had predicted his cruel death, His resurrection on the third day (Matt. xx: 19), and His ascension (John xx: 17), and had intimated that at a future period He would again return to the earth in glory (Matt. xxvi: 64, etc.).

In the days of Christ it was a custom of the Roman governors of Judea to keep the Government of Rome well informed on all important events. One of the letters sent to the Senate of Rome by Publius Lentulus in the days of Tiberius Cæsar is said to have been largely concerned about Jesus Christ, the new Prophet of Truth. The letter is very interesting on account of the

description it gives of the personal appearance of Jesus Christ. It runs thus:

"Conscript Fathers: There appeared in these our days a man of great virtues, named Jesus Christ, who is now living among us. Of the gentiles he is accepted as a Prophet of Truth; but his own disciples call him the Son of God. He raiseth the dead and cureth all manner of diseases. A man of stature somewhat tall and comely, with a very reverend countenance, such as beholders may both love and fear. His hair is of the color of a filbert fully ripe, plain to the ears, whence downward it is more orient of color, somewhat curled and waved about his shoulders. In the midst of his head is a seam or partition of his hair, after the manner of the Nazarites. His forehead is smooth and delicate, his face without spot or wrinkle, beautiful with a comely red; his nose and mouth exactly formed, his beard thick, the color of his hair, not of any great length, but forked; his look innocent; his eyes gray, clear and quick; in reproving, terrible; in administering, courteous; in speaking, very modest and wise; in proportion of body, well shaped. None have ever seen him laugh, but many have seen him weep, a man for his singular beauty surpassing the children of men."

Christ, Order of. On the abolition of the Templars by Clement V., in 1312, King Dionysius of Portugal preserved the order in his dominions, but changed its title to that of The Knights of Christ, or The Order of Our Lord Jesus Christ. This arrangement was sanctioned by Pope John XXI. or XXII., in 1319. The seat of the order was transferred from Castro-Marino to Thomar in 1366. The new order afterward attained such power that King John III. was obliged to obtain an edict from Pope Adrian VI., 1522, by which the grand mastership of the order became vested in the kings of Portugal.

Christ, or Criss-cross, Row, the alphabet arranged in the form of a cross to symbolize the crucifixion of Christ, the letter A being at the top of the cross and Z at the foot. It was so printed in old hornbooks, or primers. See HORNBOOK.

Christ, Wilhelm von, a German classical scholar; born in Geisenheim, Prussia, Aug. 2, 1831. He studied at Munich and Berlin; in 1854 became an instructor in the Maximilian Gymnasium, Munich, and in 1860 was appointed professor of classical philology in the University there. Among his published works are: "Die metrische Ueberlieferung der pindarischen Oden" (1868); "Metrik der Griechen und Römer" (1879); "Attikusaussage des Demosthenes" (1882); "Griechische Litteraturgeschichte" (1898); also text editions of Aristotle's "Poetics" and "Metaphysics"; and Homer's "Iliad," with prolegomena.

Christadelphians, a religious body who believe that God will raise all who love Him to an endless life in this world, but that those who do not shall absolutely perish in death; that Christ is the Son of God, inheriting moral perfection from the Deity, our human nature from his mother; and that there is no personal devil. According to statistics published in 1906, they had in the United States 63 organizations with 1,277 members. Their founder was Dr. John Thomas (*q. v.*), an Englishman, who came to the United States in 1832.

Christchurch, a parliamentary and municipal borough of England, in Hampshire, at the head of the estuary formed by the Avon and the Stour, 24 miles S. W. of Southampton. The noble priory church here, dating from the twelfth century, is one of the most interesting ecclesiastical edifices in England. It contains a monument to Shelley. The parliamentary borough comprises two favorite watering-places, Bournemouth and Muddiford. It returns one member to Parliament. Pop. of the municipal borough (1901) 4,204.

Christchurch, a town of New Zealand, capital of the province of Canterbury, on the Avon river, 7 miles from the sea. A railway tunneled through the Lyttleton Hills connects it with Lyttleton, the nearest port. Among the public buildings are the government offices, museum, cathedral, St. Michael's Church, and Christ College. It also has a hospital, high schools, parks, and pleasure-grounds. It is situated in a grazing district and has a large trade in wool, timber, etc., and various manufactures. Pop. (1901) 17,537; with suburbs, 57,041.

Christ Church, College of, a notable institution in Oxford, England. In 1526 Wolsey obtained from Clement VII. a bull for the suppression of 22 monasteries, the site of one of which he chose for a new college, to be called Cardinal College, and which he intended to endow beyond that of any other in Oxford. On the fall of Wolsey, in 1529, the establishment came into the hands of King Henry VIII. In 1532 that prince founded it under the name of King Henry VIII.'s College, and in 1546 he once more reestablished the college under the name of "Christ Church Cathedral in Oxford, or the Foundation of King Henry VIII., with a dean and canons, 60 students, 40 schoolboys, clerks, choristers," etc. This foundation is now subsisting, though it has undergone considerable modifications.

Christian I., King of Denmark and Norway from 1448 to 1481.

Christian II., King of Denmark, Norway, and Sweden; son of Hans, and grandson of Christian I., Kings of Denmark, etc.; born July 2, 1480. In 1501 he was named successor to the crown, and took part in the government of Norway, which he conducted with great severity, suppressed two insur-

Christian II.

rections in 1502 and 1508, and made an unsuccessful incursion into the Isle of Gottland, with a view to restrain the communications of the Swedish insurgents with the Hanseatic towns. On his accession to the throne in 1513 he signed a capitulation in favor of the privileges of the lay and clerical aristocracy in his dominions, including the independent administration of justice; but all his efforts were bent toward strengthening the royal power, particularly in Sweden, which refused to acknowledge him. To strengthen himself against Steen Sture, the administrator of Sweden, who had set himself in opposition to the Union of Calmar formed in 1397 between Norway, Sweden, and Denmark, he asked and obtained the hand of Isabel, daughter of Philip I. of Castile, and sister of Charles V. of Germany, whom he married in 1515. He had already a mistress called Dyveke, the daughter of a Dutch woman who kept an inn in Bergen, Norway. She exercised a great influence over the king, and by her liberal spirit and knowledge of the institutions of Holland tended greatly to improve the administration of his government. She became a sort of prime minister, and had great influence in originating those wise laws which gained for this king the love of his subjects. But she incurred the hatred of the nobility, and in 1517 died of poison.

Suspicion fell on the relatives of Torbern Oxe, a young nobleman who had conceived a passion for her. The resentment of the king was aroused against Oxe himself, who, in defiance of the capitulation, was tried by a jury of peasants, condemned, and executed. Soon after war broke out with Sweden, and in 1518 Christian made an unsuccessful expedition to Stockholm. The chief of the Danish partisans, Gustavus Trolle, Archbishop of Upsala, was deprived and imprisoned by the Swedish nobles. Pope Leo X. then excommunicated Sture, put the kingdom under an interdict, and charged Christian with the execution of his bull. Making all the preparations and alliances in his power, Christian sent an army into Sweden commanded by Otto Krumpen, who defeated the Swedes in the decisive battle of Bogesund (Ulrikehamn), Jan. 19, 1520, in which Steen Sture the administrator was killed. Stockholm, under the command of the widow of Sture, stood a siege of four months, during which period the rest of the country was subdued, and on Nov. 4, Christian was crowned King of Sweden. Yielding to his clerical advisers the king now committed various severities, both in Sweden and Denmark; persecutions for heresy and political trials and executions took place in both countries. Two bishops were among the victims in Sweden, and the widow of Sture was imprisoned in Denmark. At the same time Christian set himself diligently to continue his work of leg-

Christian IV.

islative reform. Unity of weights and measures and a new and regular tariff were established, a post-office, sanitary police, and means of primary instruction for the people were organized, and the superior schools reformed. The peasantry, who had been subjected to feudal servitude by the numerous German nobles resident in Denmark, were emancipated. He also encouraged commerce, proposed making Copenhagen a free port as a rival of Lübeck, established a municipal government in the towns of Denmark, and erected an ecclesiastical tribunal independent of Rome.

In the meantime Sweden had revolted under Gustavus Vasa, who had expelled the Danish garrisons and been proclaimed administrator. Christian was engaged in a feudal contest with his uncle Frederick, and Lübeck, in alliance with Vasa, declared war and threatened Copenhagen. To find the means of defense Christian convoked the Diet toward the close of 1522. Instead of attending it the nobles and prelates assembled at Wiborg in Jutland, proclaimed the deposition of Christian, and called his uncle Frederick to the throne. Christian fled to the Netherlands to claim the succor of his brother-in-law Charles V. Gustavus, already master of Sweden, put an end to the union of Calmar in 1523, and was proclaimed king. Christian remained nine years in exile without obtaining aid from Charles, who allowed the queen his sister to die in indigence. He visited England and Germany, and adopted the Reformed faith. At length, with the assistance of Charles, he equipped a fleet in Holland, landed in Norway in 1531, and was proclaimed king by the Norwegian Diet, which had refused to recognize Frederick. The commander of the Danish fleet, a bishop, having offered him a safe conduct, he repaired to Copenhagen to negotiate with Frederick, who disavowed the admiral, and retained him prisoner. He was confined for 12 years in the Castle of Sonderburg, island of Alsen, in a dungeon of which the door was walled up, the only access being by the window, and his only attendant a Norwegian dwarf. In 1544 Christian III. somewhat relaxed the rigor of his confinement, and in 1549, on renouncing his right to the crown, he was permitted to reside in the Castle of Kallundborg in Zealand, where he was subjected to a less severe surveillance, until his death in 1559. His misfortunes were chiefly due to the enmity excited by his reforms, and his violation of the capitulation entered into at his coronation.

Christian III., succeeded his father, Frederick I., and died in 1559.

Christian IV., King of Denmark, son of Frederick II. and the Princess Sophia of Mecklenburg; born in Zealand in 1577; succeeded to the throne as a minor in 1588; and early gave numerous proofs of a sin-

Christian V.

cere love of religion and justice, and a high esteem for science and art. Having married Anna Catherina, Princess of Brandenburg, he made a voyage to the North Cape to learn the boundaries of his kingdom and protect the rights of his subjects in that remote region. Because of claims advanced by Sweden, he engaged in what is called the Calmar War with Charles IX. and his successor Adolphus, and terminated it by an advantageous peace, in which he stipulated for the free navigation of the Baltic.

In 1613 Christian attempted in vain to check the nobles, and relieve the peasantry. In the Thirty Years' War he was beaten by Tilly at Lutteram-Barenberge in 1626, but afterward, in conjunction with Gustavus Adolphus, obtained the treaty of Lübeck, 1629. He laid the foundation of the Danish navy, extended trade to the East Indies, introduced a judicious system of finance, and fitted out several expeditions for the discovery of the Northwest passage. He died in 1648, and was succeeded by his son Frederick III.

Christian V., succeeded Frederick III. in 1670, and died in 1699, after a long and fruitless war against Sweden.

Christian VI., succeeded his father, Frederick IV., 1730, and died in 1746.

Christian VII., succeeded his father, Frederick V., in 1766, and in the same year married Caroline Matilda, sister of George III. of England. The dissipations of his early life had enfeebled his energies and rendered him unfit for government. The management of the State was, in consequence, seized by Count Bernstorff, who had possessed the entire confidence of the king's father. Bernstorff, however, was soon forced to retreat before Struensee, who exercised unbounded influence over the king and his imprudent young queen. But innovations of a despotic tendency soon drew upon this minister the hatred of the nation. The queen-dowager seeing this, made it an occasion for satisfying her ambitious nature, by attaching herself to the malcontents; and in 1772 she succeeded in persuading the vacillating king to draw an order of arrest for Struensee and the young queen. Bernstorff was recalled from Hamburg. In 1784, Christian being incapacitated by mental disease, his son, Frederick VI., came to the head of the government, as joint regent with the queen-mother. Christian died in 1808.

Christian VIII., Duke of Schleswig-Holstein and Lauenburg, succeeded Frederick VI. in 1839, as King of Denmark only, and died in 1848 after an unimportant reign.

Christian IX. (of Schleswig-Holstein-Sonderburg-Glücksburg); born in 1818, succeeded Frederick VII. as King of Den-

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mark, in 1863. His second son was, in 1863, elected king of Greece, and his two eldest daughters married heirs-apparent of the crowns of Great Britain and Russia. He died Jan. 29, 1906.

Christian Architecture, a style of architecture adopted for religious buildings after the introduction of Christianity. The Roman Early Christian style appeared first in basilicas and circular churches. The former were, doubtless, originally built on the model of the Roman basilicas, but the requirements of the new religion soon necessitated various modifications in the original plan. The Christian basilicas were constructed generally with three aisles: the central one broader than the others, the left or N. being reserved for males and the right or S. for females. Sometimes we find five aisles. The building terminated in a semi-circular apse. The decorations consisted of paintings and mosaics, used mainly in the apse. The pillars were generally of the Corinthian order. Symbols were largely introduced. These were the cross, the monogram of Christ, a lamb or a dove, as typifying the Holy Spirit, and a fish, used as a symbol of Christ from the letters of the Greek word *ichthus* = a fish, forming the initials of the titles of our Lord, *Iêsous Christos, Theou huïos, sôtêr* = Jesus Christ, the Son of God, the Saviour. The roofing was of beams with flat paneling, frequently gilt. The altar stood at the E. end in front of the apse. The space round the altar was railed off and called the sanctuary. Adjoining the entrance was generally a narrow space called the narthex. In a portico in front of the building was a bowl for washing the hands, and under the altar a crypt for the reception of the bones of the patron saint. See ARCHITECTURE.

Christian Brothers. See BROTHERS OF THE CHRISTIAN SCHOOLS; LA SALLE, JEAN BAPTISTE DE.

Christian Catholic Church. See DOWIE, JOHN ALEXANDER.

Christian Church, The, consists of those who have been baptized in the name of Christ and who accept his doctrines and live in harmony with them. The Church, in its broadest sense, consists of true believers in all ages; but the Christian Church was established through the life and work of Christ himself, and consists only of his followers. Its first great increase was at Pentecost, where 3,000 souls were converted; shortly afterward 5,000 were added to the Church. Stephen was the first to suffer martyrdom. Paul made three great missionary tours, and the result was the organic unity of the Church in its first period.

Ancient Period, A. D. 30-750.—The first part of this period was distinguished by great simplicity of doctrine and life, and

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zeal in extending the kingdom of Christ. Important centers were established, and the Gospel was largely confined to the middle and lower classes. Controversies arose between the Gentile and Jewish Christians, but not to such an extent as to arrest steady progress. The heretical sects, with Saturnius, Basilides, and others at their head, were of no serious injury. The chief defenders of Christianity were Aristides, Justin Martyr, Melito, Tatian, Hermas. This was the time of great persecutions. There were ten in all, the most serious being under the Emperors Nero, Decius, and Diocletian. The Scriptures were collected into a canon, and the Church made great advance in numbers and territory. The most important writers were Ignatius, Irenæus, Origen, Tertullian, and Clement of Alexandria. The more serious schisms were produced through Felissimus, Novatus, and Miletus. The doctrinal controversies related chiefly to eschatology, human depravity, and the divinity of Christ. The Council of Nice (A. D. 325) was a great triumph for orthodoxy. It declared the essential Trinity of the Godhead, and settled for all time the divinity of Christ as a fundamental doctrine of Christian faith. The heresy of Arius was condemned. Persecution ceased, through the sympathy of the Emperor Constantine, who, in 313, removed all disabilities from Christians, and in 323 made Christianity the state religion of the Roman Empire. Monasticism, a reaction against worldliness, increased rapidly. Julian the Apostate endeavored to revive paganism, but without avail. Leo the Great, Bishop of Rome, extended the authority of the Western Church in opposition to the claims of the patriarch of Constantinople. Mohammedanism paralyzed the Eastern Church for a time. Mohammed was born in Mecca, Arabia, 570; declared himself a prophet in 609; founded a new religion, based upon the Koran; conquered Arabia, and died in 632. He was succeeded by the Caliphs, who conquered all North Africa, Western Asia, and gained a foothold in Spain and the South of France. Mohammedanism was arrested in Western Europe by Charles Martel, by the victory of Tours, in 732. The most important recent defeat of Mohammedanism in Europe has been the triumph of Russia over Turkey in the war of 1877, and the practical disruption of Turkey in Europe, and the liberation of the Christian provinces. Gregory the Great, Bishop of Rome, ruled from 590 to 604. He magnified the Romish pretensions, organized monkish orders, elaborated the church festivals, and established purgatory as a Roman Catholic doctrine. He organized a mission among the Anglo-Saxons. The Gospel spread rapidly through Britain and Germany. Christian

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art was patronized liberally by the Roman bishops. The close of the ancient period found the Latin or Western Church very vigorous and aggressive, but the Eastern Church in a stagnant condition.

Mediæval Period, A. D. 750-1517.—This period falls into three great divisions: From Charlemagne to Gregory VII., (750-1073); from Gregory VII. to removal of Papal See to France, (1073-1305); from removal of Papal See to Reformation, (1305-1517). The Middle Ages were the transition from the ancient to the modern period. The most important political events, all of which had a bearing on the Church, were the end of the Greek exarchate in Italy; the destruction of the Lombard kingdom, the organization of the Frank Empire under Pepin, rise of the new Germanic Church, division of the Mohammedan caliphate, decline of the Greek Empire, and development of the new Roman Empire in the West. Charlemagne was the greatest mediæval ruler. He was victorious over many northern tribes, and increased the territory of the Church to vast proportions. He was a liberal patron of learning, and authorized a Latin version of the Scriptures. Alfred the Great of England reigned from 871 to 901, and was as distinguished for learning as for his power to rule. The Russian monarchy was founded by Ruric in the middle of the 9th century. At this time the evangelization of heathen nations progressed rapidly. The Hungarians, Bulgarians, Bohemians, Moravians, Wends, and Scandinavians accepted Christianity. Corruption increased rapidly in the Roman Church; the papacy was at the service of the highest bidder; and indulgences and transubstantiation were cardinal forces in the new Romanism. The violent rule of the Mohammedans over Palestine excited the wrath of Western Europe, and crusades were organized for the rescue of the country from the Moslems. There were seven crusades, extending from 1096 to 1272. Christian Europe failed, finally, to hold the country, but the general effect of the crusades was beneficial in the development of commerce, introduction of Oriental thought, and the growth of popular liberty. Reformatory movements were inaugurated through the Waldenses, (1170); Wyclif, (1324); John Huss, (1373); the Moravian Brethren, (1417); the Mystics, (Tauler, Suso, Ruysbroek, Groot, Thomas à Kempis,) and Savonarola, (1480-1497), Mendicant orders were established. The Inquisition, established to arrest reform, was decreed in 1215.

The Modern Period, 1517 to the Present.—The Church was in a corrupt and superstitious condition. All the attempts at reform had been unsuccessful. Martin Luther,

born 1483, began the German reformation by publishing 95 theses against Rome. He translated the Scriptures into German, gained the coöperation of the German princes, and published sermons and other works against the errors of Romanism. Melancthon was the chief doctrinal writer of the Reformation. Erasmus labored in the department of New Testament criticism. The leading Swiss Reformers were Zwingli in Eastern Switzerland, and the learned and pure Calvin in Western. Farel stood next to Calvin in Geneva. The English Reformation had King Henry VIII. on its side, through no pious motives, but because the Pope would not sanction his frequent marriages. This was the great opportunity for which the Reformers of England had been waiting. Protestant sentiment grew rapidly, but in the next reign Ridley, Latimer, Cranmer, Hooper, Taylor, fell victims to Queen Mary's Romanism. Under Elizabeth the Reformation was placed on a firm foundation. The Puritans were a reaction against Romanism and sympathy with it in the Church of England. They preserved, under Cromwell, the liberties of the English nation. Arminius, born 1560, in Holland, opposed the chief tenets of Calvinism. The Synod of Dort resulted in the political triumph of the Calvinists, and the expulsion of the Remonstrants, until the death of Maurice, (1630). The Thirty Years' War (1618-1648) was confined to the Continent, and established the territorial boundaries of the Protestant and Catholic nations. The Huguenots of France were persecuted 1572, and 70,000 people were killed on St. Bartholomew's night. The Jesuits, organized by Ignatius Loyola, 1540, were established as an offset to the aggression of Protestantism. Deism prevailed to an alarming extent in England, its chief promoters being Hobbes, Herbert, Shaftesbury, Tindal, Bolingbroke, Hume, and Gibbon. They had strong antagonists, (Baxter, Cudworth, Taylor, Wateland, Leland, Butler, Paley), but the general condition of the people was irreligious. Methodism, which arose from John Wesley, born 1703, was a fervent religious movement. Charles Wesley, Whitefield, John Fletcher, Joseph Benson, and Adam Clarke were strong coadjutors. German Rationalism arose in 1750, through the teachings of Wolfe, Semler, and the example of the Prussian court. It is now in decline, through the labors of Tholuck, Neander, Hengstenberg, Ullman, and others. The Evangelical Alliance (1846) has promoted the unity of orthodox Christians in all parts of the world, and, to a corresponding degree, the victory over skepticism. The Old Catholics, a Roman Catholic reaction against the Vatican Council of 1869, were organized into a Church in

1870; Döllinger, Huber, and Friedrich were at their head. They have made great progress in certain parts of Germany and in Switzerland.

The American Church.—The colonization of North America sprang from religious motives. The colonists sought freedom here because of the oppressions at home. Periods of American Church History: (1) From 1607-1660, revival and progress. (2) 1660-1720, trial, disputes with Great Britain, religious decline. (3) From 1720-1750, great revivals. (4) From 1750-1783, political agitation, freedom from British rule. (5) From 1783 to the present, extensive revivals, separation of Church and State, abolition of slavery, evangelization. The Protestant Episcopal Church was founded by the James River Colony (1607); its first General Convention was in 1785; it ratified the Thirty-nine Articles in 1832. The Puritan Pilgrims landed at Plymouth in 1620, and began the development of Congregationalism. The Cambridge Platform was established in 1648. The Reformed (Dutch) Church was established in 1628 in New Amsterdam (New York). The first independent organization was in 1771. The Baptists began in Providence, R. I., in 1639, through Roger Williams. The Reformed (German) Church was organized in 1741. The Lutherans were established first in New York in 1669; the first Synod was held in 1748. The Presbyterians were organized at the close of the 17th century. The first Presbytery was established in Philadelphia in 1706, and the first General Assembly in 1789. The first Methodist Society in the United States was established in New York in 1766, and the first Conference was held in Philadelphia in 1771. The Reformed Episcopal Church was organized in New York in 1873, under Bishop Cummins. The Roman Catholic Church in the United States was first established in Maryland through immigration in 1632. The Episcopal See of Baltimore was established in 1789. For statistics of the American Churches see the separate articles.

Christianity, Isaac Peckham, an American editor and diplomatist; born in Johnstown (now Bleeker), N. Y., March 12, 1812. He was one of the founders of the Republican party and espoused its cause as editor of the "Monroe Commercial." In 1875 he was chosen United States Senator from Michigan, and in 1879 became Minister to Peru. He died in Lansing, Mich., Sept. 8, 1890.

Christian Connection. See CHRISTIANS, CHRISTIAN CONNECTION, ETC.

Christian Endeavor, Young People's Society of, a society distinctly religious in all its features; organized Feb. 2, 1881, in Williston Church, Portland, Me., by the

Christian Endeavor

Rev. Francis E. Clark, D. D. From one small association it has expanded into over 64,020 societies, in all parts of the world, with an aggregate membership (1903) of 3,822,300. In addition to the main organizations in the United States it has been found necessary to form branches, among which are the Juniors, organized March 27, 1884, at Tabor, Ia., by the Rev. J. W. Cowan and Miss Belle Smith; the Intermediate, organized by the Rev. A. Z. Conrad, of Worcester, Mass.; and the Mothers', suggested by Mrs. Amanda B. Fellows, of Chicago, and organized in April, 1893, at Topeka, Kan., by Mr. F. C. Barton. Among other special branches are the Life Savers', instituted by the Rev. S. Edward Young, at the United States Life-Saving Station at Asbury Park, N. J.; the Travelers' Christian Endeavor Union, organized at Philadelphia, Nov. 14, 1892, for work among commercial travelers; the Floating societies for work in the United States navy and among seamen generally; and various other organizations whose fields of labor lie among the Chinese, the Indians, convicts in prison, etc. The first Christian Endeavor Society in England was organized in 1887, and was followed by similar ones in other countries, and the constitution has been printed in over 30 different languages. The movement is not a denominational one. Any society belonging to an evangelical Church, which adopts the leading principles as set forth in the constitution, including the prayer-meeting pledge, and which guarantees these principles by the name Christian Endeavor either alone or in connection with a denominational name is admitted to all the privileges of the organization. In the United States the Presbyterian Church has the largest number of societies; in England the Baptists lead; while in some parts of Canada and Australia, the Methodists are in advance of all others. In some of the American States, the Disciples of Christ, and in others the Congregationalists, claim the largest number.

The distinctive features in the Christian Endeavor movement are its work among the young people, leading them to consecrate their lives to the active service of God; the weekly prayer-meetings, which each member takes a solemn pledge to attend regularly (unless unavoidably detained), and to take part in; and the re-consecration meetings held once a month, at which special efforts are made to see if each one has been faithful to his pledges. The amount of good accomplished in training the young people in the practical work of Christianity and fitting them to take up the work of those dropping out of active service can never be fully estimated. The World's Union of Christian Endeavor held its first triennial convention at Washing-

Christianity

ton, D. C., in July, 1896, which was attended by representatives from all over the world. Rev. Dr. Clark was elected president, and Rev. W. J. L. Closs, of Australia, was made the first secretary of the new organization. The United Society of Christian Endeavor is a bureau of information, which simply seeks to spread the idea of the movement throughout the world. Its headquarters are in Boston, and John Willis Baer is the secretary.

FRANCIS E. CLARK.

Christian Era, the era or epoch introduced by the birth of Christ. It was calculated back about the year 532, by a monk, Dionysius Exiguus (the latter word, meaning little, being assumed either because his stature was diminutive or because he modestly believed his mental powers small, which they were not). It is thought that he fixed the advent too late by four years, and that consequently Jesus was born, if the contradiction in terms can be permitted, in B. C. 4. J. W. Bosanquet considers that it was in B. C. 3. The Christian Era is sometimes called the Dionysian era. The Rev. Charles Force Deems, D. D., an eminent American clergyman, in his "Jesus," places the birth "about the beginning of August, B. C. 6, A. U. C. 747."

Christiania, a city and port, the capital of Norway, province of Aggershuus or Christiania, at the head of the long narrow inlet called Christiania Fjord, about 60 miles from the open sea or Skagerrack. The houses are mostly of brick and stone, generally plain buildings, devoid of architectural pretension. Important public buildings are the royal palace, the house of representatives or Storting, the governor's palace, and the cathedral. An interesting building is the fine old castle of Aggershuus, with its church and citadel crowning a point jutting out into the fjord. Attached to the university—the only one in Norway, opened in 1813—is a museum, containing a fine collection of antiquities. The manufactures of the city consist of woolen cloth, ironware, tobacco, paper, leather, soap, spirits, glass, etc., and there are extensive breweries. The exports are principally timber and iron. The environs are exceedingly beautiful. Pop. (1905) 223,373.

Christianity, the religion of which Jesus Christ is not only the founder, but also the object, since it is by Him and in Him that man recovers his union with God by an effective reconciliation. We have thus determined in a general manner its true character, and marked the difference that exists, as we shall prove, between it and all the religions which preceded it. But first we must justify our definition. The only way to get a sure grasp of the leading thought of a doctrine and a religion is to trace it to its origin, and to seize it at its source, be-

fore the stream has had its current troubled with the foreign elements that mingle with it. Now about primitive Christianity we possess a number of documents which are at least authentic, whatever the authority we attribute to them from a doctrinal point of view. Confining ourselves to those documents alone, whose authenticity is not disallowed by the most negative criticism, we have in the epistles of Paul to the Corinthians, the Galatians, the Romans, and the Thessalonians, a testimony to primitive Christianity which falls between the year 55 and the year 64 after Jesus Christ. It emanates from an apostle who had been in direct contact with the earliest associates of Christ, with those who had both seen and heard Him. The first three gospels, in which an historical basis is generally recognized in what concerns the actions as well as the discourses of Jesus, point back to the same date. We are thus led back to the very origin of Christianity. Moreover, we recognize in the Church of the earliest period made known to us, whether in the Acts of the Apostles or in writings as authentic as the letters of James and those of Peter, the living impress upon simple and honest hearts of the direct remembrance of Christ, like the track marking His passage across the earth. Here our concern is not more to determine the true character, the essence of Christianity, than to find out in those documents the real meaning of the religion of the gospel as it presents itself to us. It is undeniable that if it claims to carry to the world a revealed doctrine, revealing completely the true nature of God as well as that of man, and the normal relations of union between them, it attaches that doctrine to a personality considered not only as the organ of the revelation, but as its object. We have thus the right to assert that Christianity is Jesus Christ, without fearing to detract anything from the attributes of God, for Jesus Christ is His ambassador, His son, the sole mediator between God and man—in one word, the Redeemer, the Saviour, as His name implies. He has never ceased to require faith in Himself as the means of again finding God by Him. Fragmentary quotations on this point are vain. The whole gospel demands this faith in His person, and St. Paul sums it up in the words addressed to the gaoler at Philippi: "Believe on the Lord Jesus Christ, and thou shalt be saved." (Acts xvi: 31).

How Distinguished.—Christianity is herein distinguished from all other religions. The revelation which it brings to the world is something other than a supernatural communication of a transcendent doctrine about God, and about our origin and purpose in the world. It consists essentially in a great work accomplished by a

single person—a work which is the supreme manifestation of the holy love of God. The mere exhibition of this divine work casts a bright light upon God as well as upon man and results in a doctrine which implies a complete metaphysic, a complete anthropology, and an entire system of ethics, as well as far-reaching views on the history of the human race in its terrestrial development and in its future destiny. For had it been otherwise, Christianity must have contented itself with communicating to us the outward fact without explaining it—without making us grasp it by its inward side in its profound significance; which would have been to alter its nature completely. It none the less remains true that for Christianity doctrine is only a secondary and complementary element—the interpretation of the fact of the great work, which is its first object. This is why it addresses itself before everything to the heart and to the conscience, though at the same time it opens up to the intellect the vastest possible horizons. As soon as we deviate from this divine realism, we make Christianity fall into an intellectualism which chills it while perverting it; and we substitute for it the parching formulas of a scholasticism which at all times and in all Churches has caused it to leave its banks and diverge into new and widely different channels.

Let us further consider that divine work accomplished by Christ for the salvation of the world, which constitutes the essence of Christianity, without lingering to discuss its proofs, which belong to the province of apologetics. This word salvation, if we take it in all its fullness, comes before us as its principal and even sole subject. "The Son of man," says Jesus, "is come to seek and to save that which was lost." (Luke xix: 10). This one word contains within itself the whole gospel, and alone explains to us why it has been specially called good news. This is its true significance, if we leave aside entirely its theological development. Humanity is not in its normal condition; it is lost by its own fault—through having broken by voluntary revolt the bond which at the beginning united it to God as made in His own image, and which was intended ever to become closer through the voluntary obedience it was invited to offer in the mysterious probation of its free-will. Incapable of rising again of itself, it must needs be sought out by compassionate love like a wandering and lost sheep, for the sake of being lifted up and brought back to God. This is what the Son of Man has done in agreement with the offended Father, who has had compassion upon him. Though by a saving act of His own good pleasure God has pardoned the sinner, He has not

abrogated the laws of moral order. These laws demand no vengeance unworthy of God, but merely a reparation—a retraction of sin involved in an essentially moral expiation. Such an expiation can consist only in a perfect obedience, complete even to the length of accepting in a voluntary sacrifice the consequences of the original revolt. This is what the Son of Man, who was also the Son of God, has willed and has accomplished. He has died for the sins of the world, and risen again for its justification; and the cross on which He has accomplished this reparative work rises before us forever as the symbol of a reconciliation, which each man in his turn must appropriate to himself by an act of faith uniting him to the sacred sufferer.

Redemption and Redeemer.—Christianity is thus preëminently the religion of redemption and of the redeemer. It has introduced to the world the grand reparative influence of a victorious love, inaugurating in Jesus Himself an unceasing struggle; for that reparative influence must struggle constantly against the powers of evil, which are not magically suppressed. But this reparative work cannot consist alone in the salvation of individual souls; to be worthy of God it must strive to restore all that the original fall has blighted or destroyed—to make the fallen creature realize all his lofty destiny—that is to say, to reconstitute in man all the greatness kept in store for him, and to give him up without reserve to God, making the regenerating spirit penetrate into every sphere of his activity as into all his faculties. Hence the wide mission of Christianity to purify and raise everything that is human in the most diverse spheres of society, from the institutions which regulate the relations of men to each other to the highest culture of the intellect. This restoration of man after the divine type is the continuation and application of the redemptive work of Christ, which, after having had for its first intent to form in the Church a society of believing souls, pardoned and saved, called to work directly for the salvation of all that is lost, next radiates outward into all the departments of human activity. It is in this enlarged sense that we must understand the kingdom of God which the Saviour came to found in our sinful world, and of which the progress goes on only at the price of an incessant struggle, which will continue to the end of time. But this general advance of the kingdom of God in its widely human extension is always proportionate to its internal development within His Church, which keeps and cherishes the central hearth of the divine life, whence emanate all light and heat.

We know in a general manner what the vast influence of Christianity has been in

the world for 19 centuries. We may say that the cross of Calvary has divided history; we find its luminous track marked everywhere. It has renewed society in the very depths of universal decline without ever neglecting its first task, which is to lead the souls of sinners to Christ. Spiritual conquests count upon no more than this. But these victorious struggles have not been pursued without many dangers, no little resistance and as much dark uncertainty, which have sometimes had the effect of altering Christianity for a time, at least in its historical realizations, for its high ideal has never ceased to soar with serene radiance in the eternal gospel. It may be put under a bushel, but it has never been possible to extinguish it or to change its form. It is this inherent recuperative power that admits of the renewal and elevation again of Christianity, however much it may have been debased. To illustrate the difficulties and the opposition which Christianity encountered upon its way, we must first carry ourselves back to the condition of the world at the time of its first appearance, and understand the spiritual influence of the great religions it found at that time before it. There is no better means of establishing its originality and recognizing all the gains it has brought to humanity, than to bring into the light its true relation to the religions of the past. These religions fall into two types of very different nature and very unequal value: Judaism, and its antagonist, Paganism, comprising a considerable number of particular religions presenting one common character in spite of well-marked differences.

New and Old.—The assertion is often made in our day that Christianity was at first a mere development of Judaism, and that it was by combining with elements borrowed from the religions and the philosophies of the ancient pagan world that it assumed its final form. But this explanation will not stand an impartial examination of the actual facts. Undoubtedly there exists a real relation between the new religion and those which preceded it. For how could it be otherwise, since on its own showing it came to accomplish that which had been asked for; expected, and longed for by the human soul under every sky, as well as positively promised on the soil of Judæa by direct revelations. If Christianity were only a religious doctrine, its originality might be disputed by adducing the basis of belief which it has in common with the anterior religions, though here too it manifests a splendid superiority. But as has been shown, it is more than a body of doctrine—it is an immense work of reparation effected by its founder. In that respect it cannot be compared in any-

thing with what has preceded it, and there will always be between it and the noblest intuitions of the philosophy of a Socrates or a Plato, or the sublimest oracles of an Isaiah or a Jeremiah, that insuperable distance which divides a hope and a desire from its effective realization. If we consider somewhat more closely its relations to the religions which preceded it, stripping it in this manner of that which constitutes its essential originality, we find at once that that relation assumes a quite peculiar character when the religion of the Old Testament is concerned. Here there is direct preparation under the form of a series of positive revelations. It was necessary in the first place that the cradle of the Messiah should be deposited upon consecrated soil—consecrated indeed, though darkened under the veil of idolatry; next, that there should be found there a chosen people to represent man in the expectation of, and the desire for, a true Messiah. For in order that the Saviour might accomplish His work of reparation in the name of the human race, it was necessary that He should be waited for by a chosen people, such as could be formed only in a nation separated from the pagan world, and subjected to a particular moral and spiritual education under special divinely sanctioned institutions. Greatest of these was the law of Sinai, intended to awaken in the heart sorrow and hatred for sin. Prophecy completed the work of preparation by announcing to hearts pierced through by the sword of the law the coming of him who was to restore all things again, whose work was prefigured by the priesthood of the sons of Aaron and the sacrifices offered to God most holy. These special institutions were proper only to the period of preparation which was called the Old Covenant. Everything they contained that was exclusive and peculiar must disappear when the period of accomplishment had succeeded it.

The Old Covenant itself was aware of its transitory character, for above all its institutions, there soared a promise of enlargement which God gave to the father of the chosen race on the day when He bade him leave his country and his kindred: "In thee shall all the families of the earth be blessed" (Gen. xii: 3); and prophecy was but one long and splendid enrichment of the promise: "I will also give thee," he says, "a Messiah, for a light to the Gentiles, that thou mayest be my salvation unto the end of the earth" (Isa. xlix: 6). As soon as the reconciliation has been consummated between man and God by the sacrifice of Calvary, the wall of separation between Israel and other nations is broken down; the barriers between a powerless priesthood and the simple faithful who participate in the priesthood of Christ fall down; and

sacrifices which make no expiation disappear before the only sufficient offering. You are kings and priests, says the apostle Peter to the early Christians (I Peter ii: 9). The religion of humanity, which is the religion of the soul, supersedes the exclusive religion of the circumcised people—the religion of the letter which killeth; and this splendid enfranchisement is but the consequence of the redemptive work of Christ which faith assimilates. All this glorious liberty is included in the words: "The just shall live by faith" (Rom. i: 17).

Pauline Interpretation.—It was the mission of Paul, the former Pharisee, the grand freedman of Christ, to set free the new religion from the bonds of Jewish legalism; called as he was by a divine revelation to draw all the consequences from the teaching of the Master. He formulated the charter of this freedom in two sentences, stamped with a kind of divine genius: the first, "The law was our schoolmaster to bring us unto Christ, that we might be justified by faith" (Gal. iii: 24). Both its lofty mission and its powerlessness are here recognized together. The second is: Before Christ "there is neither Greek nor Jew. . . but Christ is all, and in all" (Col. iii. 11). Thus the religion of humanity rises on the ruins of the national religion. We see the New Covenant striking its roots deep into the soil of that Judæa whence cometh salvation (John iv: 22), but growing like a great tree capable of lodging in its branches all the birds of heaven; and all its liberal and blessed expansion but brings us back to the work of the Redeemer, as St. Paul asserts in the words: "Stand fast therefore in the liberty wherewith Christ hath made us free" (Gal. v. 1).

If we pass from Judaism to the religions of the ancient pagan world, at least to those developed in countries where they came into direct contact with Christianity, we find that they also had their preparation. In the first place, there is not one human soul which has not had engraved upon it the divine law, as St. Paul recognizes: the Gentiles, says he, "Show the work of the law written in their hearts, their conscience also bearing witness, and their thoughts the meanwhile accusing or else excusing one another" (Rom. ii: 15). In the next place, God has not ceased to speak to them by the grand spectacle of the world itself, and of the heavens in which His invisible perfections may be seen as with the bodily eye (Rom. i: 20). Finally, if He has not granted them direct revelations, His spirit has constantly breathed upon them as it breathed upon the confused waters of chaos from which was to emerge a world. After all, they belonged, as St. Paul says again,

to the offspring of God (Acts xvii: 29), and there was not a single man among them who had not in him a ray of that light of the word "which lighteth every man that cometh into the world" (John i: 9). The need of a renewing work meets us again everywhere in the very heart of Paganism. There is no nation which has been without its priests and its sacrifices, and which has not sought that atonement for which the human conscience has always longed. But that did not hinder the pagan world from continuing to be sunk in idolatry, for it fell under the dominion of a Nature which it deified. Hence its dreadful errors equalled only by its dreadful corruption. Yet it never ceased to seek for God, groping blindly in the dark (Acts xvii: 27). The moral conscience which had never been stifled reacted incessantly against the deadening influence of the nature-religions; it called for a God greater than those which Paganism had fashioned for it; it had its sublime aspirations which never ceased to reëcho through the pagan night one long penitential psalm, which, sung in the plains of Chaldæa, sometimes became a true supplication to the future Saviour. "I turn from every side," says the son of Vedic India to his god, "desiring to know my sin. Absolve us from the sins of our fathers, and from those which we have committed in our own bodies." (*Rig Veda*, vii: 86).

The Pagan Nations.—The preparation of the pagan nations consisted in their being made to experience their inability to find salvation in their idolatrous religions. We may consider that preparation as finished, when out of the ruins of their old idols they raised that altar to the unknown God which St. Paul recognized as the symbol of aspirations all the more ardent the more they had been deceived, and the more general the decline in the world around. The converted pagans found that peace for which they longed at the feet of Christ. They gave up without difficulty their own peculiar rites—that priesthood and those sacrifices which had availed but to express and stimulate their desire for salvation without satisfying it. For them, too, the exclusive and national character which clothed religion before the revelation of God's universal fatherhood needed to be expanded. For the religion of humanity to supersede the various religions of the soil, it was necessary not only for the Jew to renounce his exclusive theocracy, but also for the son of Paganism to recognize that the kingdom of Christ, not being of this world (John xviii: 36), ought not to be incorporated with the state as a thing that belonged to a particular people. We see that Paganism, some admirable ideas alone excepted, brought nothing to Christianity but

aspirations frustrated and yearnings unsatisfied. From the doctrinal point of view, even its noblest philosophies had been falsified by the influence of the nature-religions. Platonism itself with all its idealism ended in Oriental dualism, for unable to triumph over evil, it identified it finally with matter under a fatalism whence man could escape only by an asceticism of which the Buddhist annihilation is the logical consequence. It is this which forever distinguishes the Christian metaphysics from all the Greco-Oriental speculations comprised in the system of the Alexandrian Philo. To prevent any confusion between Christianity and Hellenism it is sufficient to read these words in the prologue to the fourth gospel: "The Word became flesh." Presented thus according to its primitive type, the religion of Christ appears before us in its true character and its incontestable originality; and herein rests its power. Were we to see in it only a synthesis of all the anterior religions, we should have in Christ only a kind of composite idol enshrined in the last of the pagodas; and we could not connect it with that primitive Christianity which alone is true, and which remains for all time in the faithful image it has left us of itself in the sacred volume which makes it live anew in its first and authentic manifestations. Thanks to that book we can always trace it back to its source, and mark the point of departure between what it is in itself, and the superfluous accretions which have changed it.

Vicissitudes.—For it was impossible that Christianity should make no deviations once it had begun to float upon the stream of history. These were rendered imperative by its being imposed by authority upon successive generations like a dead letter—the most serious of all changes to which it could possibly have been subjected, for it is before everything the religion of the spirit and of liberty. The purpose of history after its own modification through the influence of Christianity was precisely to make it penetrate to modern humanity in a free assimilation, but that assimilation involved the possibility of all its stumblings, its failures, and its obscurities; without, however, the true Christian spirit ever ceasing to struggle against error to bring back the Church to its original type. Let us not forget that the effects of Christianity radiate outward far beyond the immediately religious sphere; through an influence direct and indirect by turns it strives to reëstablish human society upon the type of justice and love—a result which certainly forms it into a part of the kingdom of God. Mere social progress not infrequently advances religious progress, as it binds fewer burdens on the individual conscience, and appears for that reason the more easy.

We cannot give more than a rapid sketch of the deviations as well as the victorious struggles of Christianity from its beginning to our own day. To explain its deviations it is sufficient for us to recall its leading thought, which is also its great power — emancipation, for these invariably tend to the alienation of the freedom in which the gospel has made us free. Christ has freed man from all the burdens under which he was bowed down, and first of all from that of sin, by His redeeming work alone. Whenever man turns aside from this, whenever he ceases to believe in a salvation which is the free gift of God, apprehended by faith, he girds on again his ancient chains, he seeks for mediators in a new priesthood, returns from the New Covenant to the Old, and restores anew the theocracy; in one word, he becomes again a Jew. This is the whole history of the formation of Catholicism, the real cause of all the slavery which it has caused anew to weigh upon the freedmen of Christ.

On the other hand, the return to Paganism takes effect whenever for the gospel of the redemption we substitute a purely philosophical speculation. The digression to the left is no better than that to the right; it is even worse, for it ends in a parching rationalism which cannot long rest on the slope downward to pantheistic naturalism. We shall limit ourselves to characterizing the principal periods of the history of Christianity, in each of which we find the battle arrayed between its most faithful representatives and the promoters of tendencies whether toward Judaism or Paganism.

Already in the apostolic age the struggle had begun, for we know that it needed the apostolate of Paul to bring down the Church from its high chamber, to cast aside the swaddling clothes of its cradle, and come gradually to the point of renouncing Judaic exclusiveness. What a combat the great apostle of the Gentiles had to wage against the survivors of the synagogue who wished at any cost to hinder the grand liberation of souls, and at the close of his life against the first representatives of pagan speculation, the Gnostic heretics of Colosse and Ephesus. Beyond doubt he was victorious, and when his noble head fell under the axe of Nero's executioner, it might have been said of him that though dead he would speak till the end of time, ever uttering anew his great cry for liberty, for the freedom of the Church from all its bonds through justifying faith.

First Period in History.—The first period of the history of Christianity after the death of the last apostles extends from the 2d century to Constantine. It is an heroic age. The mission of Christ extends over all the empire, and fashions a whole people

with their own consent. Persecution rages without intermission, but the blood of the martyrs is the seed of the gospel. The struggle goes on also in the world of thought. The Gnostic heresies mark the reaction of the pagan spirit; they are refuted by a powerful polemic. The apologetic writings of Justin Martyr, of Irenæus, of Clement of Alexandria, and of Origen, breathe the most living and the largest faith. The most important social reforms, as the elevation of woman, the respect due to the man in the slave, are realized at the family hearth. But the gravity of the struggles against heresy, and the questions of discipline arising out of persecution itself for the restoration of such Christians as had wavered, tended to strengthen ecclesiastical authority in an exaggerated degree to the detriment of the primitive liberty. That tendency was aided by a certain weakening of the dogma of justification by faith, despite the struggles of Origen and Tertullian against the innovators.

The second period extends from Constantine to the establishment of the papacy. Christianity became the religion of the State when the Cæsar of Byzantium granted it his burdensome protection, but it still retained within it its generous sap. In spite of the authority of St. Augustine faith in the free grace of God became more and more obscured. The discussions raised by Arianism more and more gave the foremost place to a Christian theodicy which resulted in a subtle divine metaphysic elaborated by the great councils of Nice, of Constantinople, and Chalcedon. These councils constituted a completed novel central authority within the Church. At the same time the old hierarchy was reestablished to govern flocks cast by their birth itself into the fold of the Church, and the crook of the shepherd became the symbol of a despotic authority. The Bishop of Rome acquired a primacy that ever grew greater, until when the floods of barbarian invasion had submerged the old Roman government, the papacy became incontestably the chief centralizing power. It had a high regard for social progress, and the Christian mission continued its conquests; but unhappily after its union with the empire the Church began to employ forcible constraint against its enemies both without and within. Spite of many a protest Catholicism took the place of the primitive Christianity, and suppressed all its liberties. It was as if the dethroned Jewish theocracy had thus revenged itself for its downfall; yet the enslaved Church continued to preserve the treasures of piety. Monasticism became the right arm of the papacy, and rendered it the most precious service in the education of the races still rude and indeed hardly escaped from bar-

barism. With Gregory VII. the great transformation was completed, and the new theocratic organization appeared in all its glory. No one can deny that under the given conditions it rendered precious services. It was still Christianity to which Europe owed its alleviation from the barbarism that weighed upon it. To it alone the weak and the oppressed owed it that they were not crushed.

Middle Ages and Reformation.—It is impossible to do more than characterize briefly some of the most prominent features of the Middle Ages and the Reformation. In the Middle Ages we mark the immoderate expansion of the religious and social omnipotence of Christianity, manifesting itself in the Crusades and the momentary subordination of the state to the Church after memorable struggles; and in consequence of that very temporal primacy of the Church we see it diverge more and more from its primitive type. It has quite decidedly become a new theocracy, and as has ever been the case the progressive diminution of its liberties coincides with the complete subversion of the grand doctrine of justification by faith. Salvation by works replaces salvation by grace, the supposed merits of glorified saints are purchased for the benefit of sinners, and finally indulgences from the consequences of sin are sold for a price in money. Yet Christianity even thus disfigured and diminished still shows itself beneficent for the consolation of human misery. It produces a magnificent art. The Gothic cathedral is the symbol of its greatness and also of its formidable power. Scholasticism produces its famous theological Summas which are, as it were, the cathedrals of thought. The monastic orders founded in great numbers contribute at once to the relief of the wretched and to the enslavement of the faithful. Yet it was in some of these convents that there was developed that profound and touching mysticism which sought to find God beyond the sacerdotal hierarchy. From the 14th century onward an ardent aspiration toward reform stirred the Church. It was the ferment preparing the great approaching renovation that was to shine forth after the great schism, which weakened the papacy by breaking it into factions. This need of reform was expressed officially in the councils of Pisa and Basel. The Reformation had already its forerunners in John Huss and Wyclif, while it was, as it were, realized beforehand in the valleys of Piedmont.

With Luther it burst forth with irresistible power. If its banner was victorious over a great part of Europe, it was because it bore the grand device of all Christian liberty: "The just shall live by faith." The liberty of the people of God was act-

ually reconquered in principle; it founded itself as at the first days of Christianity on the certainty of salvation granted by grace and seized by faith. This doctrine of liberation dismisses all human mediators to find again the universal priesthood in the sacrificial priesthood of the Redeemer. To all tradition it opposes the sovereign authority of Christ, whom Luther calls the King of the Bible, which alone permits us to know him. Next ensued a gigantic struggle, on the one hand, between the Reformation and the ancient Catholic Church, and on the other hand, between Christianity and a pagan culture eager to resuscitate the naturism of the ancient world without its religious aspirations. This double struggle has reached in our day its culminating height. It is complicated, whether in Catholicism or in the churches of the Reformation, by an intestine struggle which brings to an issue on narrowed ground the two opposing elements. Thus Catholicism, even after the Council of Trent, saw arise within itself a movement for reform, which, rendered illustrious by the Abbé de St. Cyran and Pascal, tried to elevate the doctrine of grace and to limit the papal power. Gallicanism contrived to lay some restriction upon the papal powers, but was speedily defeated like Jansenism, from which it had separated in the 17th century while retaining the stamp of its influence.

Liberalism and Conservatism.—In the bosom of Protestantism there broke out early a struggle between a conservatism which would retain as much as possible of Catholicism and a Christian liberalism whose aim it was to bring back the Church to the apostolic type. That struggle has led to the creation of different Churches practicing in both hemispheres with more or less fidelity the constituent principles of the Reformation, or, more correctly, continuing them and disengaging them from things inconsistent therewith. In the domain of thought the battle has been fought between the partisans of a strict dogmatism and those who would admit of theological progress without breaking in anything with the eternal gospel. We must also recognize that within the heart of historical Protestantism we have seen produced, rather more than a century since, on some questions, philosophical tendencies which are Christian only in name, and which in their extreme manifestations would introduce into the fortress the enemy that besets the walls—we mean a culture decidedly anti-Christian. The siege is being carried on today more vigorously than it ever was before. The struggle between Christianity and tendencies contrary to it has never been more serious. Anti-Christianity under all its forms has taken a considerable develop-

ment, and seems to resuscitate in our modern so-called Christian world the old Paganism, while eliminating from it the better elements, its aspirations and foreshadowings of the religion of the redemption; for this neo-Paganism in its most logical manifestations ends in an absolute naturalism which will only admit of matter and force in the evolution of all life. On the other hand, what we call the Judaizing tendency so ready to appear in the Church on the morrow of the apostolic age, has reached in these last days the final stage of its course. The ecclesiastical policy which has brought about in succession the syllabus of Pius IX., the Encyclical "*Quanta Cura*" (1864), the proclamation of the Immaculate Conception of the Virgin (1854), and that of the papal Infallibility at the Vatican council of 1870, have assured the triumph of the theocratic system, while condemning everything in the bosom of contemporary Catholicism like liberty in the Church or in the heart. Nothing is further from our thought than to place Catholicism *per se* outside the pale of Christianity. We recognize in it the treasures of piety. Its charity has never expended itself over social misery more bounteously than now. Christ is loved and adored within its fold by a multitude of pious souls who find Him in spite of defective forms of worship and the long chain of sacerdotal hierarchy. We refer only to the peculiarly ecclesiastical and specific principle of Catholicism when we speak of its return to Jewish theocracy. This return is the more inexplicable as the institutions proper to the Old Covenant have no longer any reason for their existence since they have found their accomplishment in the gospel. It is impossible not to observe that there exists a real co-relation between the development of the anti-Christianity of this renewed theocracy which breaks with all modern progress from a social point of view by its attempt to enchain thought and the conscience to a sacerdotal power. Wherever Catholicism is the dominant religion it is taken as the true representative of Christianity itself. Hence is propagated the erroneous idea that there is an opposition between the religion of Christ and social progress, seeing that all the grand principles of justice, of law, and of brotherhood, come in reality from Him who has raised man in every sense by reconciling him with God. Human brotherhood with all that it implies can come only from the divine fatherhood.

Theocracy.—We are thus right in affirming that the victory of the Catholic theocracy has been the surest means of actually turning away recent generations from a Christianity ill understood and misrepresented, and that it has in this way facilitated the progress of anti-Christianity. Happily Christianity has had other repre-

sentatives who have shown it in its true character. We must recognize that in the bosom of Catholicism are to be found grand and lofty Christian men like Lacordaire, P. Grétry, Montalembert, and Dollinger, who have not admitted the divorce of the religion of Christ from political and social progress, of the gospel from liberty. They have opposed with energy the party of religious absolutism; their eloquent testimony endures in their books, and their thought remains like leaven within the Church which they have adorned, though they failed to persuade her. We may hope that this movement for true liberty will revive sooner or later in her, all the more that the fall of the temporal power will finally bring about important moral consequences.

Whatever there may be in such forecasts of the future, really evangelical Christianity has shown itself wherever the Reformation has been planted, as the initiator and propagator of true liberalism. It is easy to prove that it was to its influence, distorted indeed and indirect, that the French revolution of 1789 owed everything that it contained of what was true and fertile for the future. Its first adherents had breathed the air of freedom in Anglo-Saxon countries. Besides, the French Protestants, by their resistance to the intolerable persecutions of which they had been the object, had preserved in their own persons the most important of all liberties—that of the conscience. It is more important today than ever, in face of the rising flood of democracy, that Christians, in order to dissipate the misunderstanding which in its opposition to the gospel and to liberty favors contemporary anti-Christianity, should delight to place themselves in the van of political and social progress, and should especially take to heart the elevation of the laboring classes. This is what true Christians are now doing more and more in every country. We gladly recognize that Catholics and Protestants are vying with one another in their zeal for this great social task, which is the foremost duty of our age. We may perhaps add that the gradual disappearance of State religions, with their authoritative constitutions defining the identities between the spiritual and the temporal, need not at all tend to the disadvantage of Christianity, since it will render forever afterward impossible all recourse to force for maintaining the authority of doctrine, thus putting final end to an intolerance which was the most flagrant contradiction of its most essential principle. We must not forget to make allowance for the modern cessation of compulsion in religion in our estimation of the actual manifestations of anti-Christianity, which in former times was compelled to save itself by concealment or in hypocrisy, though it was possible for it to

exist in large proportions within a state, though all unseen. But now the time has come for that which was whispered low to be proclaimed on the house-tops. Yet positively the truth has everything to gain in that freedom, which, however irreverent it sometimes may be, is still due to a state of things through which the great opprobrium of a persecuting religion has been made to disappear—a result for which we can hardly congratulate ourselves too highly.

Adversaries.—The secularization of the State entails upon us great responsibilities, especially in what concerns the young, who are the more judiciously intrusted to the care of the Church, because everywhere they are called to form their faith without any help from the State. The vast and glorious development of the natural sciences has largely contributed to develop unbelief in the domain of speculation, under the influence of that pantheistic or materialistic philosophy which had preceded it. In the intoxication of all their scientific discoveries, men imagined that they could put God and the spirit out of the world, and recognize therein only the play of mechanical forces, the evolution of motion producing a series of existences comprising thought, conscience, and soul. The adversaries of Christianity have divided themselves more and more into two great schools: Agnostics, denying the possibility of obtaining the least knowledge of what is beyond our own consciousness, and dogmatic Materialists from whatever cause produced. We have a right to affirm that Christianity has striven victoriously against both the one and the other. First of all, it numbers in the domain of science more than one illustrious representative who has actually shown that we may enrich science while believing firmly in God. Next—and this is still more important—it has brought about the most salutary enlargement in intellects within the bosom of the most earnest Christianity. The most eminent among Christian thinkers have proclaimed the reciprocal independence of science and religion. They have recognized that the first is sovereign in its own sphere, that God has not revealed what man can discover, and that in consequence religion has not to link itself with such or such a conception of the past, as if it had therein a revealed system of science. By the happiest coincidence, illustrious savants with absolutely no connection with the Churches, as Du Bois-Reymond and Virchow, have refused the natural sciences the right to make excursions out of their own domain, and to settle questions like those of the origin of life or of man. They have thus declared a perfectly rational scientific agnosticism about what concerns that problem of origins, which is specially the problem of religion. It follows from

this that there may exist other processes of discovery and of experiment than those of the natural sciences in that which transcends their province. It is for Christians so to employ these as to establish the reality of a spiritual and divine world, and such of its successive manifestations in religious history as come to center themselves in Christ.

We may say that in this way a work of great importance to apologetics has been accomplished; it has happily reflected light on the very conception of a doctrine which is ever the more widened the less it is allowed to be shut in within any formulas of the orthodoxies of the past, in order to grasp ever the more closely the living object of belief, which is Christ, and understand the better that eternal gospel which as we have established, is essentially a fact and a person. That enlargement which we can verify in all Churches freed from the yoke of outward authority, is not only favorable to the true progress of the Christian conception, but also to its preservation. One of the most significant characteristics of this progress in our age is that it makes more than ever of the human element in the gospel, without detracting in anything from its divinity. To the metaphysical abstractions which effaced the original character of this great past has succeeded a really historical comprehension which makes it live again before our eyes. Thus in our conception of the very personality of Christ, He has come nearer us without ceasing to be the Son of God who saves us and lifts us up again. The heart as well as the intellect finds its advantage in this evolution of Christian thought, which is a return to its original; and now, indeed, it is more necessary than ever that the fire of a holy enthusiasm and a fervent love for Christ should kindle up again in Christian souls, amid all the distractions of modern life, which has become so complex through the development of human activity in every sphere, artistic, industrial, commercial, or scientific.

Conclusion.—It must not be forgotten that after all the chief struggle of Christianity is not against such or such a system, but against the power of evil, against sin which destroys us; and that it is above all a work of redemption, of restitution, and of salvation. It is this which distinguishes it from the two great religions which dispute with it the world. Buddhism is the religion of absolute nothingness, of *Nirvana*, placing salvation in death and in annihilation, and only retaining its millions of adherents by concessions ever more and more frequent to idolatrous fetichism. Mohammedanism is merely a materialization of Judaism, making of its Allah a God at once terrible and indulgent, for he has only murderous rage for those

who do not hasten on in the footsteps of his pretended prophet to the brutal conquest of the world, while at the same time he is full of indulgence to a life of sensuality, which after being largely satisfied on earth expects its final gratification in a sensual paradise. To reconquer the millions of men held within the grasp of these two great religions, and those who belong to fetichistic idolatry, which is a survival of prehistoric humanity, Christianity has spared no effort, and has never refused to pour out the blood of its martyrs.

If the dust of the battle sometimes casts a shadow over the true character of Christianity, it none the less remains vigorous and living as it was 19 centuries ago. We recognize it, even under forms the least favorable, by the intensity of its religious life, by its love of God and of Christ inseparable from its love for man, who would perish without it. Its career of conquest, far from being diminished, has increased largely during the last century through the magnificent development of its missions abroad and at home. Its charity never ceases to multiply works of benevolence and of relief. The eye of faith discerns across the great and tremendous struggle which sums up the whole of human history, a combatant greater than the greatest and holiest of Christian soldiers — that divine hero of whom Luther says in his immortal hymn, that He fights for us and with us.

Christian Knowledge, Society for Promoting, a society founded in London in 1698, in connection with the Church of England, having for its main objects the establishment of churches, schools, and libraries, and the publication and circulation of religious and moral literature. It is still in active operation, publishes a great number of religious and instructive works, and recently established a training college for school-mistresses. In 1811 the National Society branched off from it, and has done much to further education in England in connection with the Established Church.

Christians, Christian Connection, etc., an American religious denomination that came into existence during the period from 1793 to 1810, having a threefold origin. It grew out of secessions from the Methodist, Baptist, and Presbyterian bodies. It includes the American Christian Convention (Christian Connection), in the Northern United States and Canada, and the Christian Church, South. The churches are independent. They recognize no sectarian authority in doctrine, deem the name "Christian" sufficient, and make character and practical piety the test of fellowship. The Scriptures are their only rule of faith, and while they practise immersion they do not insist on it. They have numerous conferences, maintain several colleges, publish

various periodicals, and carry on active missionary work. The United States census reported in 1910 for 1906, 1,379 organizations, 1,323 churches and halls, and 110,117 communicants.

Christiansand, the sixth city of Norway in respect to population (though a great part of it was burned in 1892), is situated near its S. extremity, on a sandy plain. It is a garrisoned town; was built by Christian IV. in 1641; and has been the capital of its province or stift since 1684. It has several dockyards, and a good harbor much used for refuge. The steam-packets from London, Hull, Hamburg, etc., to Christiana and the N. usually call here. At the mouth of the harbor is the beautiful island of Od-derö, laid out with public gardens and promenades. Christiansand has a considerable trade in timber, pitch, stockfish (salted cod), fish-oil for curriers, salmon, mackerel, and lobsters, the latter chiefly for the London market. About 30 lobster smacks are regularly employed between Christiansand and Billingsgate during the season. Many thousands of white ptarmigans caught in the neighboring districts of Lister and Mandals are shipped annually from Christiansand to England. Shipbuilding is a considerable industry. Christiansand has a cathedral and grammar-school, and is the residence of a bishop. The streets are wide, straight, and regular. Pop. (1900) 14,666.

Christian Science, a system of demonstrable religion based upon the spiritual meaning of the Old and New Testaments; its founder, Rev. Mary Baker G. Eddy, in her text-book, "Science and Health, with Key to the Scriptures," published in 1875, concisely states the divine Principle, rules and practice of this Science.

The basic Principle of Christian Science is God's infinity, His all power, all knowledge and all presence, and man as God's idea, reflection, spiritual image; hence man, by virtue of his divine origin, is pure, healthy, happy and immortal. In Christian Science it is axiomatic: (1) that Truth appeals to the intuition, the common-sense, of mankind; (2) that it is not conceivable that God, the divine Principle of all that really is, has failed to make whatever is necessary to human happiness, universally obvious to his children; (3) that it is not thinkable that God, with one hand, has given us life, health, love and song, and with the other, has supplanted them with darkness, disease, sin and death. Christian Science affirms that the great commandment, to love God supremely and your neighbor as yourself, is mandatory, imperative; and Christian Scientists — realizing, according to the Scriptures, that you can love God only by loving your neighbor, and that the only possible manifestation of love for your neighbor is in *doing*, not saying — make the

great mission of their church one of *ministry* to men.

The progress of Christian Science has been extraordinary. Starting with a few followers of Mrs. Eddy in 1867, its adherents have multiplied into scores of thousands, drawn from every occupation, profession and phase of religious belief, and it has so impressed intelligent investigation that the encyclopedic and statistical authorities recognize it as a potent factor in the betterment of mankind. The denomination has something over 650 churches; the central or Mother Church is located at Boston, Mass., and has over 35,000 communicants; the "branch churches" are located in various cities of the United States, Canada, Mexico, England, Ireland, Scotland, France, Germany, Switzerland and Australia; the aggregate value of its property is estimated at \$10,000,000. This church publishes all of its own literature, including its text-book, all the writings of Mrs. Eddy, a weekly paper, a monthly magazine, and a quarterly publication, containing the church "Lesson Sermons;" it conducts regular Sabbath services, also mid-week meetings, at which are given testimonies of Christian Science healing; it also supports, as administrative and educational adjuncts, a Metaphysical College, a Board of Education, a Board of Lectureship, a Publication Committee for each State and foreign government where churches are established.

Christian Scientists do not worship Mrs. Eddy, but they do believe that whoever continuously toils, sacrifices and suffers for the weal of men, "dwells apart," is august, sacred. The United States census reported in 1910 for 1906, 638 organizations, 573 churches and halls, 85,717 members and church property valued at over \$8,740,000.

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Christians of St. John the Baptist. See MANDÆANS.

Christians of St. Thomas, a sect of Christians on the coast of Malabar, in India, to which region, according to a tradition, the apostle Thomas carried the gospel. Originally they probably belonged to a body of Christians who, in the year 499, united to form a Syrian and Chaldaic Church in Central and Eastern Asia, and are, like them, Nestorians (see NESTORIANISM; NESTORIUS). In the eighth century they received a metropolitan from the Nestorian patriarch. Since 1665 their main body has belonged to the Jacobite sect of Eastern Christians (see JACOBITE). They number about 300,000 and are under the British government.

Christiansund (sometimes confounded with Christiansand, though 350 miles farther N.), a Norwegian coast-town, built on three wooded islands, Kirklandsö, Inland-

sö, and Nordlandsö. The main thoroughfare being the sea-channels between these islands gives it a curiously picturesque character, which is heightened by the irregularity of ground on which the wooden houses are built, scarcely any two being on the same level. It has a considerable trade with Spain and Italy in salt-fish, and is a calling-place for the omnibus passenger steamers which now ply so numerously on the Norwegian coast. The chief public buildings are the grammar-school and custom-house. Pop. (1901) 12,043.

Christian Union Churches, an American denominational union, organized in 1865, composed of members of all varieties of orthodox belief. Their creed is simple, covering the headship of Christ, sufficiency of the Bible, and right of local Church government. They are located chiefly in the older Western States, and are in affiliation with the "Christians." The United States census in 1910 reported for 1906, 217 organizations, 204 churches and halls, 13,950 communicants, and church property valued at \$299,250.

Christian University, a co-educational institution in Canton, Mo., organized in 1853, under the auspices of the Disciples of Christ; has grounds and buildings valued at over \$75,000; productive funds aggregating \$71,000; volumes in the library, over 5,000; average annual ordinary income, about \$15,000; average number of faculty, 15; average student attendance, 240; graduates, over 500.

Christie, William Henry Mahoney, an English astronomer; born in Woolwich, Oct. 1, 1845; a graduate of Trinity College, Cambridge, and for a long time assistant in the Royal Observatory of Greenwich. On the retirement of Airy (*q. v.*) as Astronomer Royal in 1881, Christie was appointed his successor, a position which he still holds. He is best known for his spectroscopic work with the Greenwich Equatorial, especially that relating to the motion of stars in the line of sight.

Christina, Queen of Sweden; born in 1626. She was the daughter of the great Gustavus Adolphus, and on her father's death, in 1632, was crowned queen, being then only six years of age, with the five principal ministers of state appointed by Parliament her guardians. Christina was educated under the eye of the celebrated Swedish chancellor Oxenstiern, and early showed great avidity for learning, as well as a considerable share of moral eccentricity. She was fond of wearing men's apparel, and of following masculine habits and pursuits; hence she acquired quite an Amazonian reputation. On the termination of her minority, in 1644, she entered upon administrative business with a zeal and an ability which astonished her peo-

Christina

ple. She put an end to the war with Denmark, begun that year; and in 1645, by the treaty of Brömsebro, obtained some new provinces. She next turned her attention to the promotion of the interests of commerce, education, and learning. She was herself, perhaps, the most accomplished woman of that age, understanding no fewer than six languages, and maintaining an autograph correspondence with the most learned men of foreign nations. Gassendi sent her his mathematical works; Descartes, Grotius, Salmasius, Bochart, Vossius, Meibom, and other learned men, sought her court, and were received with the most flattering distinction. Descartes ended his days at Stockholm; and Salmasius, under her patronage, entered the lists against the republicanism of Milton. She studied chemistry, astronomy, and even alchemy and astrology, with the most celebrated professors. Having, in 1649, settled the regal succession in favor of her cousin, Prince Carl Gustav of Pfalz-Zweibrücken, she for some time conducted her government in a manner that promised the surmounting of the temporary difficulties of the realm; but, having resolved to abandon Protestantism, she, in 1654, in an assembly of the states at Upsala, abdicated her crown, reserving to herself an annual income of \$200,000. She forthwith left Sweden, and traveled in male attire to Brussels, where she made a secret profession of the Roman Catholic faith. At Innsbruck, she made a more formal and public avowal of it. She next rode to Rome, where the reception accorded to her was an ovation. There she did homage to Pope Alexander VII., and received the honor of his name, in addition to her own, being thenceforward styled Christina Alexandra. In 1656 she went to France, where she lived principally at Fontainebleau, Compiègne, and Paris. During the year following, she excited universal horror and disgust by the cruel assassination of her master of the horse, the Marquis Mondschi, who had brought this fate upon himself by betraying the queen's secrets. In 1660 her successor on the Swedish throne died, and she thereupon repaired to Sweden to claim it for herself; but her conversion to the Roman Catholic Church proved a bar to her resumption of the crown, and she was compelled to return to Rome in 1668, where she died in 1689.

Christina, Maria, daughter of Francis I., King of the Two Sicilies, and mother of Isabella II., the dethroned Queen of Spain; born in 1806. She was married to Ferdinand VII. in 1829, and took an active part in the affairs of Spain from 1830 to 1854. As queen-regent she governed arbitrarily, and in 1854 she abdicated, dying in 1878.

Christology

Christmas, the festival of the Nativity of Christ observed by the Christian Church yearly on the 25th of December. Augustine considered the festivals, Good Friday, Easter Sunday, Ascension Day, and Whitsuntide, as the only festivals which had an Apostolic origin and the sanction of a general council. Christmas he deemed to be of later origin and lesser authority. When the first efforts were made to fix the period of the year when the advent took place, there were, as we learn from Clement of Alexandria, advocates for the 20th of May and for the 20th or 21st of April. The Oriental Christians generally were of opinion that both the birth and baptism of Jesus took place on the 6th of January. Julian I., Bishop of Rome from A. D. 337-352, contended for the 25th of December, a view to which the Eastern Church ultimately came round, while the Church of the West adopted from their brethren in the East the view that the baptism was on the 6th of January. When the festival was at length placed in December, it afforded a substitute to the various nations who had observed a festival of rejoicing that the shortest day of the year had passed, besides spanning over the great interval between Whitsuntide of one year and Good Friday of the next. Coming to the Roman Christian converts, in lieu of the saturnalia, to which they had been accustomed while yet they were heathens, its purity became sullied almost at the first by revelry which had crept into it from this source. Similarly the Yule log, the mistletoe, etc., among English-speaking peoples, are relics of Druidism. See CHRISTIAN ERA.

Christmas-boxes, boxes in which presents were deposited at Christmas; hence a Christmas gift. The custom of bestowing Christmas-boxes arose in the early days of the Church, when boxes were placed in the churches for the reception of offerings; these boxes were opened on Christmas-day, and their contents distributed by the priests on the morrow.

Christmas Island, a British island in the Pacific in 1° 57' N. lat., and 157° 27' W. long., with some guano deposits. Another Christmas Island, annexed to Great Britain in 1888, lies about 250 miles S. W. of Java (11° S., 105° 30' E.), is 6 miles long by 4 broad, partly volcanic, partly coralline in structure, with rich phosphate deposits (worked since 1897). There is a third Christmas Island off Cape Breton.

Christmas-rose, a plant, *Helleborus niger*, order *Ranunculaceæ*, so called from its flowering at Christmas; also called Christmas flower.

Christology, that branch of the study of divinity which deals directly with the doctrine of the person of Christ.

Christophe

Christophe, Henri, a King of Haiti, was an African slave; born in Grenada, West Indies, in 1767, who received his freedom as a reward of faithful service. On the outbreak of the negro insurrection in St. Domingo, 1801, he became one of its leaders, and attracted by his energy and ability the attention of Toussaint l'Ouverture, who conferred upon him a divisional military command. After the deposition of Toussaint, Christophe served under his successor, Dessalines, and waged a war of increasing ferocity against the French, who, in 1803, were compelled to evacuate the island. In 1811 Christophe obtained undisputed possession of a portion of the island with the title of King of Haiti. His reign was that of a sanguinary despot, occasioning ultimately a successful revolt of his black subjects, whereupon he committed suicide in 1820.

Christopher, St., a Christian martyr who is supposed to have lived in the 3d century A. D. He was a native either of Syria or Palestine, and is believed to have suffered martyrdom by decapitation in the reign of the Roman Emperor Decius. The Roman Catholic Church celebrates his festival on July 25.

Christopher's, St. (commonly called St. Kitt's), a British island in the West Indies, one of the Leeward Islands, 23 miles in length, and in general about 5 in breadth; area, 68 square miles, or 44,000 acres, of which about 17,000 acres are appropriated to the growth of sugar, and 4,000 to pasturage. The interior consists of many rugged precipices and barren mountains. Of these the loftiest is Mount Misery (evidently an extinguished volcano), 4,100 feet high. The chief town, a seaport with open roadstead, is Basseterre. The island has a legislature of its own, with an executive subordinate to the governor of the Leeward Islands, resident in Antigua. It was discovered by Columbus in 1493. Pop. (1901) 29,782.

Christy, Charles, an American minstrel; born in New York city, in 1828. He was an actor from boyhood, supporting Forrest and Macready as well as singing on the minstrel stage. He later became a theatrical manager. He died in Kansas City, Mo., Feb. 13, 1897.

Christy, Howard Chandler, an American artist; born in Morgan county, O., Jan. 10, 1873; removed to New York in 1893 and engaged in illustrating magazines and periodicals; was a "Rough Rider" in the Santiago campaign in 1898; and became chief of the illustrating class in Cooper Union. He is widely known and exceedingly popular because of his outlines of female heads.

Chromatophores, pigment cells containing pigment granules of various colors,

Chromium

which enable animals such as chameleons and cuttlefishes to change color rapidly.

Chromatype, a photographic picture in which the paper employed has been sensitized by some of the salts of chromium.

Chromium, an element originally discovered in 1797 by Vauquelin, in the native chromate of lead of Siberia. It was afterward found combined with iron. It is the coloring matter of the emerald and beryl, and has received its name from the brilliant colors of its compounds. Chromium, which has hitherto been procured in very small quantities, owing to its powerful attraction for oxygen, may be obtained by mixing the oxide of chromium with charcoal, and exposing the mixture to the most intense heat of the furnace. It is also obtained by heating the anhydrous sesquichloride of chromium with zinc, or potassium, or sodium. It is extremely hard, of a grayish white color, and less fusible than platinum. Its specific gravity is between 6 and 7. The metal is readily acted on by hydrochloric acid, but less readily by sulphuric, and not at all by strong nitric and by nitrohydrochloric acids. Chromium forms three classes of compounds, the chromous and chromic in which the metal is basic, and the chromic in which it plays the part of an acid.

With oxygen it yields five compounds, chromous oxide (CrO), which forms salts isomorphous with those of iron; an intermediate oxide (Cr_3O_4) resembling the black oxide of iron; the sesquioxide (Cr_2O_3), which is the base of the common chromic salts. This compound has a green color, is hardly soluble in acids after ignition, and is practically infusible, but when mixed with a flux, such as borax, and heated, it readily melts, imparting to it a fine emerald green color, and is therefore employed in coloring glass and painting porcelain. It can be obtained by igniting chromate of mercury or of ammonium. A compound of this oxide with water is precipitated when a chromic salt, the sulphate or chloride, is mixed with ammonia. It is a violet-green, flocculent or gelatinous body, which when dried is still soluble in acids; but if it be heated, it suddenly becomes incandescent, changes to green, and is insoluble in acids. The remaining oxides are the binoxide (CrO_2), of no importance, and the chromic trioxide or anhydride (CrO_3), the most important of all. In combination with lead oxide it forms the mineral in which the element was first detected. The anhydride is now prepared from a chromate by decomposition with an acid. Usually a cold strong solution of potassic anhydrochromate is mixed with sulphuric acid. On cooling, dark red prisms of the anhydride separate, and these are laid on a porous tile to dry. The anhydride is very soluble in water; the

Chromium

solution has strong acid properties, and acts as if it contained chromic acid (H_2CrO_4). This acid combines with a number of bases, giving salts isomorphous with the sulphates, and all distinguished by their rich colors. The best known is the potassic chromate, which is manufactured on a very large scale, and is the immediate source from which the other chromates, and indeed the compounds of chromium generally, are prepared.

The manner in which it is formed is as follows: Chrome iron ore mixed with carbonate of potassium, and sometimes with lime, is roasted for several hours in a reverberatory furnace, with free access of air, until the chromic oxide is converted into the anhydride, which combines with the alkali. The mass is lixiviated with water, and by rapid boiling the potassic chromate is thrown down in granular crystals, which are lifted out, drained, and recrystallized. Formerly chrome iron ore, reduced to fine powder, mixed with half its weight of nitrate of potassium, was heated strongly for an hour or two in crucibles or on a hearth. The resulting masses were then repeatedly digested with water, and the colored alkaline liquids, saturated with nitric acid, were concentrated by evaporation, till no more crystals of niter separated. The yellow liquid, being now set aside for a week or two, deposited a copious crop of crystals, the form of which is that of a four-sided prism, terminated by dihedral summits. Their color is an intense lemon yellow, with a slight shade of orange; 100 parts of water at 60° dissolve about 48 parts; but boiling water dissolves almost any quantity. This lemon yellow salt is, however, usually converted into the bichromate or anhydrochromate by adding to the solution the proper amount of nitric, sulphuric, or hydrochloric acid to remove half of the potassium. The bichromate crystallizes in splendid red tabular crystals, which fuse when heated and dissolve readily in water. The aqueous solution of both compounds may be used to prepare the chromates of the other metals by double decomposition. In this way metals give precipitates of different colors; for instance, mercury, an orange red; silver, crimson; bismuth, barium, and lead, a beautiful yellow color; the last now extensively used as a pigment, under the name of chrome yellow. Chrome yellow is largely manufactured in the United States, at Baltimore, near which place is found one of the most remarkable deposits of chrome iron ore in the world. The process consists in adding a solution of acetate of lead (or sugar of lead) to the rough solution of chromate of potassium, from which the nitrate of potassium has been just separated by crystallization. The acetate of lead is added as long as any sediment falls. The liquid is then filtered, and the yellow pre-

Chromo-lithography

cipitate left on the filters dried for sale. Chrome yellow is much used in pigment printing on calico. The pattern is printed with the lead salt, and the cloth is afterward treated with the chromate. By boiling chrome yellow with an alkaline fluid part of the acid is removed, and the color acquires a deeper orange or even a red tint. In this way orange chrome and palladium red are prepared, and by proper treatment the different tints can be produced on cloth from the original yellow chrome.

Chromium combines with most of the elements, but we need only mention its chlorides and sulphates. The chromic chloride (Cr_2Cl_6) is prepared by making an intimate mixture of chromic oxide and carbon, heating this to redness in a porcelain tube, and passing over it a current of dry chlorine gas. Crystalline scales of the chloride sublime. They have a splendid purple color, and are quite insoluble in pure water. It is easy, however, to obtain a solution of the hydrated chloride by acting on the metal or on the precipitated oxide with hydrochloric acid. It is a purplish green fluid, which when evaporated is apt to decompose with escape of acid. The chromous chloride (CrCl_2) is a white mass which dissolves in water, giving a blue solution, and rapidly absorbs oxygen from the air. The least trace of this chloride renders the purple chloride readily soluble in water. The chromic sulphate is obtained by dissolving the oxide in sulphuric acid, but it is best known in combination with potassic sulphate, as the salt which can be crystallized from a mixture of anhydrochromate of potassium, sulphuric acid, and alcohol. On heating this mixture the color changes from yellow to purplish green, and the solution on standing deposits dark reddish purple octahedra, belonging to the regular system, and of remarkable beauty and symmetry. With care they can be produced of great size, and then they appear almost black. From its identity of shape and constitution with ordinary alum this salt is known as chrome alum. The chromous sulphate is only known as a double salt with potassic sulphate. Chromium salts have latterly been used for some time in the tanning of certain kinds of leather. They are also used to some extent as mordants.

Chromium (or Chrome) Steel, steel in which the carbon is replaced by the metal chromium. It is claimed that this steel can sustain a greater degree of heat than ordinary steel, and consequently will not so easily become oxidized or "burnt" in working and that it rolls more easily. This steel has been used with great success in the construction of the St. Louis bridge.

Chromo-lithography, the art of printing chromo-lithographs. Color printing was first used in Europe in illuminating

Chromosphere

missals and making playing-cards, but it was not successful till it was combined with lithography, invented between 1796 and 1800 by Alois Senefelder of Prague. In the art an outline drawing is first traced, then various stones are taken, one for each color, to which the drawing is transferred. Then the artist puts in the colors, with soap, of the tints required. Next the slab is put upon the press and carefully damped with a sponge, after which the oil color is applied with a leather roller; the parts of the slab which contain no drawing, being wet, resist the ink, while the drawing itself, being oily, repels the water while retaining the color.

Chromosphere. During total eclipses it is observed that a red-colored envelope surrounds the sun, and shoots up to great distances from the surface. It seems to have been first recognized by Secchi; and the projecting portions of it are commonly described as "red-colored protuberances" and "red flames." To this red envelope the name chromosphere was given by Sir J. Norman Lockyer. The light from it is much fainter than that from the photosphere; and till 1868, when M. Janssen and Mr. Lockyer almost simultaneously pointed out a method of viewing it, it was never seen except during eclipses. (See SUN.)

The spectrum of the chromosphere was first observed in 1868 during the Indian total eclipse, and it was found to consist of a number of bright lines, and conspicuous among them those of hydrogen. The light of the chromosphere was thus proved to be due to vast flames or masses of incandescent vapor or gas, hydrogen forming a large part of the whole.

Since the invention of the Janssen-Lockyer method of observing, as it is called, very remarkable advances have been made in our knowledge of solar physics, discoveries quite unthought of having followed. The observations are made by means of a combined telescope and spectroscope. A spectroscope is substituted for the eye-piece of the telescope, the slit of the spectroscope being placed at the principal focus of the object glass of the telescope. The slit is capable of being moved in such a way that any particular band of the image formed by the object glass of the telescope may be examined by the spectroscope. The spectroscope employed for the purpose of examining the chromosphere must have the greatest possible dispersive power, and requires for this purpose a very long train of prisms.

As mentioned above, the spectrum of the chromosphere consists of a series of bright lines. The breadth of a bright line of the spectrum is not sensibly increased by increasing the dispersive power of the spectroscope, but the contrary is the case with a continuous spectrum, which is extended by dispersion. Thus the latter becomes weak-

Chromosphere

ened, while the former maintain their brightness, and become more visible in comparison with the others. The slit of the spectroscope being arranged so as to take in a band, either tangential or radial, close to the edge of the image of the sun formed by the object glass of the telescope, it is found that the bright lines of the chromosphere are perfectly visible, in spite of the light of the continuous spectrum proceeding from the inner portion of the disk. Farther, it has been found possible, by using a spectroscope of the very highest dispersive power, and by opening the slit sufficiently wide, to see the whole of one of the protuberances at once, and by this means to watch its motions and its changes. The reader must recollect that a continuous spectrum consists of an enormous number of images of the slit, placed side by side, and in ordinary cases slightly overlapping each other. If we could employ an infinitely narrow slit we should have an infinite number of infinitely narrow images, and no overlapping whatever. But suppose a light to consist of only two or three colors, say light from a source only capable of giving the two bright lines C and F, that is, one in the red and another in the blue part of the spectrum. It is easy, even with a slit of sensible width, to keep the two from overlapping, and we shall see without any confusion the two bright lines or bands at different parts of the spectrum, darkness intervening. Now imagine a flame or tongue of fire starting up from the sun's surface, and let the spectroscope be directed on its image in the telescope; there will be only portions of the slit illuminated by it, portions corresponding to the shape of the flame; if the flame contain only light of the bright lines C and F, there will be seen two images of the flame at the points of the spectrum belonging to these colors. The observation of these flames by Mr. Lockyer has furnished us with what may be considered at present as a very complete knowledge of the atmosphere of the sun, though doubtless there is yet much to be discovered by the daily observations of them that is now carried on; and the same method applied to the sun's spots has proved not less fruitful. We can only give a few of the results here, but the reader will find an account full of interest in Mr. Lockyer's papers communicated to the Royal Society, and printed in abstract in the Royal Society's "Proceedings" for 1869 and 1870.

The chromosphere and its prominences, when examined with the telespectroscope (as the instrument just described is called), exhibits a spectrum of bright lines, due to incandescent gases. The most elevated portions consist entirely or almost entirely of hydrogen, the lightest of the gases. Lower down are found the gases or vapors of the

heavier metals — of sodium, magnesium, barium, iron, and others. The lower the layer of the chromosphere examined the more dense is the spectrum filled with lines of metals, and in the prominences the red hydrogen flames tower high above all of the others.

From minute displacements of well-known lines in the spectrum (see SPECTRUM ANALYSIS) motions are inferred of the incandescent bodies from which these lines are proceeding. On this principle motions of the fixed stars have been determined. Thus Sirius is receding from us at the rate of 20 miles per second, while Arcturus is approaching us at the rate of 50 miles per second. The principle applied to the results of the spectroscopic examination of the prominences of the chromosphere shows that they are due to enormous outbursts of gases and vapors from the sun. These gases are projected outward with extraordinary velocity, and in their neighborhood vast cyclones are observable. It is also proved by applying the same principle that the spots on the sun's surface are due to, or at least are accompanied by, vast up-rushes and down-rushes of gaseous matter.

Chronicle, an historical account of facts or events disposed chronologically or in the order of time. Most of the historians of the Middle Ages were chroniclers who set down the events which happened within the range of their information, according to the succession of years.

In the Scriptures, the name of two books, consisting of an abridgement of sacred history from its commencement down to the return of the Jews from the Babylonish captivity, and called by the Septuagint *περιλειπόμενα* (lit., things omitted), because they contain many supplemental relations omitted in the other historical books. It has been supposed by Eichhorn, and many other writers, that the Chronicles were compiled by Ezra, though circumstances are not wanting to diminish the probability of this conjecture.

Chronograph, the name given to various devices for measuring and registering very minute portions of time with extreme precision. Benson's chronograph is, in principle, a lever watch with a double seconds hand, the one superimposed on the other. The outer end of the lowermost hand has a small cup filled with a black viscid fluid, with a minute hole at the bottom, while the corresponding end of the uppermost is bent down so as just to reach the hole. At the starting of a horse-race, the observer pulls a string, whereupon the bent end of the upper hand passes through the hole and makes a black mark on the dial, instantly rebounding. Again, as each horse passes the winning-post the string is redrawn and a dot made, and thus the time occupied by

each horse is noted. This chronograph registers to one-tenth of a second. Strange's chronograph is connected with the pendulum of an astronomical clock, which makes a mark on a sheet of paper at the beginning and end of each swing. By touching a spring on the appearance (say) of a particular star in the field of a telescope, an additional dot is made intermediate between the two extreme ones, and by measuring the distance of this from either of these extremes the exact time can be ascertained to one-hundredth of a second. Schultze's chronograph, in which electricity is applied, is yet far more precise, registering time to the five-hundred-thousandth part of a second. They are now used by physicians and nurses to accurately take the pulse of their patients, and are so made that the moment the pulse has been taken the large sweep second hand can be instantly stopped by a slight pressure on the stem of the watch; if there is a fluctuation in the pulse, the second hand can be thrown quickly back to the starting point and the pulse taken over again without in any way interfering with the other mechanism of the watch. So much depends upon accurate knowledge of the pulse that these chronometers are an invaluable auxiliary in the sick room.

Chronology, the doctrine of science of time, or of computing dates: the method of ascertaining the true periods, or years, when past events took place, and arranging them in their proper order, according to their dates.

The following are the leading systems of chronology existing among the several nations of the world. Want of space forbids that the list should be exhaustive:

1. *Chinese and Japanese Chronology*: In these calculation is made by cycles of 60 years, each year of the cycle separately named.

2. *Hindu Chronology*:

(1) *Historical*: No system is universal in India or exclusive. Two of the chief are the era of Salivahana (A. D. 77), and that of Vicramaditya (B. C. 57).

(2) *Astronomical*: The Hindus have four ages. We are now in the Kali Yooga, beginning 3101 B. C.

3. *Egyptian Chronology*:

(1) *Historical*: Julius Africanus and Eusebius have preserved some fragments of a work by Manetho, an Egyptian priest, who lived in the time of Ptolemy Lagus, in the 3d century B. C. In these fragments the successive rulers of Egypt, from the very first to nearly the time of Alexander the Great in the 4th century B. C., are arranged in 30 or 31 dynasties. Increasing importance has been given to his work, as it has been found that one after another of his statements, once unsupported, have been

confirmed by the hieroglyphics of the monuments. A long period is of course requisite for so many dynasties. Lane, Stuart Poole, and others largely reduce this by making certain of the first 17 dynasties contemporaneous, while Bunsen, Lepsius, and their followers make them successive, and contend for a lengthened chronology.

(2) *Astronomical*: The Egyptians, moreover, calculated by a tropical cycle of 1,500, and a Sothic cycle of 1,460 Julian years.

4. *Greek Chronology*: In the time of Herodotus, and subsequently in that of Thucydides, the Greeks had no chronology spanning wide intervals of time. It was not till B. C. 194 that Eratosthenes, the "father" of Greek chronology, began to count by Olympiads, the first of which was dated from what we now should call B. C. 776. He was followed by Apollodorus, B. C. 115, Censorinus A. D. 238, etc. There were other Greek methods of computation than by Olympiads; thus the era of the Seleucidæ was B. C. 324.

5. *Roman Chronology*: The method of Roman reckoning was by the consulships, which, of course, could give no indication of time unless their order was carefully preserved, and even then was clumsy. A much simpler and better plan was by calculating years from the building of the city. This Varro, whom the moderns follow, placed in what would now be called B. C. 753, while Cato preferred 752. It does not materially diminish the value of this date that Rome would seem to have come into existence earlier than that year. It is enough for chronology that the date to be reckoned from is a fixed one.

6. *Jewish Chronology*: Up till the 15th century the Jews followed the era of the Seleucidæ. Since then they have dated from the creation of the world, which they fix 3760 years and three months before the commencement of the Christian era.

7. *Mohammedan Chronology*: Dates are counted from the Hegira, i. e., the time of Mohammed's flight from Mecca to Medina, July 15 or 16, A. D. 622.

8. *Christian Chronology*: Since the 6th century dates have begun to be reckoned from the birth of Christ (see CHRISTIAN ERA), though the system did not become universal in Europe till many centuries subsequently. The chief disadvantage of this method is that it requires a counting backward as well as forward; its advantage is that it evades dating the creation of man and of the earth, though, of course, investigations have been made as to how many years B. C. these events, formerly believed to have occurred almost at the same time, took place. Hales brought together 120 opinions on the subject, the extremes varying by 3,268 years, while it has been

affirmed that even 300 diverse views on the subject exist. One great reason of the discrepancy is that the Hebrew, the Samaritan, and the Greek Pentateuchs all differ as to certain numbers in Genesis v. and elsewhere, so that Archbishop Ussher, following the Hebrew, makes the creation B. C. 4004, while Hales, preferring the Septuagint Greek, fixes the date at 5411.

9. *Scientific Chronology*: Wherever the occurrence of an eclipse of the sun or moon has been noted by an ancient or other historian in the annals of any year, which he accurately notes, astronomy will ultimately fix that eclipse with unerring exactitude to the day, hour, minute, and second. The only uncertainty at present is that the value of certain tables, called Hansen's, by which the moon's motion is computed, has excited differences of opinion. Geology has proved finally and irreversibly that the world was in existence many millions of years before man came on the scene, and that the two events must not be confounded by chronologists. Occurrences marking the several stages in the earth's past history, it has hitherto dated by geological periods, or subdivisions of them, not by historic time. It is only now beginning cautiously to feel its way to date in years a few events of the Post-Pliocene, or at furthest, of the Newer Pliocene periods. The first appearance of man (a very recent geological event) it carries back further than history has as yet ventured to do.

Chronometer, any instrument that measures time, as a clock, watch, or dial; but, specifically, this term is applied to those time-keepers which are used for determining the longitude at sea, or for any other purpose where an accurate measure of time is required, with great portability in the instrument. The chronometer differs from the ordinary watch in the principle of its escapement, which is so constructed that the balance is free from the wheels during the greater part of its vibration, and also in being fitted with a "compensation adjustment," calculated to prevent the expansion and contraction of the metal by the action of heat and cold from affecting its movements. Marine chronometers generally beat half-seconds, and are hung in gimbals in boxes 6 or 8 inches square. The pocket chronometer does not differ in appearance from a watch except that it is somewhat larger.

Chronoscope, an instrument for measuring the duration of extremely short-lived phenomena, such as the electric spark; more especially the name given to instruments of various forms for measuring the velocity of projectiles.

Chrysalis, the last stage through which a lepidopterous insect passes before be-

Chrysanthemum

coming a perfect insect. It is also called pupa. In this stage the insect is inactive, takes no food, and is inclosed in a transparent case, often of a metallic luster, and composed of a fiber spun by the larva.

Chrysanthemum, a genus of herbaceous or slightly shrubby plants, belonging to the *corymbiferous* group of the order *Compositæ*. The family is represented in the United States by the well-known ox-eye daisy, *Chrysanthemum leucanthemum*, and the corn marigold, *C. Segetum*, besides which many varieties have been introduced from other countries and are cultivated here. *C. Sinense* is the plant commonly known as the Chrysanthemum, and so much prized for its flowering in November and December.

Chryseis, the daughter of Chryses, priest of Apollo, famed for beauty and for her skill in embroidery. She fell to Agamemnon's lot in the course of the Trojan War, but was afterward restored, in order to stop a plague among the Grecians, which Apollo had sent at the request of her father.



ABDUCTION OF CHRYSEIS.

Chryselephantine, a name given by the Greek sculptors to those statues which were overlaid with ivory and gold. The most celebrated of these were the colossal works executed by Phidias, in the age of Pericles; the greatest being the Pallas of the Parthenon, 26 cubits high, and representing the goddess in armor covered with a long robe.

Chrysobalanææ

Chrysippus (kris'ip-us), a famed Greek philosopher; about 280-206 B. C.; born probably at Soli in Cilicia. He attended at Athens the lectures of Zeno, at least of Cleanthes; after the death of Cleanthes he became head of the school. His writings were exceedingly numerous, but only fragments remain. The loss is not very much to be regretted, if we may judge of the quality of the whole mass by specimens preserved for us in ancient authors. But there were precious



CHRYSIPPUS.

gems of thought scattered through the rubbish of hair-splitting refinements and mere anilities; and it is to be regretted that these were not timely "tried out" and the rest shot into the dust-hole. This service Seneca could have done most acceptably,—a reverent disciple of Chrysippus, but also an outspoken critic of his writings, as we see in his treatise on "Kindnesses": "I may seem to be setting Chrysippus to rights: he is a great man, but after all a Greek; his all too fine analysis is worked overmuch; even when you think he is getting at the heart of the matter, he punctures only, instead of boring through."

Chrysis, a priestess of Juno, who by falling asleep suffered the sacred fire to destroy the temple of her goddess, and was at last burned herself.

Chrysis, the golden wasp, or ruby-tail fly, a genus of *Hymenoptera*. They are magnificently colored with metallic hues. They are parasitic, depositing their eggs in the nests of the solitary mason-bees or other *Hymenoptera*, on the larvæ of which their larvæ live. *C. ignita* has the head, thorax, and legs of a rich blue or green, and the abdomen copper colored. It is constantly in motion. It may be seen in summer on sunny walls poking into holes in quest of the nest of other Hymenopterous insects, of which its larvæ may make a prey.

Chrysobalanææ, a sub-order of *Rosaceæ* presenting close affinities through *Cæsalpinea* to *Leguminosæ*. The 180 species are trees or shrubs, natives of tropical and subtropical America and Africa. The fruit of many is eatable, as the cocoa plum of the West Indies (*Chrysobalanus*). The kernels of some resemble sweet-almonds, notably those of *Acia dulcis*, and other species of Guiana. A useful oil is expressed from the seeds of *Prinsepia utilis*, a spiny Himalayan plant.

Chrysoberyl

Chrysoberyl, a gem almost as hard as sapphire, and the finer specimens of which are very beautiful, particularly those which exhibit an opalescent play of light. Lapidaries sometimes call it oriental or opalescent chrysolite. It is of a green color, inclining to yellow, semi-transparent, or almost transparent, and has double refraction. It occurs crystallized in six-sided prisms; often in macles, or twin crystals. It is found occasionally in granite, but more frequently in gneiss and mica-schist; sometimes it occurs in sandstone or in alluvial soil derived from the disintegration of schistose rocks. Localities for its occurrence are the Ural Mountains, Ceylon, Pegu, Brazil, and Connecticut. It is composed of alumina, glucina, and small proportions of ferric oxide, titanate acid, and sesquioxide of chromium—the alumina being about 80 per cent. of the whole. The Chrysoberyl of the ancients was a different mineral, probably the Chrysoprase of the moderns.

Chrysocola, an ore of copper.

Chrysolite, a green-colored orthorhombic mineral of a vitreous luster, transparent or translucent. Hardness, 6-7; sp. gr., 3.33-3.5. Composition: Silica, 31.63-44.67; protoxide of iron, 6.0-29.71; protoxide of manganese, 0-1.81; magnesia, 32.40-50.49. It is generally divided into two classes: Precious: Of a pale yellowish-green color and transparent, so as to be fit for jewelry. This is found in the Levant. Common: Dark yellowish-green to olive, or bottle-glass green; common in basalt and lavas, at times in large masses, having a rectangular outline. The *chrysolithus* of Pliny was probably our topaz, and his topaz our Chrysolite. It frequently changes color, becoming brownish or reddish-brown through the oxidation of the iron. Under the action of carbonated waters, the iron is carried off instead of being peroxidized, and also some of the magnesia is removed at the same time; and thus may come serpentine and picrosmine, which often retain the crystalline form of Chrysolite.

Chrysoloras, Manuel (kris-ō-lō'rās), a Greek scholar; born in Constantinople, about 1355. He was the first to attain eminence in Italy as a teacher of the literature and language of Greece: a work by him called "Queries" (*Erotemata*), long remained authoritative on Greek grammar. He died at Constance, April 15, 1415.

Chrysophyllum, a genus of *sapotaceæ*, consisting of trees with milky juice, alternate leaves with numerous transverse closely-aggregated ribs, and golden hairs on the under surface. The fruit of *C. Cainito* is in the West Indies esteemed a delicacy under the name of the star-apple. ..

Chrysostom, John, St. ("golden-mouthed"), a celebrated Greek father of

Chrysostom

the church; born in Antioch about A. D. 344. Secundus, his father, who had the command of the imperial troops in Syria, died soon after the birth of his son, whose early education devolved upon Anthusa, his mother. Chrysostom studied eloquence with Libanius, the most famous orator of his time, and soon excelled his master. After having studied philosophy with Andragathius he devoted himself to the Holy Scriptures, and determined upon quitting the world and consecrating his life to God in the deserts of Syria. He spent several years in solitary retirement, studying and meditating with a view to the church. Having completed his voluntary probation he returned to Antioch in 381, when he was appointed deacon by the Bishop of Antioch, and in 386 consecrated priest. He was chosen vicar by the same dignitary, and commissioned to preach the Word of God to the people. He became so celebrated for the eloquence of his preaching that the Emperor Arcadius determined, in 397, to place him in the archiepiscopal see of Constantinople.

He now exerted himself so zealously in repressing heresy, paganism, and immorality, and in enforcing the obligations of monarchism, that he raised up many enemies, and Theophilus, patriarch of Alexandria, aided and encouraged by the Empress Eudoxia, caused him to be deposed at a synod held at Chalcedon. The emperor banished him from Constantinople, and Chrysostom purposed retiring to Bithynia; but the people threatened a revolt. In the following night an earthquake gave general alarm. In this dilemma Arcadius recalled his orders, and Eudoxia herself invited Chrysostom to return. The people accompanied him triumphantly to the city, his enemies fled, and peace was restored, but only for a short time. A feast given by the empress on the consecration of a statue, and attended with many heathen ceremonies, roused the zeal of the archbishop, who publicly exclaimed against it; and Eudoxia, violently incensed, recalled the prelates devoted to her will, and Chrysostom was condemned and exiled to Armenia. Here he continued to exert his pious zeal until the emperor ordered him to be conveyed to a town on the most distant shore of the Black Sea. The officers who had him in charge obliged the old man to perform his journey on foot, and he died at Comana, in Pontus, 407. Here he was buried; but in 438 his body was conveyed solemnly to Constantinople, and there interred in the Church of the Apostles, in the sepulchre of the emperor. At a later period his remains were placed in the Vatican at Rome. The Greek Church celebrates his feast on Nov. 13, the Roman on Jan. 27. His works, which consist of sermons commentaries, and treatises,

Chub

abound with information as to the manners and characteristics of his age.

Chub, a European river fish, of the genus *Cyprinus* or carp; or, as some regard it, of the sub-genus *Leuciscus* (*L. cephalus*). The body is oblong, nearly round; the head and back green, the sides silvery, and the belly white. It frequents deep holes in rivers shaded by trees, but in warm weather floats near the surface, and furnishes sport for anglers. It is indifferent food, and rarely attains the weight of 5 pounds. Allied American species receive the same name.

Chubb, Thomas, an English writer; born in 1679. Although engaged as a glover and chandler he gave his chief attention to philosophical and theological study, and was celebrated in the Arian controversy for his argumentative keenness. In this connection he published, in 1715, "The Supremacy of the Father Asserted," besides various other moral and theological tracts. He died in 1746.

Chubb-lock, a lock so named from the name of its inventor, a London locksmith. It has more tumblers than usual, with the addition of a lever called the detector, which is so fixed that while it does not act under the ordinary application of the key, yet cannot fail to move if any one of the tumblers be lifted a little too high, as must be the case in any attempt at picking. This movement fixes the bolt immovably, and renders all further attempts at picking useless.

Chubut, or **Chupat**, a colony in Patagonia, so named from a river which drains a large part of its area. The entrance to the river, about 600 miles S. of the river Platte, is bad, but the bar can be crossed by vessels of from 7 to 12 feet draught. Its principal interest lies in its Welsh settlement, which has remained almost wholly Welsh-speaking. The first settlers, 151, arrived in July, 1865. Epochs in its history have been the abandonment of the colony in 1867; the subsequent return from New Bay; a 20 months' nearly complete isolation from the outer world, terminated in 1871. The principal town, Trerawson, or Rawsonville, about 5 miles from the sea, is named after Dr. Rawson, an Argentine statesman. Frosts seldom last through the day, fogs are infrequent, English grain and roots are produced, and salt of good quality is found.

Chuck-Will's-Widow, a popular name for a bird of the goat-sucker family, *Antrostomus carolinensis*, so called from its cry.

Chukiang, or **Canton, River** the "Pearl River" of the Chinese, is the lower part of the Pekiang, and has a navigable channel of about 300 miles. Opposite Canton it is about $\frac{1}{4}$ mile wide, and is crowded

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with shipping up to 1,000 tons' burden; larger vessels must tie up at Whampoa, 15 miles below. About 40 miles below Canton it is called "Boca Tigris."

Chung-King, a Chinese port in Szechuen, on the Yang-tze-Kiang, at the junction of the Pei river. It was declared open in 1890, and has acquired a thriving trade. There was a rebellion of the natives here in 1896-1898, which checked progress. A railway to center at Chung-King is projected and valuable coal mines are to be worked. The gross value of the trade in 1898 was \$12,095,170, of which the exports of local origin amounted to \$4,086,106. Pop. (1905), official est. 620,000.

Chuquisaca (chö-kē-sa'ka), or **Sucre**, a city of South America, the former capital of Bolivia; well situated on a plateau between the Amazon and La Plata rivers, 9,343 feet above sea-level. It has a cathedral and a university. It was founded by one of Pizarro's officers in 1539. Pop. (1900), about 20,900. The province of Chuquisaca has an area of 39,890 square miles; pop. (1900) 196,434.

Church, the whole body of Christians; the Christian place of worship; the clergy; or a sect or denomination of Christians. For details of the Church in the several meanings of the word, see ARCHITECTURE; CHRISTIAN ARCHITECTURE; CHRISTIAN CHURCH, THE; and the titles of the different denominations.

Church, Benjamin, an American soldier; born in Duxbury, Mass., in 1639. He commanded forces with distinction in King Philip's War and in the famous battle of 1675 with the Narragansetts won renown. He captured and executed King Philip in 1676. After compiling "Entertaining Passages Relating to King Philip's War" he died in January, 1718.

Church, Benjamin, an American physician; born in Massachusetts, about 1710. He was graduated at Harvard; became noted for his patriotic writings during the decade preceding the Revolutionary War, and was a leader in the "Boston tea-party." He secretly corresponded in cipher with the British, and, being detected, failed to exculpate himself. He sailed for the West Indies in 1776, and was lost at sea.

Church, Francis Pharcellus, an American editor; born in Rochester, N. Y., Feb. 22, 1839. First publisher and editor of the "Army and Navy Journal"; afterward, with his brother, established and edited the "Galaxy" magazine. He was a leading editorial writer of the daily journals of New York. He died April 11, 1906.

Church, Frederick Edwin, an American landscape-painter; born in Hartford, Conn., May 4, 1826; was a pupil of Thomas Cole.

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His earliest productions were views of the Catskill Mountains, among which he resided, and a view of East Rock, near New Haven, which attracted very favorable notice. In 1855 he visited South America, and found in the magnificent scenery of that country materials for several of his most admired pictures. After his return he executed his "View of Niagara Falls from the Canadian Shore," regarded by many as the most successful representation of the great cataract. Among his other works are "The Heart of the Andes," "Cotopaxi," "Morning on the Cordilleras," "Under Niagara," "The Icebergs," and "Sunrise on Mount Desert Island." After a visit to the Holy Land in 1868 he painted "Damascus" (1869), "Jerusalem," (1870), "The Parthenon," (1871), etc. He died in New York city, April 7, 1900.

Church, Frederick Stuart, an American artist; born in Grand Rapids, Mich., in 1842. He studied at the National Academy of Design, and since 1885 has been a full member thereof. He has achieved note as a painter of figures and animals.

Church, Richard William, an English clergyman, Dean of St. Paul's, London; born in Lisbon, April 25, 1815. He spent a great part of his youth in Italy and elsewhere on the Continent, took a first-class at Oxford in 1836, and soon after was elected to a fellowship at Oriel. From 1853 he held the rectory of Whatley, near Frome. In 1854 he published "Essays and Reviews," and thereby took rank almost at once as one of the most graceful and scholarly writers of the day. His university sermons (1876-1878), in a volume entitled "Human Life and its Conditions" (1878), the series of St. Paul's and Oxford sermons in "The Gifts of Civilization" (1880), and the five St. Paul's sermons forming "The Discipline of the Christian Character" (1885) are profound contributions to religious thought. Other works are his "Life of St. Anselm" (1871), an amplification of two essays in his first volume; "The Beginning of the Middle Ages" (1877), an introduction to the series of "Epochs of Modern History; "Dante: an Essay," with a translation of the "Monarchy," by his son, F. J. Church; "Spenser" (1879), and "Bacon" (1879), two of the best books in the series of "English Men of Letters." His occasional essays or lectures on such subjects as Montaigne, Brittany, Cassiodorus, the sacred poetry of early religion, the "Thoughts" of Pascal and Bishop Andrewes are only less valuable. His "Bacon," "Spenser," "St. Anselm," "Dante," and some of his miscellaneous essays, were reprinted in a uniform edition in five volumes in 1888. He died in London, Dec. 9, 1890.

Church Government

Church, William Conant, an American journalist; born in Rochester, N. Y., Aug. 11, 1836. He became the publisher of the New York "Sun" in 1860, and was war correspondent of the "Times" (1861-1862). In conjunction with his brother Francis he established the "Army and Navy Journal" (1863), and the "Galaxy" magazine (1866), and has been a contributor to the "Century" and other periodicals. He has written notable biographies of John Ericsson and General Grant.

Church-ale, a kind of church festival in old England at which ale was drunk liberally. The name is obviously compounded like bridal=bride-ale, scot-ale, clerk-ale, bid-ale, etc. The Church-ales were usually held upon Whitsuntide, and two persons were chosen beforehand to preside over the feast, and divide out the victuals and drink voluntarily contributed by the parishioners. Sometimes the drink which had been brewed from malt given by the parishioners was sold about Whitsunday at the church for the support of orphans and poor, the repair of the church, and similar objects. The practice of holding Church-ales with the corresponding games was denounced by the Puritans, and is not overlooked in Stubbs' "Anatomie of Abuses."

Church Army, an English religious organization, founded in London in 1882, having for its objects the training of working men for ecclesiastical service among the laboring classes, to raise the lower classes of society, and to assist the deserving poor. The work is carried on through mission houses, labor homes, and by means of prison and work-house committees.

Church Discipline, the practice of the Christian Church in dealing with such of its office-bearers and members as have by public scandal caused hindrance to its common spiritual life. Its Scripture authority, resting on such passages as Matt. xvi. 19; xviii. 15 (*et seq.*), is further enforced in Paul's epistles and in the gospel and epistles of John.

Church Government, the regulation and ordering of spiritual matters, or those pertaining to the discipline and work of the Church. Four leading views are at present entertained regarding church government. The first three agree that the rudiments of a scheme of church government are laid down in the New Testament. They differ, however, as to what that scheme is, much the greater number believing it to be Episcopacy, though one large minority are in favor of Presbyterianism, and another in favor of Congregationalism. The fourth view, which has not a large number of advocates, is that no scheme of government was laid down in the New Testament, applicable to all times and places,

but that the church has the power to adapt its government to the circumstances in which it finds itself at any particular time.

Church History, the history of the Christian Church (*q. v.*).

Churchill, Charles, an English satirical poet; born in Westminster, February, 1731. He first won fame with "The Rosciad," a satire upon the actors of the time, in which only Garrick and some few popular actresses are praised. His capacity for ridicule was so great that "The Ghost," "The Farewell," "The Conference," "The Author," "The Prophecy of Famine," etc., proved exceedingly popular. He is almost without a peer in his special field. He died in Boulogne, France, Nov. 4, 1764.

Churchill, John, Duke of Marlborough. See MARLBOROUGH.

Churchill, Randolph Henry Spencer (usually called **Lord Randolph Churchill**), an English statesman, third son of the seventh Duke of Marlborough; born at Blenheim Palace, Feb. 13, 1849. He was educated at Merton College, Oxford, and entered Parliament in 1874. In the same year he married Jennie Jerome, of New York, who did much to aid him in his political work. By 1884 he was a leader of the Conservatives, of whom a small but influential number, known as the Fourth party, had already given him active support. He acquired distinction as a debater, and was a severe critic of Gladstonian policies and sometimes of his Conservative associates. In 1885 he was made secretary of state for India, his tenure of office being rendered notable by the annexation of Upper Burma. On the defeat of Gladstone's Irish bill in 1886 Churchill became leader of the House of Commons and chancellor of the exchequer, but six months later he resigned from the cabinet. As the champion of "Tory democracy" he left the record of a brilliant, sometimes rather violent, career in British politics. His health failing, he sought to restore it by voyages to South Africa and elsewhere, but without avail. He died in London, Jan. 24, 1895.

Churchill, Winston, an American author; born in St. Louis, Mo., Nov. 10, 1871. He was graduated from the United States Naval Academy in 1894, and became an editor of the "Army and Navy Journal" the same year. After serving as managing editor of the "Cosmopolitan" magazine, he turned his attention to fiction. In 1903 and 1905 he was a member of the New Hampshire legislature, and in 1906 was a reform candidate for governor of that State, but failed of election. His writings include: "The Celebrity" (1898); "Richard Carvel" (1899); "The Crisis" (1901); "The Crossing" (1904); "Coniston" (1906); etc.

Churchill, Winston Leonard Spencer, an English author, son of Lord Randolph Churchill; born Nov. 30, 1874. He was educated at Harrow and Sandhurst, entered the army in 1895, served in that year with the Spanish forces in Cuba, later with the British in India and Egypt, and in the South African War (1899-1900). In November, 1899, he was taken prisoner by the Boers, while acting as correspondent of the "Morning Post" of London, but he escaped in December. In 1900 he was elected Conservative member of Parliament for Oldham. He has published: "The Story of the Malakand Field Force" (1898); "The River War" (1899); "Savrola" (1900); "London to Ladysmith via Pretoria" (1900); "Ian Hamilton's March" (1900); and "Lord Randolph Churchill" (1906).

Churchill River, a river of Saskatchewan and Keewatin, Canada, which rises in La Crosse lake, forms or passes through various lakes or lake-like expansions, the largest being South Indian lake, and enters Hudson bay after a N. E. course of about 800 miles. It is called also Missinippi or English river.

Churching of Women, a form of thanksgiving after childbirth, adopted from the Jewish ceremony of purification, and practised still in the Roman Catholic and Anglican churches, the latter having a special service in the Prayer Book.

Church of England. See ENGLAND, CHURCH OF.

Church of God, a Christian sect which originated in 1830, in a movement led by John Winebrenner (*q. v.*). Churches of this denomination exist principally in Pennsylvania and the Western States. The government of the Church of God is congregational, with a supervising church council composed of the preachers in charge, the elders, and deacons. Associations or conferences of churches, called elderships, meet annually, and a general eldership meets every three years. The Church of God holds the doctrines of the evangelical churches, with baptism by immersion only, subsequent to faith; feet-washing; the administration of the Lord's Supper in the evening; all the instrumentalities of revivals; and protests against the liquor traffic. The United States census reported in 1910 for 1906, 518 organizations and 24,356 members.

Church-rate, a tax formerly levied on parishes in England for repairing, maintaining, etc., the churches of the establishment. The tax, as a compulsory assessment, has been abolished, and the payment of church-rates is now voluntary.

Church, States of the, or Papal States, a territory that stretched from the Po to near Naples, and in 1859 had an area of 15,774 square miles and a pop. of 3,000,-

Churchwardens

000. It was divided for administrative purposes into 20 districts, including the Comarca of Rome; six legations, among them those of Bologna and Ravenna; and 13 delegations, including Ancona and Perugia. More general divisions were the Romagna, Umbria, and the March of Ancona. The war of 1859 and the popular vote of 1860 left the Pope only the Comarca of Rome, the legation of Velletri, and the delegations of Civita Vecchia, Frosinone, and Viterbo, 4,493 square miles in extent, with a pop. of about 700,000, the rest being united with Italy. The temporal power of the popes originated in a gift of the exarchate of Ravenna by Pepin to Pope Stephen II., and it reached its greatest extent under Innocent III. (1198-1216). The withdrawal of the French garrison of Rome in 1870 led to the final downfall of the Pope's temporal power.

Churchwardens, in the Church of England, officers—usually two—annually chosen by the parishioners or ministers, or jointly by these, to have care of the edifice and other church property, superintend public worship and the distribution of alms, and to form and execute other parochial regulations. In the Protestant Episcopal Church of the United States each parish annually elects churchwardens in Easter week, and their duties are substantially the same as those above mentioned. In most of the dioceses in the United States the legal corporation of a parish consists of the rector, the churchwardens, and the vestrymen.

Churchyard Beetle, the *Blaps mortisāga*, a very common insect found in dark, damp, and dirty places; it is black, but little shining, and the tip of the elytra forms a short obtuse point.

Churn, a vessel for preparing butter from cream or milk, in which cream is agitated to separate its buttery globules in a solid mass from the fluid portions. Churns are made of various forms; in a very common kind a perforated circular board is made to move up and down in a vessel containing the cream, and having the shape of the frustum of a cone, by means of a long stalk or rod fixed to it, called the churn-staff. In others the churning is performed by a circular motion. Very large churns are worked by steam or horse power.

Churrus, the resinous exudation of the leaves and flowers of Indian hemp, *Cannabis indica*. It is used by the natives of India as an intoxicating drug. According to Jaffur Shurreef, a man covers himself with a blanket and runs through a field of hemp early in the morning; the dew and gum of the plant naturally adhering to it are first scraped off and the blanket afterward washed and wrung. Both products are boiled together and an electuary formed.

Chyme

The smoking of five grains of it will produce intoxication.

Churubusco, Battle of, fought in Mexico, Aug. 20, 1847. After the battle of Contreras, fought on the same day, Santa Ana, with some 27,000 men, made a stand at this hamlet, on the river Churubusco, 6 miles S. of the City of Mexico, to resist the advance of the United States army under Gen. Scott. Churubusco had the strongly fortified convent of San Pablo and an elevated causeway with a stone bridge across the river. Gens. Worth and Pillow attacked and carried the bridge; the convent, after holding out two and one-half hours, yielded to Gen. Twiggs. Gen. Shields, who had been engaged on the right, joined in the pursuit, which extended nearly to the City of Mexico. Of 8,000 United States troops in the two actions there were 139 killed and 926 wounded; the Mexicans lost 4,000 killed and wounded, 3,000 prisoners, 37 guns, many small arms, and much ammunition.

Chusan, the principal of the group of islands known as the Chusan Archipelago; lies about a mile off the E. coast of China, opposite Ningpo. It has an area of over 230 square miles, and a population of 200,000 to 250,000; and although mountainous in the center, it is generally fertile, and everywhere carefully cultivated. Ting-hai, the capital, a walled town about 3 miles in circumference, is, from its position on the route between Canton and Peking close to the great ports of Shanghai and Ningpo, a place of both strategic and commercial importance, and its land-locked harbor is a busy shipping center. There are few manufactures, but its carved work and silver wares are in repute, and cordage, matting, and fans are exported. It was taken by the British in 1840, and held till 1841, the close of the war; and in 1860 it was again occupied by an English force. Pop., 30,000 to 40,000. The most remarkable of the surrounding group is the sacred island of Pu-tu, a mile E. of Chusan, covered with Buddhist temples, pagodas, and monasteries, and inhabited by upward of 1,000 monks. The chief monastery is one of the richest in China.

Chyle. See CHYME.

Chyme, in animal economy. In the process of digestion the food is subjected to a temperature usually above 90° F. It is mixed with the gastric juice, a liquor secreted by the glands of the stomach, and is made to undergo a moderate and alternate pressure by the contraction of the stomach itself. It is thus converted into a soft uniform mass of a grayish color, in which the previous texture or nature of the aliment can be no longer distinguished. The chyme, as this pulpy mass into

which the food in the stomach is resolved is termed, passes by the pylorus into the intestinal canal, where it is mixed with the pancreatic juice and the bile, and is still exposed to the same temperature and alternating pressure. The thinner parts of it are absorbed by the slender tubes termed the lacteals. The liquor thus absorbed, which is called chyle, is of a white color; it passes through the glands of the mesentery, then enters the thoracic duct, and is conveyed by it into the blood at the junction of the left jugular with the left subclavian vein. Chyle is an opaque milky fluid, mild to the taste. By standing for some time one part of it coagulates, another portion is coagulated by heat. The chyle, after mixing with the lymph conveyed by the absorbent vessels, is received into the blood, which has returned from the extreme vessels before this passes to the heart. All traces of it are very soon lost in the blood, as it mixes perfectly with that fluid. It is probable, however, that its nature is not immediately completely altered. The blood passing from the heart is conveyed to the lungs, where it circulates over a very extensive surface presented to the atmospheric air, with the intervention of a very thin membrane, which does not prevent their mutual action. During this circulation the blood loses a considerable quantity of carbon, part of which, it is probable, is derived from the imperfectly assimilated chyle, as this, originating in part from vegetable matter, must contain carbon in a larger proportion than even the blood itself.

Cialdini, Enrico (chē-äl-dē'nē), an Italian military officer; born in Castelvetro, Modena, Aug. 10, 1811. Designed for the medical profession, he studied at Parma, but by his share in the insurrection of 1831 was forced to escape to France. He joined the foreign legion raised by Dom Pedro against the Miguelists, but, in 1835 passing over to the Spanish service, he fought against the Carlists and was made colonel. When Charles Albert headed the Italian rising in 1848, he hurried to Italy; in the struggle which ensued he received a dangerous wound, and fell into the hands of the Austrians. On his release, he was employed by the Sardinian government to reduce the volunteers to discipline, and fought at the head of his new regiment in the brief campaign of 1849. In the Crimea he commanded a division of the Sardinian contingent; and on his return was appointed aide-de-camp to the King. He was intrusted by Cavour with the formation of the famous Cacciatori delle Alpi. In the war of 1859 the victory at Palestro was his chief exploit. In 1860 he defeated the Papal army at Castelfidardo; in 1861 Gaeta and Messina yielded to him. Created Duke of Gaeta, and for a few

months governor of Naples, he had to act against Garibaldi in the second Sicilian expedition (1862). In 1864 he became a Senator; and in the war of 1866 he occupied Venice almost without a blow. In 1876 he was sent as ambassador to Paris, but he retired in 1881, and received the post of one of the two generals of the army. He died Sept. 9, 1892.

Cibber, Colley, an English dramatist; born in London, Nov. 6, 1671; was one of the most successful staggers of plays in the history of the theater, and he saw every effect with the eyes of the audience. Hence his dramatic works—particularly "Love's Last Shift," a farce; "Love Makes a Man"; "She Would and She Would Not," and "The Careless Husband," comedies—are masterpieces of construction. He portrayed the fop with an infinite felicity; and not a few of his scenes are unexampled as specimens of effective action unmarred by meaningless detail. He died in London, Dec. 12, 1757.

His son, Theophilus, born in 1703, drowned in his passage to Ireland in 1757, was an actor and dramatic writer. He was much inferior to his father in capacity. Susanna Maria, wife of Theophilus, born in 1716, was one of the best actresses on the English stage. She was sister of Dr. Arne (composer of "Rule, Britannia"), who taught her music, and introduced her in one of his operas at the Haymarket Theater. She died in 1766.

Cibitu, a Northern island of the Philippine group, 14 miles long and 2 miles wide. It is flat, with a conical mountain in the center, 500 feet high. It is surrounded by coral reefs, with no anchorage to speak of. It was sold by Spain (with Caygayan) to the United States in 1900, upon payment of \$100,000, having been inadvertently excluded from the terms of the treaty of peace.

Cibrario, Luigi (chē-brär'yō), an Italian historian and politician; born in Turin, Feb. 23, 1802. He studied law, entered the service of the State, and soon distinguished himself by his historical investigations. In 1848, when Italy rose against the Austrians, Charles Albert appointed him commissioner at Venice and a Senator of Sardinia. In 1839 he published his "Della Economia Politica del Medio Evo," in 1840, his "Storia della Monarchia di Savoia"; and in 1847, his "Storia di Torino." In 1852 he was made Minister of Public Instruction, and ultimately, in 1855, Minister of Foreign Affairs. He published numerous other works on history, numismatics, and miscellaneous subjects. He died Oct. 1, 1870.

Cicada, a genus of homopterous insects, tribe *Cicadariae*, sub-tribe *Stridulantia*, or

it may be made a family *Cicadiidæ*. They have three *ocelli* or simple eyes, with the short antennæ in front. The tarsi are three-jointed. The male has a drum or musical apparatus placed in a cavity on each side of the abdomen, and concealed by scale-like plates. A muscle pulls the drum in and again lets it out with the effect of producing a sharp continuous sound. Familiar in the warmer parts of this country, the South of Europe, in India, in Bermuda, the West Indies, etc. The Greeks, who considered the *Cicadas* happy in having "voiceless wives," called the animal *Tettix*. The observation that the female *Cicadas* do not emit the sharp, continuous sound described is accurate. The grasshopper and *Cicada*, though popularly believed the same, are not given of the same order. The former belongs to the *orthoptera*, the latter to the *homoptera*. The former possesses mandibles, while the latter has a suctorial apparatus instead. The antennæ of the former are very long, and those of the latter very short. The former emits its voice by night, the latter in the brightest sunshine. Many other differences between the two exist. One American species of *Cicada*, *Cicada Septendecim*, appears only once in 17 years, hence it is popularly known as the 17-year locust. It is no more akin to the locust than to the grasshopper.

Cicatrization, the process of healing or skinning over of an ulcer or broken surface in the skin or in a mucous membrane, by which a fibrous material of a dense resisting character, covered by a protecting layer of epithelium, is substituted for the lost texture. The new tissue in such a case is called the *cicatrix*, and usually resembles to a considerable extent the structure which it replaces; it is, however, less elastic, and from its shrinking in volume may produce an appearance of puckering. This shrinking sometimes leads to serious results, especially after extensive burns. The glands and other special structures of the original tissue are wanting in the *cicatrix*, which, however, performs perfectly well, in most instances, the office of protection to the parts below the surface.

Cicely (sis'e-li), a popular name applied to several umbelliferous plants. Sweet Cicely, or sweet Chervil, is *myrrhis odorata*, a plant common in Great Britain and in other parts of Europe. It was formerly used in medicine, and in some parts of Europe is used as an ingredient in soups. Sweet Cicely is found in North American woods from Canada to Virginia.

Cicer, a genus of *leguminous* plants, sub-order *Papilionaceæ*, tribe *Vicieæ*. *C. arietinum*, the chick-pea, is a native of Egypt and the Levant. It is cultivated in the S. of Europe, in India, and elsewhere

It bears pale solitary violet flowers. A field in full bloom, and glistening with dew, is a beautiful spectacle, but an acid which it contains destroys the boot-leather of any one who, walking over it, treads it down. Anglo-Indians call the seeds, gram. They are used to some extent in India for feeding horses.

Cicero, Marcus Tullius, a Roman orator; born in Arpinum, in the year of Rome 647 (106 B. C.). His family belonged to the order of *equites*, but had always kept themselves aloof from public business and office. His father, who lived in retirement, devoted to literary pursuits, was the friend of the first citizens of the republic. Among this number was the celebrated orator Crassus, who himself attended to the education of the young Cicero and his brother Quintus, selected teachers for them, and directed their studies. The perusal of the Greek authors, together with poetry, oratory, and philosophy, occupied the first years of Cicero's youth. He wrote a great deal in Greek. His versification was good, but his poetical merits, on the whole, only moderate. His destination was to be first orator of Rome. In his youth he made one campaign under Sulla, in the Marsic war. After his return he availed himself of the instruction of the academician Philo, and of the celebrated orator Molo, and employed several years in acquiring the knowledge requisite for an orator. He witnessed the barbarities of Marius and Cinna, and the proscriptions of Sulla, after which the exhausted, blood-stained republic remained undisturbed under the yoke of its dictator. Cicero, at that time 26 years old, endowed with knowledge and genius, appeared before the tribunals, at first in civil suits, afterward in a criminal process, in which he defended Sex. Roscius of Ameria, who was accused of parricide by Chrysogonus, a freedman of Sulla. He conducted this defense with courage, confuted the accusers, and obliged the judges to acquit the accused. After this brilliant display he remained a year in Rome, and undertook another suit. His conduct in both instances must have displeased the dictator. But his debilitated health obliged him to travel; and he went to Athens, which was still the center of science (79 B. C.). Here he resided in the house of an academician, was visited by the philosophers of all the schools, and profited by the instruction of the masters of oratory. Thus he passed six months with his friend Atticus, in the enjoyment of literary pursuits. He also undertook a journey to Asia, and remained some time at Rhodes, where he likewise visited the most distinguished orators, and took part in their exercises. On his return to Rome his displays of eloquence proved the value of his Grecian instruction, and his rivals, Hor-

tensius and L. Aurelius Cotta, were forced to yield to him the palm of oratory. At last, at the age of 30, he engaged in public business. He became quæstor of Sicily during the prevalence of a scarcity of food at Rome, and managed to convey a large quantity of corn from thence to the capital, though it was difficult for him so to do without exciting the displeasure of the Sicilians. He afterward returned to Rome and appeared as an orator, defending the causes of private individuals merely for the sake of fame. It was an honorable day for Cicero when the ambassadors from Sicily appeared before him with the request that he would conduct their suit against their governor, Verres. He showed himself worthy of the confidence of an oppressed people, and appeared against this powerful robber after having himself collected proofs of his crimes in Sicily. He was opposed by the celebrated Hortensius. The crimes of Verres are painted in the liveliest colors in his immortal speeches. Seven are preserved, but only two of them were delivered. Hortensius was struck dumb by the force of truth, and Verres went into voluntary exile. After this suit Cicero was elected to the office of ædile (70 B. C.). Though possessed of only a moderate fortune, he managed by well-timed liberality to gain the affections of the people while he held this office, and at the close of 67 B. C. he was elected first prætor. But in order to obtain the consulship on which he had now fixed his eyes, it was necessary to obtain the friendship of the great. With this view he joined the party of Pompey, the head of the nobility and the first citizens of Rome. He became his panegyrist and most zealous adherent.

Catiline at that time began to plan his conspiracy against the republic. He was accused of extortion in his government of Africa, and Cicero was on the point of undertaking his defense when they became rivals, being both candidates for the consulship. Cicero's merit prevailed over Catiline's intrigues and the envy of his enemies. He was chosen consul unanimously, and entered on his office in 63 B. C., and then began the most splendid period of his political life. He succeeded in defeating the conspiracy of CATILINE (*q. v.*), after whose fall he received greater honors than had ever before been bestowed on a Roman citizen. He was hailed as the savior of the State, and the father of his country (*parens patriæ*), and thanksgivings in his name were voted to the gods. But Cicero's fortune had now reached the culminating point, and soon was to decline. The Catilinarian conspirators who had been executed had not been sentenced according to law, and Cicero as chief magistrate was responsible for the irregularity. When at the close of his consulship he stood up, according to

custom, to render an account of his administration, he was stopped by the tribune Metellus Celer, on the ground that having put Roman citizens to death without a hearing, he himself was unworthy of being heard. Accordingly he was only able to pronounce the celebrated oath, "I swear that I have saved the republic." Cæsar was always his opponent, and Pompey feared a citizen who loved liberty too much to be favorable to the triumvirs. Cicero saw his credit gradually decreasing, and even his safety threatened. He therefore occupied himself more than ever with science, wrote the history of his consulate in Greek, and composed a Latin poem on the same subject, in three books. At last the storm broke out. Clodius, Cicero's enemy, caused a law to be renewed, declaring every one guilty of treason who commanded the execution of a Roman citizen before he had been heard in his own defense. The illustrious ex-consul put on mourning, and appeared, accompanied by the *equites* and many young patricians, demanding the protection of the people. Clodius, at the head of armed adherents, insulted them repeatedly, and ventured even to besiege the senate. Cicero upon this went into voluntary exile, leaving Rome in 58 B. C., and ultimately took refuge in Thessalonica, with Plancus. Clodius in the meantime procured new decrees, in consequence of which Cicero's country seats were torn down, and a temple of freedom built on the site of his house at Rome. His wife and children were exposed to ill treatment.

While the accounts of these occurrences drove the unhappy man almost to despair, a change favorable to him was occurring in Rome. The audacity of Clodius became equally insupportable to all. Pompey encouraged Cicero's friends to get him recalled to Rome. The senate declared that it would not attend to any business till the decree which ordered his banishment was revoked. Through the zeal of the consul Lentulus, and at the proposition of several tribunes, the decree of recall passed the assembly of the people in the following year in spite of a bloody tumult, in which Cicero's brother Quintus was dangerously wounded. Cicero returned after an absence of 10 months. The assembled senate received him at the gates of the city, and his entry resembled a triumph. But all power at Rome was now in the hands of the triumvirs Crassus, Pompey, and Cæsar, and for the next few years Cicero had to be more of an onlooker than an actor, and even submitted to praise and flatter what he disliked and despised. To oblige Pompey he defended Vatinius and Gabinius, two citizens of bad character, who had shown themselves his implacable enemies. At the age of 54 he entered the college of the augurs. The death of the turbulent Clodius, who

was slain by Milo, delivered him from his most dangerous opponent. He defended the perpetrator of this act, who was his friend and avenger, in a beautiful speech; but the presence of Pompey's soldiers, and the tumult of the friends of Clodius, confused him while delivering it. At this period the senate appointed him governor of Cilicia (52 B. C.). Cicero conducted a war while in this office with good success, repulsed the Parthians, and was greeted by the soldiers with the title of imperator. As soon as his term of office had expired he returned to Rome (Jan. 49 B. C.), which was threatened with serious disturbances owing to the rupture between Cæsar and Pompey. Dreading the horrors of a civil war, he endeavored in vain to reconcile the rivals. Cæsar advanced toward Rome, and Pompey was forced to flee with the consuls and the senate. Cicero, not anticipating this sudden approach of Cæsar, was still in Italy. Cæsar saw him at Formiæ, but was not able to gain him over; for although convinced that the party of Cæsar was likely to prevail, and although his son-in-law, Dolabella, was one of Cæsar's confidants, he was prompted by his sense of honor to return to Pompey. After the battle of Pharsalia and the flight of Pompey he refused to take the command of some troops who had remained at Dyrrhachium, but returned to Italy, which was governed by Cæsar's representative, Antony. This return was attended with several unpleasant circumstances, until the conqueror wrote to him, and soon after received him graciously (47 B. C.).

Cicero now devoted himself entirely to literature and philosophy. He was divorced from his wife, Terentia, to enable him to marry Publilia, a beautiful and rich heiress, whose guardian he was; but this union was not happy, and was speedily dissolved. In 45 B. C. the death of his daughter Tullia occurred, and affected him very painfully, as he had been devotedly attached to her. The assassination of Cæsar opened a new career to the orator. He hoped to regain great political influence. The conspirators shared with him the honor of an enterprise in which no part had been assigned him; and the less he had contributed to it himself, the more anxious was he to justify the deed, and pursue the advantages which it offered. But Antony took Cæsar's place. Even in this turbulent year Cicero found leisure for literary occupations, and, among other labors, completed his work "*De Gloria*," which was lost as late as the 14th century. He determined on going to Greece, where he could live in safety; but he soon returned to Rome, and composed those admirable orations against Antony, delivered in 43 B. C., which are known to us by the name of "*Philippics*," and which are equally distinguished for eloquence and

patriotism. His implacable enmity toward Antony induced him to favor young Octavianus, who professed to entertain the most friendly feelings toward him. With him originated all the energetic resolutions of the senate in favor of the war, which the consuls and the young Cæsar were conducting, in the name of the republic, against Antony. Octavianus having possessed himself of the consulate, and formed an alliance with Antony and Lepidus, after the death of the two consuls, the power of the senate and of the orator yielded to the arms of the triumvirs. Cicero was at last convinced that liberty was at an end. At Tusculum, whither he had retired with his brother and nephew, he learned that his name, at Antony's demand, had been added to the list of the proscribed. He repaired in a state of indecision to the sea coast, and embarked. Contrary winds drove him back to the shore. At the request of his slaves he embarked a second time, but soon returned again to await his fate at his country seat near Formiæ. "I will die," exclaimed he, "in my country, which I have more than once saved." His slaves, seeing the neighborhood already disturbed by the soldiers of the triumvirs, endeavored to convey him away in a litter, but soon discovered the murderers at their heels. They prepared for combat; but Cicero, who felt that death was unavoidable, ordered them to make no resistance, bent his head before Popilius, the commander of the murderers, who had once been saved by his eloquence, and suffered death more courageously than he had borne misfortune. He died in his 64th year, A. U. C. 711 (43 B. C.). His head and hands were, by the orders of Antony, affixed to the same rostrum from which the orator, as Livy says, had poured forth eloquence unequalled by any human voice.

Cicero's eloquence has always remained a model. After the revival of learning he was the most admired of the ancient writers; and the purity and elegance of his style will always place him in the first rank of Roman classics. The style of his philosophical writings, without oratorical ostentation, breathes the pure Attic elegance which some of his contemporaries wished also to see in his orations. The orator is seen, however, in his prolix and comparatively unanimated dialogues. His philosophical works, the principal part of the contents of which is taken from the Greek, and which combine academic and stoic doctrines and principles, possess very unequal interest for us. Thus, for example, his work "*De Natura Deorum*" is for us only a collection of errors; the "*Tusculanæ Quæstiones*" are full of the subtleties of the Athenian school; his work "*De Finibus Bonorum et Malorum*" likewise belongs to this somewhat dry dogmatic

philosophy. On the other hand, his works on practical morals have maintained their full value. The book "De Officiis" is to this day the finest treatise on virtue inspired by pure human wisdom. The pleasures of friendship and old age have likewise been excellently set forth in "De Amicitia" and "De Senectute." Of his political work "De Republica," a considerable part was brought to light by Mai, and published in Rome in 1822. Cicero wrote the six books "De Republica" in his 54th year. In these he endeavored to show by what policy, what resources, and what morals, Rome had obtained the dominion of the world. Cicero's works "De Divinatione" and "De Legibus" are instructive monuments of antiquity. The same philosophical spirit is evident in all his oratorical treatises, particularly in the most important of them, "De Oratore," although this contains as little of utility for us as the "Claris Oratoribus," "Topicis," "De Partitione Oratoria," etc. The most interesting of all Cicero's works for posterity are his "Epistolæ Familiares" and "Ad Atticum," which give a more exact and lively idea of the state of the republic than any of his other works, and display most strongly the characteristic traits of the author.

Cichorium, succory or chicory, a genus of Composite plants. *C. intybus*, distinguished by having the lower leaves runcinate and the heads usually in pairs, is the origin of the cultivated chicory. It is found wild in Europe, in North Africa, in Siberia, and the N. W. of India. The roots are boiled and eaten, or they are dried and used as coffee. *C. endivia* is the common endive. It is extensively cultivated in Europe, into which it was introduced from its native country India, in many parts of which it is called *Kasnee*. Properly speaking, succory consists of the blanched leaves of *C. intybus* and endive those of *C. endivia*.

Cicuta, the water hemlock, or cowbane. A genus of plants, order *Umbelliferae*. It has compound umbels with many rays; few or no bracts, but many small bracteoles. The flowers are white, the fruit orbicular, or broadly ovoid. *C. maculata*, which has doubly serrate lanceolate leaflets, is a tall plant of three or four feet high, found by roadsides or the margins of lakes in this country. It is a deadly poison.

Cid, The, Don Rodrigo (Ruy) Diaz, Count of Bivar; born in 1026. The model of the heroic virtues of his age, and the flower of Spanish chivalry, styled by his enemies, the Moors of Spain, *el seid* or *cid* (the lord), and by his king and countrymen *Campeador* (champion), he continues to live in the poetry of his country. Rodrigo loved and was beloved by Ximena, daughter of Lozano, Count of Gormaz, who,

with Diego, the father of Rodrigo, excelled all the knights at the court of Ferdinand I. of Castile. The envy of Gormaz at Diego's superior estimation at court produced a dispute between the two which led to a duel. Gormaz vanquished the old Diego, and insult being added to this disgrace Diego demanded from his son the blood of the offender. In the contest between honor and love the former prevailed in the breast of the youth, and Gormaz fell. Ximena, unfortunate as a daughter and a mistress, could no longer listen to the voice of love; it became necessary for her to demand vengeance on the object of her affections. But no champion was found to meet the young hero; and nothing but the discharge of the important duties which devolved upon him could preserve him from sinking under his despair. Five Moorish kings appeared in Castile; devastation and death accompanied their progress. Rodrigo, who was not yet 20 years of age, threw himself on his noble horse Babieca, and at the head of his vassals went to meet the enemy, who soon ceased to be the terror of the country. The young hero sent the five captive kings to Ferdinand, who, as a reward for his bravery, gave him Ximena, and united those whom the decrees of fate seemed to have separated for ever. Ferdinand added Galicia, Leon, and Ovideo to Castile, and posterity calls him the Great; but it was Rodrigo who gained him the name. A quarrel having arisen between Ferdinand and King Ramiro of Arragon concerning the possession of Calahorra, the latter challenged him to single combat, and appointed for his substitute the knight Martin Gonzalez. Ferdinand chose the Cid for his champion, and by this means obtained Calahorra. Ferdinand in his will divided his dominions among his sons. This division caused a war between the brothers, in which Sancho was victorious; this success was owing to the Cid, to whom he had given the command of his forces. Alfonso was taken prisoner, Garcia brought ruin upon himself by his own imprudence, and it remained only to overcome the obstinate resistance of Zamora, where Sancho's sister Urraca ruled. Before the walls of this city Sancho was assassinated, and Alfonso was called to the throne. It is related in the ballads that the Cid, appointed by the States of Castile to read the oath of purification before the new king, on account of the murder of Sancho, read with such impressive solemnity that Alfonso shuddered, but was also offended.

The story of this warrior requires a critical examination, especially in relation to his marriage. According to history Alfonso married him to Donna Ximena, his niece (in 1074), and consequently it seems we must consider him twice married. John

von Müller, the German historian, supposes that the daughter of the proud Gormaz may have been his first Ximena. However that may be, it is certain that the Cid, notwithstanding the important services which he rendered to his king, often experienced the inconstancy of royal favor. A man like him, of strict integrity and virtue of an inflexible and lofty spirit, who despised an effeminate life, was not fitted for courts. His true friend and brother in arms, Alvaro Hanez Minaya, his wife and child, were his world. The gravity of his countenance excited respect and reverence; his retired life afforded room for the slanders of the courtiers; and he was exposed to frequent reproaches. But in times of necessity his assistance was again sought, and he was too generous to remember past offenses. The king finally took from him all that he had given him, wife and treasures; but from shame or fear he afterward restored Ximena. Disgraced, plundered, forced to depend on himself alone, Rodrigo was now happier and greater than before. Ever true to his country and his religion, he raised an army by the reputation of his name alone to subdue the Moors in Valencia. In the midst of his career of conquest he hastened to the assistance of his king, who was hard pressed by Joseph, the founder of Morocco; but the only return for his generosity was new ingratitude. He therefore departed by night with his most trusty followers, and, forsaken and ill-provided, fled from the king. He, however, remained true to himself, and fortune to him. His magnanimity again overcame the king. Permission was given to all to join the forces of the Cid, who still maintained the cause of Spain with distinguished success.

From this time he was never estranged from him, although he unintentionally promoted the machinations of his enemies. Two brothers, counts of Carrion, had resolved, by a marriage with the daughters of the Cid, to obtain possession of his wealth. The king himself promoted their suit, and the Cid yielded to his wishes. With Donna Elvira and Donna Sol they received likewise the great treasures which the arms of the Cid had won. But scarcely had they dismissed their attendants, when, in a wild, mountainous desert, they stripped the garments from the persons of the ladies, beat them till pain choked their cries, tied them to two trees, and departed with the money. A trusty servant whom the Cid had sent after them delivered the ladies from their wretched situation, and the vile deed was brought to light. The Cid demanded justice. Alfonso summoned all the vassals of Leon and Castile to a high court of justice at the city of Toledo. The Cid demanded the restoration of his treasures, and opportunity to take vengeance for the insult by the champions he should name. They

sought to avoid the combat, but the king insisted on it. With ill-concealed fear they rode to the lists; the knights of the Cid overcame both them and their uncle; their dishonored lives were spared. The last exploit of the Cid was the capture of Saguntum (Murviedro), after which he died at Valencia, in the 74th year of his age (1099). What this hero won, and for many years defended, the united power of Leon and Castile was scarcely able to preserve against the encroachments of the infidels. His dead body was mailed and mounted on his favorite steed and marched out against the enemy, who fled at its approach. He was buried at the convent of San Pedro de Cardeña, in Castile, in a tomb which was honored by emperors and kings.

The adventures of the Cid, particularly his banishment and return, are the subjects of the oldest Castilian poem, probably composed at the end of the 12th century, "Poema del Cid el Campeador," which was first published in the "Coleccion de Poesias Castellanas anteriores al Siglo XV.," of Sanchez, in 1775; but the best edition of which is that of Ilinard (Paris, 1858). The later ballads which commemorate the hero, were at the beginning of the 16th century collected by Fernando del Castillo, and in 1614 again published by Pedro de Florez in the "Romancero General." There has also been published a collection by Escobar—"Historia del muy noble y valeroso Caballero el Cid Ruy Diaz, en Romances" (Lisbon, 1615; Seville, 1632). Whatever chronicles and songs have conveyed to us of the history of the Cid, is collected in the "Chronicle of the Cid," from the Spanish, by Robert Southey (London, 1808).

Cider, a liquor made from the juice of apples. The quality of this popular beverage depends principally on the following particulars, viz., (1) kind of fruit; (2) condition of the fruit when ground; (3) manner of grinding and pressing; (4) method of conducting the requisite fermentation, and precautions to be taken against its excess.

1. The characteristics of a good cider apple are a red skin, yellow and often tough and fibrous pulp, astringency, dryness, and ripeness at the cider-making season. When the rind and pulp are green, the cider will always be thin, weak, and colorless; and when these are deeply tinged with yellow, it will, however manufactured, or in whatever soil the fruit may have grown, almost always possess color and either strength or richness. The most certain indications of the ripeness of apples are the fragrance of their smell and their spontaneously dropping from the trees. When they are in this state of maturity on a dry day (all the better if the weather is cold and bracing), the limbs may be slightly shaken and partly disburdened, thus taking such apples only as are ripe. They must be care-

fully gathered to avoid bruising, as mold rapidly fixes on the edges of every wound of a fruit gathered in autumn, and communicates a disagreeable flavor to the juice. The only artificial criterion employed to ascertain the quality of an apple for cider is the specific gravity of its must, or unfermented juice; or the weight compared with that of water. This indicates with very considerable accuracy the strength of the future cider. Its weight and consequent value are supposed to be increased in the ratio of the increase of saccharine matter. The strongest and most highly flavored cider which has been obtained from the apple was produced from fruit growing on a shallow loam, on a limestone basis. All the writers on the subject seem to agree that calcareous earth should form a component part of the soil of a cider orchard. A dry and somewhat loose soil is recommended.

2. *Condition of the Fruit.*—Each kind of apple should be manufactured separately, or at least those kinds only should be mixed which ripen about the same time. The longer the fruit remains on the tree without decay or being injured by frost the better, for not only is the perfect maturity of the juice an important consideration, but the colder the weather, short of actual frost, the more quiet and equable will be the fermentation. When gathered the apples must be carefully stored in some shady cool room, placed in heaps, where they undergo a further ripening, acquiring more saccharine matter and losing a considerable quantity of watery juice.

3. *Grinding, etc.*—This operation should be deferred till December, if possible; at whatever period it takes place it is absolutely essential that the weather should be cold, even slightly frosty, to counteract the tendency to rapid fermentation. The apples should be reduced by the mill as nearly as possible to a uniform mass, in which the rind and seeds are scarcely discoverable, and the pomace should be exposed to the air. It has been ascertained that, by exposing the reduced pulp to the operation of the atmosphere for a few hours, the specific gravity of the juice increases from 1.064 to 1.078. For fine cider the fruit should be ground and pressed imperfectly, and the pulp then exposed 24 hours to the air, being spread and once or twice turned, to facilitate the absorption of oxygen; it should be then ground again, and the expressed juice added to it before it is again pressed. The ordinary mill used by farmers in the cider districts consist of a heavy cylindrical stone 3 or 4 feet in diameter and about 1 foot thick, which is made to revolve and rub along in a circular trough in which the apples are placed. But a more perfect method is to employ cylindrical rollers placed so near each other as to crush the pips. They are fed from a hop-

per above them, from which the apples pass between a pair of fluted or toothed cylinders, by which they are torn and partially crushed before reaching the more perfectly crushing apparatus below. The mass is then put into haircloths and powerfully pressed, and the liquor is run into casks.

4. *Fermentation.*—The vinous fermentation commences and terminates at different periods, according to the condition and quality of the fruit and the state of the weather. The best criterion to judge of the proper moment to rack off (or draw the liquor from the scum and sediment) will be the brightness of the liquor which takes place after the discharge of fixed air has ceased and a thick crust is collected on the surface. The clear liquid should then be drawn off into another cask. If it remains bright and quiet, nothing more need be done to it till the succeeding spring; but if a scum collects on the surface it must immediately be racked off again.

Among the precautions used to prevent excessive fermentation is stumming, which is fuming the cask with burning sulphur. This is done by burning a rag impregnated with sulphur in the cask in which the liquor is to be decanted, after it has been partly filled, and rolling it so as to incorporate the liquor with the gas.

Cienfuegos (thē-en-fwā'gōs), a port and town of Cuba, on the S. coast, at the mouth of Iagua bay, 140 miles from Havana. Cienfuegos is the center of the Cuban sugar trade, and is connected by rail with Havana. There are soap and ice plants and some trade in rum and molasses. The sanitary condition, though backward, is improving. Pop. (1899) 59,128.

Cigar, less frequently **SEGAR**, a small roll of manufactured tobacco leaves carefully made up, and intended to be smoked by lighting at one end and drawing the smoke through it. The choicest cigars are those made in Havana and Key West, Fla. British cigars are largely made in imitation of the foreign brands, but they have never equalled the latter in quality. Good cigars are also made in the United States and elsewhere. Medicated cigars, or cigars made of some substance having remedial properties, are often used for certain complaints, as stramonium cigars for asthma.

Cilia, the hair which grows from the margin of the eyelids. The term is also applied to microscopic filaments, or plates which project from animal membranes and are endowed with quick vibratile motion. In most of the lower animals the respiratory function is effected by means of the vibratile cilia. In botany the word is applied to the long hairs on the margin of a vegetable body, as on the leaves of the *Sempervivum tectorum*.

Cilicia

Cilicia, an ancient division of Asia Minor, now included in the Turkish province of Adana, which lay between the Taurus range and the Cilician sea, while the Amanus range separated it from Syria. The E. portion of Cilicia was fertile in grain, wine, etc.; the W. and more mountainous portion furnished inexhaustible supplies of timber to the ancients. The pass called by the Turks Gölek Boghaz (anciently Pylæ Ciliciæ) is that by which Alexander the Great entered Cilicia. In early ages Cilicia was ruled by its own kings, the people, who were probably akin to Syrians and Phœnicians, being notorious pirates. The country fell successively under Persian, Macedonian, and Syrian rule, and was made a Roman province by Pompey in 67 B. C.

Cimabue, Giovanni, one of the restorers of the art of painting in the Middle Ages; born in Florence in 1240; renounced his studies to follow his inclination for painting. Two Greek artists, who were invited to Florence by the Senate to paint a chapel in the Church of Santa Maria Novella, were his first masters. Although these artists handled the pencil awkwardly, they, however, taught him, according to ancient tradition, the proportions which the Greek artists had observed in their imitations of the human figure. Attentive to their instructions, Cimabue studied principally the fine antique statues. He was the first to point out to succeeding painters the elements of the beau ideal, the memory of which had been extinguished during several centuries of disorder. His paintings are, properly speaking, only monochromes. But these faults, which are to be attributed to the infancy of the art, are compensated for by beauties of a high order—a grand style, accurate drawing, natural expression, noble grouping, and a fine disposition of his drapery.

The best paintings of Cimabue are in the Church of Santa Maria Novello at Florence, and in the Sacro Convento at Assisi. He may be called the link between the ancient and modern schools of painting. Cimabue evinced a generous appreciation of Giotto, whom tradition says he discovered drawing figures on the smooth surface of a rock while tending his sheep, and whom he took with him to Florence, and instructed with such success that the pupil soon excelled his master. He is said to have died about 1302. See PAINTING.

Cimarrones (thē-ma-rō'nās), a word derived from the Spanish word *cimarron*, meaning wild, untamed, from which comes the English words *maroon*, *marooners*. It was used in the Spanish colonies of America for fugitive slaves, of whom in the 16th century many hundreds collected on the Isthmus of Panama, where they built

Cimbri

walled towns, attacked the Spanish settlements, and became a terror all over the country. In 1572 they became associated with the English adventurer Drake, and aided his buccaneers in their forays. They finally became amalgamated with the Indian tribes.

Cimarosa, Domenico (chē-mār-ō'să), an Italian composer; born in Aversa, Dec. 17, 1749. He was the son of a workman, but early evinced great musical ability and was given a free scholarship at the Conservatory of St. Maria. He became famous when 21 with a comic opera, "The Pretended Parisian." In the ensuing 30 years he wrote over 80 comic operas, the most famous being "The Secret Marriage," a work which eclipsed by its success the fame of Mozart. As a writer of comic operas Cimarosa has never been surpassed and some critics have ranked him above all musicians as a composer of light pieces. He died in Venice, Jan. 11, 1801.

Cimbri, a warlike Celtic tribe, inhabiting Jutland. Having joined the Teutones and entered Illyria, they there defeated Cn. Papirius Carbo, at the head of a consular army, B. C. 113. After this triumph they advanced into Gaul, B. C. 112, passed into Spain, and reappearing in the frontiers of Transalpine Gaul, defeated two Roman armies B. C. 109 and 107. They inflicted a terrible defeat at Aurausio on another Ro-



MADONNA DI RUCELLAI BY CIMABUE.

man army led by two consuls, Oct. 6, B. C. 105, after which they withdrew into Spain. The Celtiberians drove them out B. C. 103; whereupon the Cimbri returned into Gaul. Marius collected a large army and went to oppose them. The Cimbri and Teutones separated into two bodies, the former tak-

ing the road through Helvetia, and the latter pressing forward to assail the Roman army. Their intention was to reunite their forces on the Lombard plains. The Teutones were attacked and overwhelmed by the Romans, and 100,000 men are said to have perished on that occasion, B. C. 102. The Cimbri in the meantime had reached the valley of the Adige, where they defeated the Roman army under Quintus Catulus. He formed a junction with Marius and allured them into an unfavorable position, in which they were defeated and exterminated, B. C. 101. The women, having put their children to death, committed suicide.

Cimbrian Panic, The, a Roman panic after the annihilation of five armies by the Cimbrians (B. C. 105). This panic rose to its climax after the terrible defeat of Cæpio, the consul in Gallia Narbonensis.

Cimburgis Lip, The, a protruding under-jaw, with a heavy lip indisposed to shut close, often called the "Austrian Lip." It came from Kaiser Maximilian I., and was inherited from his grandmother, Cimburgis, a Polish princess, who married Kaiser Friedrich III.

Cimex, a bug; a genus of *hemipterous* insects, the typical one of the family *Cimicidæ*. *Cimex lectularius* is the bed-bug. There are analogous species parasitic on pigeons, swallows, and bats.

Cimmerian Bosphorus, an ancient name for the Strait of Kaffa.

Cimmerii, or Cimmerians, a nomadic race, inhabiting the Crimea and parts of the neighboring country, having been expelled by the Scythians, passed along the shores of the Euxine, invaded Asia Minor, and pillaged Sardis, the capital of Lydia, B. C. 635. In that country they were said to have remained until about B. C. 617, when they were defeated and driven out of Asia Minor. Little authentic is known of this people. Homer refers to another people of the same name, fabled to have dwelt in a land of perpetual darkness. Hence the term "Cimmerian gloom."

Cimolite, a light gray, white, or reddish silicate of alumina, occurring sometimes massive, or of a slaty texture. It is very soft. Sp. gr. 2.18-2.30. Composition: Silica, 62.30-65.93; alumina, 20.97-24.23; sesquioxide of iron, 0-1.25; water, 9.31-12.34. It occurs at Argentiera; also at Nagpore, Central India, and in some parts of Russia. The Nagpore specimens have been called also Hunterite.

Cimon, an ancient Athenian general and statesman, was a son of the great Miltiades. He fought against the Persians in the battle of Salamis (480 B. C.), and shared with Aristides the chief command of the fleet sent to Asia to deliver the Greek colonies

from the Persian yoke. The return of Aristides to Athens soon after left Cimon at the head of the whole naval force of Greece. He distinguished himself by his achievements in Thrace, having defeated the Persians by the Strymon, and made himself master of the country. He conquered the pirate-island of Scyros, subdued all the cities on the coast of Asia Minor, pursued the Persian fleet up the Eurymedon, destroyed more than 200 of their ships, and then, having landed, on the same day entirely defeated their army (B. C. 469). He employed the spoil which he had taken in the embellishment of Athens, and in 463 re-



CINCHONA LANCIFOLIA.

duced the revolted Thasians; but the popular leaders, beginning to fear his power, charged him on his return with having been corrupted by the King of Macedon. The charge was dropped, but when Cimon's policy of friendship to the Lacedæmonians ended in the latter insulting the troops sent by Athens to their aid, his opponents secured his banishment. He retired into Bœotia, and his request to be allowed to fight with the Athenians against the Lacedæmonians in 457 at Tanagra was refused by the suspicious generals. Eventually Cimon was recalled at the instance of Pericles to conclude a peace with Lacedæmon. He died shortly after, in 449, while besieging Citium in Cyprus.

Cinchona, a genus of trees found exclusively on the Andes in Peru and adjacent countries, and recently introduced into India, producing a medicinal bark of great value known as Peruvian bark, Jesuit's bark, etc. The Jesuits introduced it into Europe. There are many species of the genus.

Cinchona Bark

Cinchona Bark, the bark of several species of *Cinchonaceæ*, used in medicine, or for the extraction of the alkaloids, quinine, cinchonine, etc., which they contain. The following are the most important: *C. flava cortex*, yellow chinchona bark, which occurs as quills covered with a brown epidermis, mottled with whitish yellow lichens, and also in flat cinnamon-colored pieces. They break with a fibrous fracture and the escape of a powder. Yellow bark is rich in quinine, and 100 grains should yield not less than two grains of alkaloid. It is derived from *C. calisaya*, which grows in the peculiar cloudy regions of the Andes. *C. pallidæ cortex*, pale chinchona bark, from *C. condaminea*. It occurs always in quills, covered with crustaceous lichens. Its fracture is short and not fibrous. It contains chiefly cinchonine. Two hundred grains of the bark yield about one grain of alkaloid. *C. rubræ cortex*, red cinchona bark. The bark of *C. succirubra*. This species appears to thrive in India. It occurs in flattened rough-fibrous, dark-brown red pieces, which are covered with a brown-red epidermis. It breaks with a red fibrous fracture. It contains about equal quantities of cinchonine and quinine, and 100 grains of the powdered bark should yield not less than one and one-half grains of alkaloid. The yellow bark is used in the form of decoction, extract, infusion, and tincture. The pale bark is contained in *tinctura cinchonæ composita* and in *mixtura ferri aromatica*. The cinchona barks contain, besides the alkaloids, also certain acids having astringent properties, and are valuable as tonics in cases of great debility. Cinchona barks rich in quinine generally contain much lime, and their solutions are precipitated by sodium sulphate. Cinchona barks are examined as follows: 100 grains of the yellow bark are reduced to powder, and are thoroughly exhausted by boiling, maceration, and percolation, with water acidulated with hydrochloric acid. The coloring matter is precipitated from the liquid by adding plumbic acetate, the solution being kept acid. It is then filtered, and to the filtrate caustic potash is added till the precipitate first formed by it is redissolved. This solution is then shaken with successive quantities of ether, till a drop of the ether evaporated to dryness leaves no residue. The ether solutions are then evaporated to dryness, and the residue of alkaloids is weighed. In testing the pale and red barks use chloroform instead of ether. When a bark containing quinine or cinchonine is heated in a test-tube a characteristic red vapor is given off, condensing to a carmine red liquid.

Cinchonism, a group of symptoms, chiefly connected with the nervous system, produced by the presence of quinine in the

Cincinnati

system. There are noises in the ears, resembling a distant waterfall or of a humming character, the ringing of bells, or the striking of a clock. These noises are accompanied with more or less deafness, which is sometimes complete. Affections of sight are less common, such as optical illusions, intolerance of light, and even blindness, giddiness, and headaches, and sometimes fainting. These symptoms usually pass away in a few days after discontinuing the drug.

Cincinnati, a city of Ohio, the second city in the State, county-seat of Hamilton co. It is situated near the S. W. corner of the State, on the N. bank of the Ohio river, nearly midway between its origin at Pittsburg and its mouth at Cairo, Ill., about 465 miles by water from each, and 138 miles by water from Louisville; and directly, 214 miles S. W. of Cleveland, 220 miles S. by W. of Detroit, 250 miles S. E. of Chicago, 45 miles N. E. of Louisville, and 300 miles E. by N. of St. Louis. Its extreme length from E. to W. is over 10 miles; its extreme width from N. to S., nearly 7 miles; its area, 42½ square miles; and its population was estimated in 1907 at nearly 348,000. The city is surrounded by a large number of populous suburbs, among which Dayton, Bellevue, Newport, Covington, and Ludlow are on the Kentucky side of the Ohio. Newport and Covington are situated opposite the main portion of Cincinnati, on opposite sides of the Licking river, which is spanned by a suspension bridge; they are themselves considerable cities, and contain the homes of many Cincinnati merchants. Fort Thomas, an important depot of the United States Army, is behind Newport, Ky., on picturesque hills overlooking the river. Popular summer pleasure resorts are the Lagoon, with park and lake, on the Kentucky shore, opposite Price Hill (see *Topography*); Coney Island, 10 miles up the river; and Chester park, in the N. part of the city.

Bridges.—The city is connected with its Kentucky suburbs by five bridges, from 1,489 to 1,648 feet in length, exclusive of approaches. The Louisville and Nashville railroad bridge, of wrought iron, resting on stone piers, and Central bridge, a fine cantilever, connect with Newport. Covington is also joined to Cincinnati by two bridges—the great wire suspension bridge, completed in 1867 at a cost of \$1,800,000, and rebuilt and enlarged in 1897 at an additional outlay of \$500,000, 2,720 feet long, with a span of 1,005 feet between the towers, 52 feet wide, and 103 feet above water; and the cantilever of the Chesapeake and Ohio railroad. The truss bridge of the Cincinnati Southern railroad, to Ludlow, was erected at a cost of \$3,348,675.

Topography, Streets, etc.—The city is laid out in an irregular block along the

Ohio, which sweeps past in a series of curves, of which the greatest is to the E., thus extending its river frontage to over 14 miles. Its main portion occupies two terraces, the lower one being a bluff about 65 feet above low water, and the upper from 50 to 100 feet higher. They are surrounded by a semicircle of hills about $2\frac{1}{2}$ miles in diameter, which approach close to the river both E. and W., and whose summits—Mount Lookout in the N. E., Mount Auburn in the N., Mount Adams in the S., Fairview Heights in the N. W., and Price Hill in the S. W.—rise from 150 to 300 feet above the second terrace, or about 475 feet above the river level. The W. portion of the city is cut through by the gently sloping valley of Mill creek, over half a mile wide in its narrowest part, through which pass highways, railroads, and the Miami and Erie canal, and along which the city has pushed up much further to the N. than in any other direction. It was a most important factor in determining the location of the city. Railroads also enter through the hollow between Mount Auburn and Walnut Hills, as well as through the narrow level along the river, below the bluffs.

This bottom level is the seat of the river shipping business, warehouses, manufacturing establishments, and the slum quarters. It has been repeatedly inundated by the Ohio during periods of high flood, when the rise of the river sometimes exceeds 60 feet. The broad levee or "public landing," fronting the mouth of the Licking, is 1,000 feet long, and with its floating docks and wharf-boats presents a busy, animated scene. The central portion of the city, largely devoted to business, is compactly built. Its streets are straight and regular, generally cross at right angles, and average 66 feet in width. Fountain square, an extension of Fifth street, is the converging point for most of the street car lines, and is in the heart of the business district. "Over the Rhine" is the popular designation for the section to the N. of the business district, beyond the eastward bend of the canal, largely occupied by Germans. The best residential sections are on the hills surrounding the original site. They present a highly picturesque aspect with their ravines, steep approaches, inclined-plane cable railways, primeval woods, much of which has been left intact, and miles of fine houses, with extensive grounds, lawns, shrubbery, and flower gardens. The houses display a great variety of design. The building materials mostly consist of brick, a freestone found near at hand, and a blue limestone quarried within the city limits. Clifton Heights, to the N., and Avondale and Walnut Hills to the E. of them, are particularly noteworthy among the residential districts for their scenic beauty and magnificent houses.

Parks and Cemeteries.—The park sys-

tem embraces 540 acres, distributed among three large parks on the hills, and seven smaller ones in the more populous sections. The largest is Eden park (216 acres), on Mount Adam, overlooking the river. It contains the two main reservoirs, a high water tower commanding a fine prospect, the beautiful buildings of the Art Museum and School, and the Rookwood Pottery, famous for its faience. The gateway of Elsinore, on Gilbert avenue, is towered in the mediæval style. Almost exactly in the center of the city is Burnet Woods, a natural forest of 160 acres, containing an exquisite lake. In its S. portion are the handsome new buildings and grounds of the University of Cincinnati (30 acres). The Zoölogical Garden (60 acres) is to the N. E., with a fine collection.

There are over a score of cemeteries, the most beautiful and extensive of which is Spring Grove (600 acres), in the N., reached by an avenue 100 feet wide. It contains a bronze statue in memory of the Ohio volunteers who died in the Civil War, and several costly monuments and mausoleums.

Buildings and Monuments.—The most notable public buildings are the Federal building (post office, custom house, courts), of brick and iron, with freestone facing, in the Roman-Corinthian style, erected at a cost of \$5,200,000; the county court house, Romanesque, with the jail in the rear, occupying an entire square; the city hall, of brown granite and red sandstone, 332 feet by 203, with a lofty tower, completed in 1893 at a cost of \$1,267,000; the City Hospital, consisting of eight buildings around a central court, covering a square of nearly four acres, and accommodating 700 patients; the public library, Romanesque; and the music hall and exposition building (500 feet by 300, with a seating capacity of over 4,000, and one of the largest organs in the country), founded and partly endowed by Reuben Springer, where the biennial music festivals are held. Perhaps the most beautiful building in the city is the Chamber of Commerce, one of H. H. Richardson's last designs, monumental in effect. Other buildings deserving of mention are the Masonic Temple (Byzantine), Odd Fellows' Temple, Y. M. C. A. building, St. Francis Xavier College, and the Museum of Natural History. Of modern buildings may be mentioned the Lafayette, Payne's, First National Bank, Third National Bank, Union Trust, Traction, Mercantile Library, and Ingalls, the last mentioned, of 14 stories, being the highest wholly concrete structure in existence. There are also a number of fine theaters, hotels, and club houses.

One of the finest public art works in the country is the Tyler Davidson Fountain, on Fountain square, surrounded by an esplanade. It includes 15 bronze figures, the surmounting one representing a female with

outstretched arms, reaching a height of 45 feet above ground, from whose fingers the water falls in fine spray. It was designed by August von Kreling, cast at Munich, and presented to the city by Henry Probasco in 1871. There are statues of Lincoln, Garfield, McCook, and Hecker, and an equestrian statue of President William Henry Harrison, first governor of Ohio.

Churches and Charities.—The various denominations are represented by about 300 churches, nearly two-thirds of which are Protestant. The city is the seat of a Roman Catholic archbishop and a Protestant Episcopal bishop. The finest church edifices are St. Peter's Cathedral (R. C.), with a spire 224 feet high, and Murillo's alleged original "St. Peter Delivered" as altarpiece; St. Paul's Cathedral (P. E.), and the Synagogue near by, all on Plum street; the First Presbyterian, with a tower and spire 285 feet high; St. Francis de Sales (R. C.), on Walnut Hills, with a 15-ton bell, the largest in America; the Unitarian, Ninth Street Baptist, St. Paul's (M. E.), Christ's (P. E.), Second Presbyterian, St. Francis Xavier (R. C.), adjacent to the college of the same name, and the Church of the New Jerusalem (Swe.).

Among the 17 hospitals, public and private, there are the City, Good Samaritan and St. Mary's, both Roman Catholic, Presbyterian, Jewish, Bethesda, United States Marine, Ohio Hospital for women and children, Longview Asylum for the insane, at Carthage, 10 miles from the city; Laura McDonald Memorial, Elizabeth Gamble Deaconess Home and Christ Hospital, etc. There are homes for the aged and infirm, incurables, orphans, friendless and fallen, a fresh-air fund and farm, a university settlement, etc.

Education.—The public school system consists of 52 elementary schools, including 1 for deaf-mutes, with 45,000 pupils, and 3 high schools, with 2,200 pupils. At the head of the city's educational system stands the University of Cincinnati. In 1858 Charles McMicken bequeathed to the city property valued at over \$1,000,000 for the foundation of a college. About half of this property, situated in Louisiana, was lost to the bequest, and the remainder was consolidated in 1870 with various other educational trusts in the hands of the city to found the present university. It consists of a college, graduate department, and schools of law, medicine and clinical medicine, engineering, technology, dentistry, and an observatory on Mount Lookout. The students number about 1,600. The Roman Catholic Church maintains a large number of parochial schools, female academies, priests' seminaries, and St. Francis Xavier (affiliated with St. Louis University) and St. Joseph's colleges. Other schools of professional, technical, or higher learning are numerous, in-

cluding the Miami Medical College, schools of pharmacy, dentistry, law, and commerce, the State Normal School, Lane Theological Seminary (Presb.), with a library of 24,000 volumes, Hebrew Union College, the College of Music, etc. The Art School, with about 500 students, is maintained by a private association in connection with the Art Museum, which contains collections of paintings, sculptures, engravings, metal work, textile fabrics, pottery, wood carvings, American ethnology and archæology, etc. The Ohio Mechanics' Institute has a large building and library, and gives literary, scientific, and mechanical instruction in its day and night courses. The Society of Natural History maintains a museum, and the Cuvier Club and the Historical Society (Ohio history and relics of mound builders, discovered in the vicinity) have also valuable collections. The largest library is the Public, with several branches and 350,000 volumes. The Young Men's Mercantile Library has about 80,000 volumes, and nearly every one of the institutions and societies of learning maintains a library of its own.

There are published in the city eight general daily newspapers (four in German), a large number of weeklies, some of which have very extensive circulations, and several monthlies devoted to religion or special trade interests.

Industries.—In the importance of its industrial interests, Cincinnati ranks second in the State, coming up very close to Cleveland. The industries are many and varied. According to the census of 1905, the leading industries, with the values of their products, were as follows: Men's and women's clothing, \$16,926,000—54.1 per cent. of the total for the State; distilled liquors, \$9,610,000, over one-half the total; malt liquors, \$7,703,000, over one-third of the total; wholesale slaughtering and meat-packing, \$13,446,000—46.8 per cent.; foundry and machine shop products, \$11,529,000; boots and shoes, \$10,597,000—42.2 per cent.; printing and publishing, including newspapers and periodicals, \$8,314,000; carriages and wagons, \$6,324,000; tobacco products, \$5,748,000; furniture, \$4,821,000. Other important industries were: Leather, saddlery and harness, soap, cottonseed oil and cake, lumber and planing mill products, coffins, upholstering materials, musical instruments, principally pianos, paints, printing ink, lithographing and engraving, carriage and wagon materials, safes and vaults, copersmithing and sheet iron working, steam fittings and heating apparatus, stoves and furnaces, structural ironwork, cooperage, pickles and preserves. Many minor industries carried on here are of special importance and in the aggregate represent much capital and labor. The growth of the manufacturing activities of the city since 1880 is shown in the following:

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Year	Number of Establishments	Capital	Wage-Earners	Wages	Cost of Materials Used	Value of Products
1880	3,275	\$50,532,000	54,513	\$19,553,000	\$62,375,000	\$1,052,550
1890	7,832	104,483,000	84,167	36,729,000	92,545,000	1,960,640
1900	5,127	109,582,000	63,240	27,189,000	77,539,000	1,578,070

The special United States Census of Manufactures of 1905 was confined to the factory industries, to the exclusion of neighborhood industries and hand trades. Compared with the corresponding figures for 1900, the results are shown in the following:

Year	Number of Establishments	Capital	Wage-Earners	Wages	Cost of Materials Used	Value of Products
1900	2,454	\$103,461,000	54,942	\$23,104,000	\$71,391,000	\$141,678,000
1905	2,171	130,272,000	58,584	27,390,000	83,258,000	166,059,000
Per cent increase		25.9	6.6	18.6	16.6	17.2

Many of the industrial establishments are situated beyond the city limits, and are therefore not included in the census reports. According to local information, the value of the output of all industrial establishments in Cincinnati and its immediate vicinity in 1906 was, approximately, \$345,000,000, the leading manufactures being as follows: Shoes, \$19,500,000; clothing, \$20,500,000; soap, \$21,000,000; machinery, \$18,000,000; furniture and office equipment, \$9,750,000; meats, \$18,000,000; beer, 55,100,000 gallons; distilled spirits, 10,921,000 gallons. The total number of employees was about 120,000.

Commerce and Transportation.—Cincinnati has a large trade in fresh and salted meats, lard, fresh and dried fruits, potatoes, dairy products, malt, hardwood lumber, pig iron, etc. In 1906 the receipts of grain and flour amounted to 38,088,000 bushels, and shipments, 28,676,000 bushels; receipts of live stock, 1,864,000 head, and shipments, 892,000 head; total railroad freight in and out, about 25,000,000 tons. In the same year there were in the city 11 National banks, with an aggregate capital of \$13,300,000, and 21 private and savings banks and trust companies, with a capital of \$4,525,000. The bank clearings totaled \$1,310,435,000. The city is a port of entry, and direct foreign imports amounted to \$2,388,000 in 1906. The river traffic, carried mainly by barges, is very large, and packet lines connect the city with all the ports of the Mississippi and its tributaries. The Miami and Erie canal, with its terminus at Toledo, gives the city a water route to the Great Lakes. The 16 railroads entering the city include the Pennsylvania, Erie, Baltimore and Ohio, Chesapeake and

Ohio, the Cleveland, Cincinnati, Chicago, and St. Louis, the Cincinnati, Hamilton, and Dayton, Louisville and Nashville, Norfolk and Western, Queen and Crescent, etc. The electric street railways have over 321 miles of track.

Administration and Public Interests.

—The city is governed in accordance with the Ohio Municipal Code of 1902. The mayor is elected biennially, other elective officers being the members of the board of public service, the treasurer, solicitor, and auditor. Other officials, including the members of the board of public safety, are appointed by the mayor. The council, composed of 31 members, 1 from each ward, appoints the city clerk and some

minor officials. The elective board of education has complete and independent authority over the public school system, including the power of taxation for school purposes. The municipal expenditure exceeds \$7,000,000 annually, over \$1,000,000 being for schools. Of the 650 miles of streets, about 400 miles are well paved. The city workhouse has cells for 700 prisoners, with workshops and grounds. The water works, owned by the city, draw their supply from the Kentucky side of the Ohio, about 8 miles up the river. The Cincinnati Southern railroad, to Chattanooga, Tenn., 334 miles distant, was constructed by the city at a cost of \$18,000,000 after the Civil War. It is operated under lease by the Queen and Crescent Company, which pays an annual rental of \$1,000,000. The municipal debt stood in 1906 at \$37,191,000.

History and Population.—The first permanent settlement was made by colonists from New Jersey and Kentucky in 1788, on land purchased the same year from the United States by John Symmes. In 1789 Fort Washington was constructed within the present city limits. In 1790 General St. Clair organized Hamilton co., with the seat of government in the new settlement, which he named Cincinnati in honor of the famous society of Revolutionary officers. In 1792 the first church (Presb.) and the first private school were opened, and in 1793 the first newspaper was published. The population, largely floating, then consisted of typical frontiersmen, who were compelled by law to take their guns to church for security against Indian attacks. In 1802 a town charter was obtained, and in 1803 the first bank was opened. In 1805 the town con-

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tained 172 buildings and 960 inhabitants, but during the next five years the population nearly trebled, making it the largest town in the State, with an important river traffic. In 1804 Lancaster Academy was founded; this became later Cincinnati College, the nucleus of the present university. Steamboat navigation was inaugurated in 1816, and a city charter was obtained in 1819. The rapid growth of the city was due, mainly, to three factors: the completion of the Miami and Erie canal in 1830, which not only developed commerce, but also furnished water power for manufacturing; the large immigration of Germans, who constituted one-third of the population by 1840; and the construction of railroads, the first of which, a section of the Little Miami railroad, was opened in 1843. Beginning with 1832, the city suffered several times from visitations of cholera, through which 9,000 perished in 1849-50. High floods of the Ohio also worked havoc in 1832, 1883, and 1884. During the anti-slavery agitation the sympathies of the people were divided, the commercial interests being linked with those of the South. The city was the most important station of the "underground railroad" for the escape of fugitive slaves, and in 1836 and 1841 the "Philanthropist" press of James G. Birney was destroyed by mobs. During the Civil War the majority of the people were pro-Union. In 1862 the city was menaced by the Confederate general E. Kirby Smith, and was for a time under martial law. Annexations to the municipal territory were made in 1869, 1895, and 1903-04. During March 28-31, 1884, there was a riot owing to the lax enforcement of the law against murderers. The court house and adjoining buildings were burned by the mob, the State militia was called out, and 45 persons were killed and 145 wounded. In 1888 the centenary of the settlement of the State and city was celebrated by the Centennial Exposition of the Ohio Valley.

Population, 1800, 750; 1810, 2,540; 1820, 9,642; 1830, 24,831; 1840, 46,338; 1850, 115,435; 1860, 161,044; 1870, 216,239; 1880, 255,139; 1890, 296,908; 1900, 325,902; 1910 (census) 363,591. In 1900 the population consisted of 157,140 males and 168,762 females, and included 14,482 negroes—4.4 per cent. of the total. The foreign born numbered 57,961, making 17.8 per cent. of the total, the most numerous elements being 38,219 Germans, 9,114 Irish, 2,902 English, Scotch, and Welsh, and 1,976 Russians.

Cincinnati, Society of the, an association founded by the officers of the American Revolutionary army in 1783, "to perpetuate their friendship, and to raise a fund for relieving the widows and orphans of those who had fallen during the war." It was so named because it included pa-

Cineas

triot, headed by Washington, who in many instances had left rural affairs to serve their country (see CINCINNATUS). The badge of the society is a bald eagle suspended by a dark-blue ribbon with white borders, symbolizing the union of France and the United States. On the breast of the eagle there is a figure of Cincinnatus receiving the military ensigns from the senators; round the whole are the words "Omnia reliquit servare rempublicam." As this distinction was made hereditary, it was attacked as opposed to republican equality. Franklin saw in it the germ of a future aristocracy; and at a meeting held in Philadelphia in 1784 several changes were made in the constitution of the society, the right of succession being made conditional on approval in each case by the society. Membership descends to the eldest lineal male descendant, if judged worthy, and, in failure of direct male descent, to male descendants through intervening female descendants. The general society is composed of the general officers and five delegates from each State society, and meets triennially. In 1854 it ruled that proper descendants of Revolutionary officers who were entitled to original membership, but who never could avail themselves of it, are qualified for hereditary membership, if found worthy, on due application.

Cincinnatus, Lucius Quinctius, a wealthy patrician in the early days of the Roman Republic, born about 519 B.C. He succeeded Publicola in the consulship, and then retired to cultivate his small estate beyond the Tiber. The messengers of the senate found him at work on his farm when they came to summon him to the dictatorship. He rescued the army from its peril, and then returned quietly to his farm. At the age of 80 he was again appointed dictator to oppose the ambitious designs of Spurius Maelius.

Cinderella (little cinder girl), the heroine of a popular fairy tale. She is the drudge of the house, dirty with housework, while her elder sisters go to fine balls. At length a fairy enables her to go to the prince's ball; the prince falls in love with her, and she is discovered by means of a glass slipper which she drops, and which will fit no foot but her own. The glass slipper is a strange mistranslation of *pan-toufle en vair* (a fur slipper), not *en verre*.

Cineas, an eminent Thessalian orator, the friend and minister of Pyrrhus, King of Epirus. He was the most eloquent man of his day, and Pyrrhus was wont to say that "the words of Cineas had won him more towns than all his own armies." He was a strenuous advocate of peace with the Romans, and was sent to Rome with proposals for a treaty after the battle of Her-

Cinematograph

aclea, 280 B.C. Two years later he was sent a second time to negotiate a peace, but without effect, and appears to have died soon after.

Cinematograph, a device for showing pictures of men, animals, etc., in motion. See BIOGRAPH.

Cineraria, a genus of plants akin to *Senecio*, or, according to Sir Joseph Hooker, ranked under it as a sub-genus. There are endless varieties produced by seed. They are all of various shades of red or blue, with or without white markings.

Cinna, Lucius Cornelius, a Roman patrician, associate of Marius, and leader of the popular party, during the absence of Sulla in the E. In 86 B.C. he was elected consul along with Cn. Octavius, and in violation of his oath to Sulla, he attempted to overpower the senate and to procure the recall of Marius and his party from banishment. In the contest which ensued, he was defeated by his colleague and driven from the city. His office thus became vacant, and the senate appointed another consul in his stead. He soon returned, however, along with Marius, and laid siege to Rome. The senate were forced to capitulate; but while the votes of the people were being taken for the repeal of the sentence against Marius, he broke into the city, massacred the friends of Sulla, and allowed his partisans to commit frightful excesses. He was consul for the next three years; but Sulla, having brought the Mithridatic war to a close, resolved (84 B.C.) to return to Italy to inflict condign punishment on his enemies. Cinna prepared to resist him by force of arms, but was prematurely slain by a mutiny among his own troops.

Cinnabar, red sulphide of mercury, the principal ore from which that metal is obtained, occurring abundantly in Spain, California, China, etc. It is of a cochineal-red color, and is used as a pigment under the name of vermilion.

Cinnamic Acid, an acid which exists in the free state in the balsams of Tolu and Peru, in liquid storax, and in gum benzoin. When oil of cinnamon is exposed to the air, it absorbs oxygen and deposits crystals of cinnamic acid. Cinnamic acid forms colorless crystals readily soluble in alcohol, ether, and boiling water, but sparingly soluble in cold water. It is not of any importance in the arts and is chiefly interesting as being the acid corresponding to oil of cinnamon. This oil is the aldehyde of cinnamic acid, and is represented by the formula $C_6H_5CH=CHCOH$. Though isomeric with oil of cassia it has a slightly different flavor, and is much more expensive. Both of these oils are employed in medicine as aromatic stimulants, but chiefly

Cino da Pistoia

as pleasant adjuncts to disguise the taste of nauseous drugs. From a chemical point of view, the cinnamic acid and oil of cinnamon are related to benzoic acid and oil of bitter almonds. Benzoic acid is regarded as C_6H_5COOH , while the oil of bitter almonds is the corresponding aldehyde C_6H_5COH . On oxidation cinnamic acid is changed into benzoic acid.

Cinnamon, the dried bark of several species of *Cinnamomum*, belonging to the natural order *Laurineæ*. The principal species, *C. zeylanicum*, is indigenous to Ceylon, whose forests from ancient times supplied it to other parts of the world. It was first cultivated by the Dutch, and is now grown on the Malabar Coast, in Java, Egypt, the West Indies, and Brazil. The wild tree attains the height of twenty or thirty feet. The leaves are oval, the flowers of a pale yellow color, and the fruit is shaped somewhat like an acorn. In April and November the Ceylonese bark the trees; the branches of three years' growth are cut down, and the outside pellicle of the bark is scraped away. Under cultivation two years or less may suffice for the period of growth. After the branches are cut they are slitted lengthwise with a knife, and the bark is stripped off, cut into pieces, and dried. In drying it curls up into "quills," the smaller of which are inserted into the larger, and these are tied in bundles for shipment. Experts are employed to chew and taste the product in order to determine its quality. The cinnamon species yield a volatile oil of great commercial value (see CINNAMIC ACID). Cinnamon is one of the most valued restorative spices.

Cinnamon Stone, a precious stone, of which the finer specimens are highly esteemed; it is regarded as a variety of garnet. Its color varies from hyacinth red to orange yellow; and when pure it is transparent.

Cinnamus, Johannes, a Byzantine historian; born about 1145. He was a court notary at Constantinople, and accompanied the emperor Manuel Comnenus on several journeys and campaigns. He wrote the history of the Byzantine Empire from 1118 to 1176, but only an extract of the work has been preserved.

Cino da Pistoia (chē'nō dā pēs-tō'yä), an Italian poet; born at Pistoia in 1270. By profession he was a jurisconsult, and he wrote a celebrated commentary on the Justinian Code. Thereafter till his death he was professor of jurisprudence in Italian universities. He was an intimate friend of Dante. His love songs ("Rimes") addressed to his mistress Selvaggia are full of tender passion; they entitle him to a place among the lyric precursors of Petrarch. He died in 1337.

Cinq-Mars, Henri Coiffier de Ruzé (sank-märs), Marquis de, a French courtier; born in 1620. At the age of 18 he was presented at court by Cardinal de Richelieu, and soon obtained the favor of Louis XIII., to whom he became Master of the Horse. Chafing at the restraint under which Richelieu held him, and ambitious of political power, he framed a conspiracy to overthrow the cardinal, of which the King himself, and his brother Gaston, Duke d'Orleans, were members. But Louis was weak and fickle, Gaston perfidious, and Richelieu not the man to be put down by a youth just turned of 20. Cinq-Mars was delivered up to the cardinal, and beheaded at Lyons, along with his friend, the councillor De Thou, Sept. 12, 1642. Cinq-Mars is the hero of a splendid historical novel by Alfred de Vigny.

Cinquecento (chink'we-chen'to), in Italian, 500, an abbreviation for *mille cinquecento*, or 1,500. The term is used to designate the art styles of the 16th century, or such as were developed about, or after, 1500. In like manner the terms *trecento* and *quattrocento* denote art of the 14th and 15th centuries. The Cinquecento is the period of the highest perfection of the arts of the Revival or Renaissance.

Cinque Foil, the name of a species of the genus *Potentilla*, which have fingered leaves. In architecture, it is an ornamental foliation or feathering, used in the arches of the lights and tracery of windows, paneling, etc.

Cinque Pace, a kind of grave, stately dance, in which the steps were regulated by the number 5.

Cinque Ports (Five Ports), the sea-port towns of Dover, Sandwich, Hastings, Hythe, and Romney, England; to which three others were afterward added, viz., Winchelsea, Rye, and Seaford. These towns are incorporated, with peculiar privileges; are under the government of a lord warden, to whom writs for the return of members to parliament from them are directed; and the members so returned are termed Barons of the Cinque Ports.

Cintra, a town in Portugal, 15 miles W. N. W. Lisbon, finely situated on the slope of the Sierra de Cintra, and much resorted to by the wealthier inhabitants of Lisbon. The kings of Portugal have a palace with fine gardens at Cintra. The town is celebrated for the convention entered into there in 1808, by which the French, after their defeat at Vimeira, were conveyed to France. Pop., 4,751.

Ciphers, signs used to represent numbers, whether borrowed signs, as letters, with which the Greeks designated their numbers, or peculiar characters, as the

modern or Arabic ones. The ciphers, such as they are at present, 1, 2, 3, 4, 5, 6, 7, 8, 9, 0, did not come into common European use until the 11th century. See NOTATION.

Cipher Writing, a method of sending important intelligence in a manner so effectually disguised that only those for whom the news is intended can understand the meaning of what is written. Till comparatively recent years diplomats, statesmen, and military or naval commanders were the principal persons compelled by circumstances to keep their affairs or their intended movements shrouded in secrecy. So long as there was no regular postal service important letters were sent by courier, and thus the weightiest secrets were often at the mercy of any one inclined to be dishonest. Before the spread of education, and at a time when few possessed a knowledge of any other language than their own, to indite a letter or a dispatch in a foreign tongue was usually ample protection against a surreptitious prying into its contents. But it is now many years since this safeguard was broken down, and it became necessary for all who did not want their correspondence known to interested parties to contrive some means of communicating with the pen that would defy scrutiny.

Hence there came into extensive use the art of writing in cipher, called also cryptography, from two Greek words *κρυπτός*, "secret," and *γράφειν*, "to write." Under this term are included all private alphabets, or systems of characters for the safe transmission of secrets. As fast as one device was discovered human ingenuity contrived another still more intricate. A cipher sufficiently perplexing for all ordinary purposes is found by using the alphabet in any language in an inverted order, taking Z for A, Y for B, X for C, and so on. When it is only desired to write a cryptogram, and not print it, such other characters may be used as are mutually agreed upon by correspondents, or the alphabet may be transposed in other ways. A figured cipher is one in which the letters of the alphabet are numbered, and these numbers compose the cryptogram. To insure secrecy it is, of course, necessary that the particular series of numbers chosen shall be known only to those who use the cipher. Another plan consists in choosing a certain book—a dictionary appears to have been the favorite—and by a simple citation of the number of the page, of the column, and of the line, sentences were constructed, the key to which was extremely difficult of discovery by one not in the secret.

As the number of different dictionaries was necessarily limited, however, the mystery could usually be solved by any one willing to devote time and patience to hunting up the particular one adopted. Various

other books have been similarly used, such as spelling-books, and even the Bible; but these systems were cumbersome, and were all more or less open to detection. Still, with devices such as these, more or less ingenious, the world was fain to be content until about 40 years ago, when a scientific discovery was made that indirectly converted cryptography into a recognized calling, requiring thought, labor, and inventive ability.

The opening years of the second half of the 19th century found the world in amazement over the then recent invention of telegraphy. Immediately a new want made itself felt. Secrecy had been sacrificed at the shrine of speed. If the mail was slow, it afforded privacy, but the contents of a telegraphic message are of necessity known to others besides the sender and the receiver. So the minister, the banker, and the merchant soon began to send cipher dispatches. It was quickly discovered, however, that existing methods of Cipher Writing were unadapted to telegraphy; the costliness of the new invention necessitated brevity; and thus it was not long before there went whirling over the wire messages of 10 words that, properly deciphered, included from 30 to 50.

A great proportion of commercial messages—orders to buy and sell and the like—are similar in their terms, and hence it is that a single word representing three or four words in frequent use is the plan on which our present cable ciphers are based, whereby there is annually a large saving in expense. Then, too, as trade increased and competition became fierce, every firm wanted its own cipher system, distinct from any used by other houses in the same business; and reflection will enable us to appreciate the vast number of separate ciphers in use in a great commercial center like New York city. Therefore, in course of time, the preparation of cipher systems for merchants and others using the telegraph largely came to be a regular calling, and in every large city the sign "Cable Codes" is to be seen.

At one of these offices a person may be accommodated with a code of from 50 to 5,000 words. Most of these codes are alphabetically arranged in parallel columns, like shipping signals—the English words and phrases in one column, and their cipher equivalents in another. To such magnitude has this business grown that all languages are ransacked for suitable cryptographic codes, and every day sees their preparation growing more complicated and costly. The modern telegraphic signals and our various systems of short-hand may be called examples of Cipher Writing, though in these cases, of course, speed and brevity are aimed at, not secrecy.

The cipher codes of the State Department at Washington are frequently changed. The special code is entrusted to the personal custody of diplomatic officials embarking on a mission, who retain possession of it and destroy it if their lives are endangered. The imprisonment of the United States Minister Conger, in Peking, in 1900, caused the cipher to figure conspicuously in international relations. China objected to the transmission of Cipher dispatches, but subsequently withdrew her objection. She was accused of having obtained surreptitious possession of a copy of the United States cipher code.

Cipriani, Giambattista (chēp-rē-ä'nē), an Italian history-painter and designer; born in Florence in 1727, of an old Pistoja family. He received some instruction from Hugford, a Florentine painter of English parentage, and he studied for three years in Rome. In 1755 he was induced by Sir William Chambers and Wilton the sculptor to settle in London, where his graceful drawings, which were reproduced by the graver of Bartolozzi, gained great popularity, and exercised a favorable influence upon the English school of figure-painters. He was a member of the St. Martin's Lane Academy, and in 1768 was elected a foundation member of the Royal Academy, to whose exhibitions he contributed till 1779, and whose diploma he designed in 1768. His pictures, of which some are preserved at Houghton, are less successful than his designs, being feeble, poor in color, and with little expression. As an etcher he is known by a few plates in Hollis's "Memoirs." He died in Hammersmith, Dec. 14, 1785.

Circars, The Five Northern, an ancient division of the Madras Presidency, in India; on the E. coast of Hindustan, the Circars being Chicacole, Rajahmundry, Ellore, Condapilly, and Guntoor. The districts that now correspond most nearly with them are Ganjam, Vizagapatam, Godavari and part of Krishna.

Circassia, or Tcherkessia, a mountainous region in the S. E. of European Russia, lying chiefly on the N. slope of the Caucasus, partly also on the S., and bounded on the W. by the Black Sea, and now forming part of the Lieutenancy of the Caucasus. The mountains, of which the culminating heights are those of Mount Elbruz, are intersected everywhere with steep ravines and clothed with thick forests, and the territory is principally drained by the Kuban and its tributaries. Its climate is temperate, its inhabitants healthy and long-lived. The people call themselves Adighé, the name *Tcherkess* (robbers) being of Tartar origin. They are divided into several tribes speaking widely-different dialects.

While they retained their independence their government was of a patriarchal character, but every free Circassian had the right of expressing his opinion in the assemblies. They possessed none but traditional annals and laws. Polygamy was permissible in theory, but not common. The duties of hospitality and vengeance were alike binding, and a Spartan morality existed in the matter of theft. Their religion, which is nominally Moslem, is in many cases a jumble of Christian, Jewish, and heathen traditions and ceremonies. As a race the Circassians are comely, the men being prized by the Russians as warriors, and the women by the Turks as mistresses, a position generally desired by the women themselves.

The early history of Circassia is obscure. Between the 10th and 13th centuries it formed a portion of the empire of Georgia, but in 1424 the Circassians were an independent people, and at war with the Tartars of the Crimea, to whose khans, however, some were occasionally tributary. In 1705 the Tartars were defeated in a decisive battle, but shortly after the territorial encroachments of the Russians on the Caucasian regions began, and in 1829 the country was formally annexed by them. A heroic resistance was made by the Circas-



CIRCE.

sians under their leader Schamyl, and on being reduced to submission numbers of the inhabitants emigrated to the Turkish provinces. In the N. and E., however, tribes of the Circassian stock remain. The Circassians, properly so called, have been estimated to number from 500,000 to 600,000.

Circe (ser'sē), a daughter of Sol and Perse, celebrated for her skill in magic and poisonous herbs. She married a Sarmatian prince of Colchis, whom she murdered to obtain the kingdom, but was expelled by her subjects, and carried, by her father, to an island called *Æa*, on the coast of Italy. Ulysses, on his return from the Trojan war, visited her coast; and all his companions, who ran headlong into pleasure and voluptuousness, were changed by Circe's potions into swine. Ulysses, fortified

against all enchantments by an herb called *moly*, which he had received from Mercury, demanded from Circe the restoration of his companions to their former state. She complied, loading the hero with honors; and, for one whole year, he forgot his glory in his devotion to pleasure.

Circinus ("the Pair of Compasses"), one of the 14 southern constellations added to the heavens by Lacaille in connection with his work at the Cape of Good Hope in 1751-1752. It is surrounded by Apus, Musca, Centaurus, Lupus, Norma, and Triangulum Australe.

Circle, a plane figure contained by one line, which is called the circumference, and is such that all straight lines drawn from a certain point (the center) within the figure to the circumference are equal to one another. The properties of the circle are investigated in books on geometry and trigonometry. Properly the curve belongs to the class of conic sections, and is a curve of the second order. A great circle of a sphere is one that has its center coinciding with that of the sphere. The celebrated problem of "squaring the circle," is to find a square whose area shall be equal to the area of any given circle. It is not possible to do so. All that can be done is to express approximately the ratio of the length of the circumference of the circle to the diameter, and to deduce the area of the figure from this approximation. If the diameter be called unity, the length of the circumference of the circle is 3.1415926535....; and the area of the circle is found by multiplying this number by the square of the radius. Thus the area of a circle of 2 feet radius is 3.14159×4 , or 12.56636 square feet approximately. For trigonometrical calculations the circumference of the circle is divided into 360 equal parts called degrees, each degree is divided into 60 minutes, and each minute into 60 seconds.

Circle, Magic, a space in which sorcerers were wont to protect themselves from the fury of the evil spirits they had raised. This circle was usually formed on a piece of ground about 9 feet square (in the East 7 feet appears to have been considered sufficient), in the midst of some dark forest, churchyard, vault, or other lonely and dismal spot. It was described at midnight in certain conditions of the moon and weather. Inside the outer circle was another somewhat less, in the center of which the sorcerer had his seat. The spaces between the circles, as well as between the parallel lines which inclosed the larger one, were filled with all the holy names of God, and a variety of other characters supposed to be potent against the powers of evil. Without the protection of this circle, the magician, it was believed, would have been car-

ried off by the spirits, as he would have been had he by chance got out of the charmed space. Another figure which, described upon the ground, could bar the passage of a demon, was the pentagram. Readers of "Faust" will remember its effect upon Mephistopheles.

Circleville, a city and county-seat of Pickaway Co., O.; is on the Scioto river, the Ohio canal, and the Cincinnati and Muskingum and Norfolk and Western railroads, 28 miles S. of Columbus. It derives its name from a circular earth work built by some ancient people, which is the site of the present city. It has several manufacturing and mills, about 16 churches, a high school, graded public schools, several daily and weekly newspapers, 3 National banks, and an assessed property valuation of over \$3,000,000. Pop. (1890) 6,656; (1900) 6,991; (1910) 6,744.

Circuit Court, a court in the United States next in rank to the United States Supreme Court. The country now has nine circuits, each consisting of several States, and each is allotted to one of the nine justices of the Supreme Court, who must attend at least one term of court in each district of his circuit every two years. Two circuits had two circuit judges each; the others three. Courts may be held at the same time in different districts of the same circuit. These courts have original jurisdiction, concurrently with those of the States, in civil suits in law or equity for more than \$500 between citizens of different States, or where an alien is a party or the United States plaintiff, as well as in revenue cases and some in bankruptcy, and in some criminal cases concerning persons denied citizenship under State laws, or offenses against the United States. Their appellate jurisdiction extends to admiralty and maritime cases, to civil actions referred from the district courts, to patent cases, and some others. The judges of each circuit and the justice of the Supreme Court for the circuit constitute a Circuit Court of Appeals. The First Circuit consists of Maine, Massachusetts, New Hampshire, Rhode Island. Second—Connecticut, New York, Vermont. Third—Delaware, New Jersey, Pennsylvania. Fourth—Maryland, North Carolina, South Carolina, Virginia, West Virginia. Fifth—Alabama, Florida, Georgia, Louisiana, Mississippi, Texas. Sixth—Kentucky, Michigan, Ohio, Tennessee. Seventh—Illinois, Indiana, Wisconsin. Eighth—Arkansas, Colorado, Oklahoma, Iowa, Kansas, Minnesota, Missouri, Nebraska, New Mexico, North Dakota, South Dakota, Utah, Wyoming. Ninth—Alaska, Arizona, California, Idaho, Montana, Nevada, Oregon, Washington, and Hawaii.

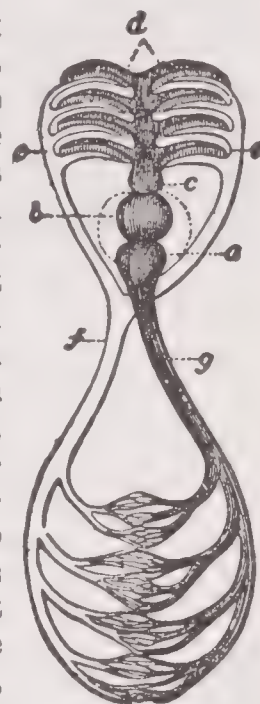
Circular Notes, notes or letters of credit furnished by bankers to persons about to travel abroad. Along with the notes the traveler receives a "letter of indication" bearing the names of certain foreign bankers who will cash such notes on presentation, in which letter the traveler must write his name. On presentation the foreign banker can demand to see the letter of indication, and by causing the presenter to write his name can compare the signature thus made with that in the letter, and so far satisfy himself as to the identity of the person presenting the note.

Circular Numbers, numbers whose powers end on the same figure as they do themselves: such are numbers ending in 0, 1, 5, 6.

Circulating Library. See LIBRARIES, PUBLIC.

Circulation, in anatomy and physics, the term used to designate the course of the blood from the heart to the most minute blood-vessels (the capillaries), and from these back to the heart. The heart is situated very nearly in the center of the cavity of the chest, or thorax, as it is termed in anatomy, between the lungs, behind the breastbone, or sternum, in front of the vertebral column, and above the diaphragm, on which it obliquely rests. In form it is somewhat conical, the lower end tapering almost to a point, and directed rather forward and to the left. This lower portion alone is movable, and at each contraction of the heart, it is tilted forward, and strikes against the walls of the chest between, in man, the fifth and sixth ribs, or a little below the left nipple.

All the large vessels connected with the heart—the *venæ cavæ*, the pulmonary artery and the aorta—arise from its base, and serve, from their attachment to the neighboring parts, to keep that portion of it fixed. Indeed, these vessels may be regarded as suspending the heart in the cavity, which is lined by a smooth serous membrane, which, near the top, is reflected downward over the roots of the great vessels, and covers the whole of the outer surface of the heart. These two smooth serous surfaces—one lining the cavity, the other investing the heart—are kept moist by a fluid which they secrete,



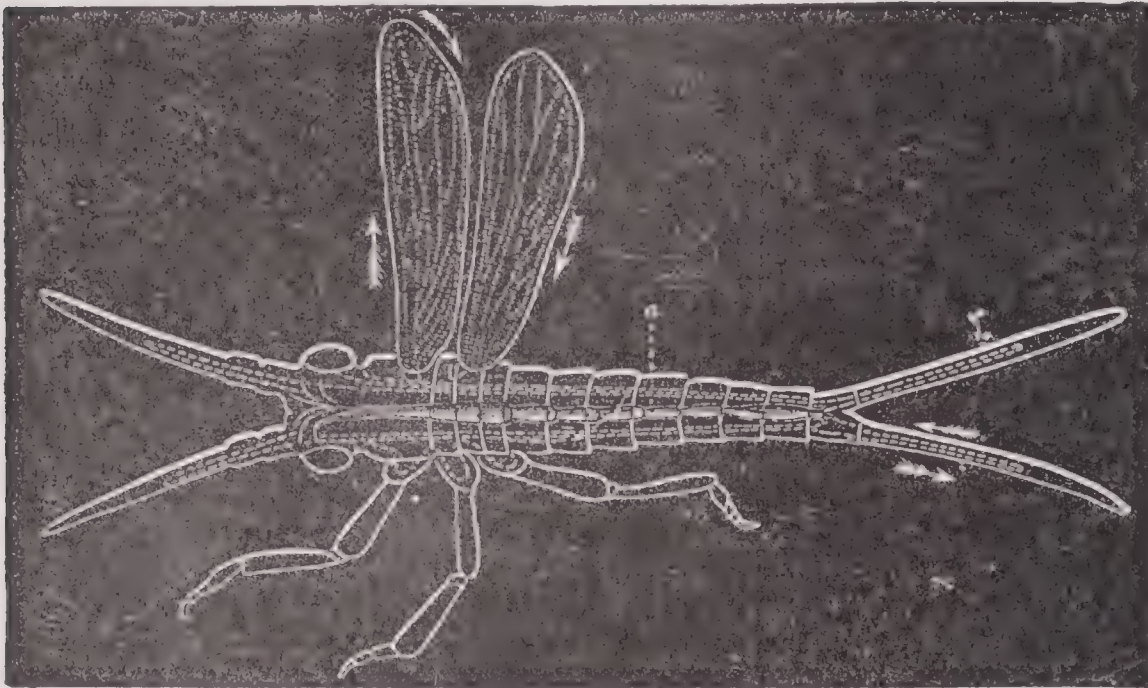
Circulation in Fishes.

a, auricle; b, ventricle; c, pulmonary artery; d, pulmonary veins, bringing blood from the gills; e, and uniting in the aorta, f; g, vena cava.

Circulation

and by this arrangement friction may be regarded as reduced to its minimum. The cavity or sac in which the heart lies is called the pericardium.

Since all the arterial blood leaves the heart through the aortic opening, in tracing its course to the different parts of the system we obviously have only to follow the aorta to its final branches. The arteries distribute the arterial blood to the capillaries, which pervade every part of the



CIRCULATION IN INSECTS. ARROW INDICATES COURSE OF BLOOD.

body. The veins, like the arteries, are found in nearly every tissue; they commence by minute plexuses (an anatomical term for a network-like arrangement), which communicate with the capillaries. Branches from these plexuses uniting together form small venous trunks, which by joining, increase in size as they pass onward toward the heart. If we except certain venous structures (called sinuses) occurring in the interior of the skull, we may divide the veins into two sets—the superficial or cutaneous and the deep veins. The deep veins accompany the arteries, and are usually inclosed in the same sheath of cellular tissue with them. In the case of the smaller arteries, they generally exist in pairs, one on each side the artery, and are called *venæ comites*, while the larger arteries have usually only one accompanying vein.

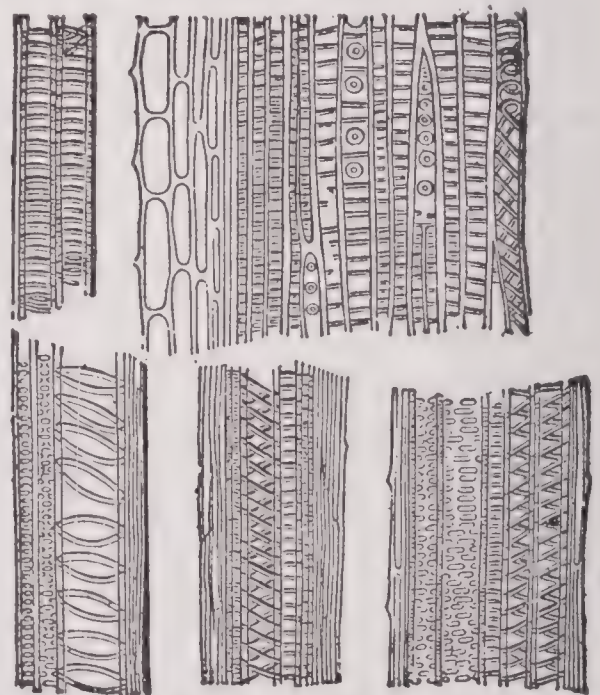
The superficial veins occur immediately beneath the integument; they not only return the blood from the skin and adjacent structures, but communicate with the deep veins. All the veins finally unite into two large trunks, termed the superior and inferior vena cava, which open into the right auricle of the heart; the superior vena cava being formed by the union of the veins which return the blood from the head and neck (the jugulars) with those which con-

vey it from the arms (the subclavians), while the inferior vena cava receives the blood from the lower extremities, the trunk, and the abdominal and pelvic viscera. See HEART.

Circulation of Sap, in plants, its ascent from the root to the leaves and bark, and its partial descent after the elaboration which it undergoes in these organs. The sap drawn from the ground by the roots ascends, in exogenous plants, through the more recent parts of the woody tissue, and especially through the alburnum. The descent of the sap takes place chiefly through the liber or inner bark. It appears certain, also, that on its return to the root, only a small portion is excreted, and that the greater part ascends again, re-adapted to the use of the plant by the excretion which has taken place. Much of the sap which is

taken up by the roots is, however, thrown off in perspiration by the bark and leaves.

Circumcelliones (circumcellio, a wandering about from cell to cell), a sect of the Donatists in Africa, in the 4th century, named from their habit of roving from house to house, plundering.



ANNULAR, DOTTED, AND SPIRAL SAP VESSELS AND DUCTS.

Circumcision, an operation consisting in removing circularly the prepuce of infants. God commanded Abraham to use circum-

cision as a sign of his covenant; and in obedience to this order, the patriarch at 99 years of age was circumcised, as also his son Ishmael, and all the males of his household (Gen. xvii: 10-12). God repeated the precept to Moses, and ordered that all who intended to partake of the Paschal sacrifice should receive circumcision, and that this rite should be performed on children on the eighth day after their birth (Ex. xii: 44). The Jews and all the other nations sprung from Abraham, as the Ishmaelites, the Arabians, etc., have always been very exact in observing this ceremony. At the present day it is an essential rite of the Mohammedan religion, and though not enjoined in the Koran, prevails wherever this religion is found. A similar operation is performed, among the Egyptians, Arabians, and Persians, on the females. The Jews esteemed uncircumcision as a very great impurity; and the greatest offense they could receive was to be called uncircumcised. Paul frequently mentions the Gentiles under this term, not opprobriously (Rom. ii: 26), but in opposition to the Jews, whom he names "the circumcised."

The feast of circumcision is a festival observed in the Roman Catholic Church, and in some other denominations, in commemoration of the circumcision of Jesus Christ. It is held on Jan. 1.

Circumference, or Periphery, the curve which incloses a circle, ellipse, oval, cardioid, or other plane figure. In figures bounded by straight lines, as the triangle, square, and polygon, the term perimeter is employed to designate the sum of all the bounding lines taken together. The length of the circumference depends partly on the nature of the curve; thus, that of the circle $= 2\pi r = \pi d$; and that of the ellipse (*q. v.*).

$$= 2\pi a \left\{ 1 - \left(\frac{1}{2} \right) \frac{e^2}{1} - \left(\frac{1.3}{2.4} \right) \frac{e^4}{3} - \left(\frac{1.3.5}{2.4.6} \right) \frac{e^6}{5} \right\} \&c$$

where a is the semi-axis major, and e the eccentricity.

Circumnavigator, one who sails round the globe. The first European known to have circumnavigated the globe was Magellan or Magalhaens, a Portuguese, who accomplished the feat in A. D. 1519. From him the Straits of Magellan derive their name. Following is a list of subsequent circumnavigators, with dates of accomplishment: Grijalva (Spaniard), 1537; Alvaradi (Spaniard), 1537; Mendana (Spaniard), 1567; Sir Francis Drake (first British), 1577-1580; Cavendish (British), first voyage, 1586-1588; Le Maire (Dutch), 1615-1617; Cuiros (Spaniard), 1625; Tasman (Dutch), 1642; Cowley (British), 1683; Dampier (British), 1689; Cooke (British), 1708; Clipperton (British), 1719; Roggeveen (Dutch), 1721-1723; Anson (afterward

lord) (British), 1740-1744; Byron (British), 1779; Portlocke (British), 1788; 1768; Carteret (British), 1766-1769; Bougainville (French), 1766-1769; James Cook (British), 1768-1771; on his death the voyage was continued by King (British), 1779; Portlocke (British), 1788; King and Fitzroy (British), 1826-1836; Belcher (British), 1836-1842; Wilkes (American), 1838-1842.

Circumpolar Stars, those that appear to move around the pole and perform their circles without setting. A star whose polar distance is less than the latitude of a place will never set at that place. They are constantly used by astronomers in connection with meridian work for determining the correction to be applied to transit observations to free them from the errors due to the slight departure of the line of collimation of the instrument from the plane of the meridian as it revolves on its axis. The pole-star Polaris or Alpha Ursæ Minoris, is the most used for that purpose.

Circumstantial Evidence, evidence obtained from circumstances, which necessarily or usually attend facts of a particular nature, from which arises presumption; any evidence not direct and positive. A light, *i. e.*, a slight presumption, has no weight or validity. A presumption of any kind is relied on only till the contrary has been proved. Still a probable presumption has considerable weight, and a violent one, that is one in which those circumstances appear which necessarily attend the fact, is in many cases held equal to full proof.

Circumvallation, or Line of Circumvallation, in military affairs, a line of field-works consisting of a rampart or parapet, with a trench surrounding a besieged place, or the camp of a besieging army.

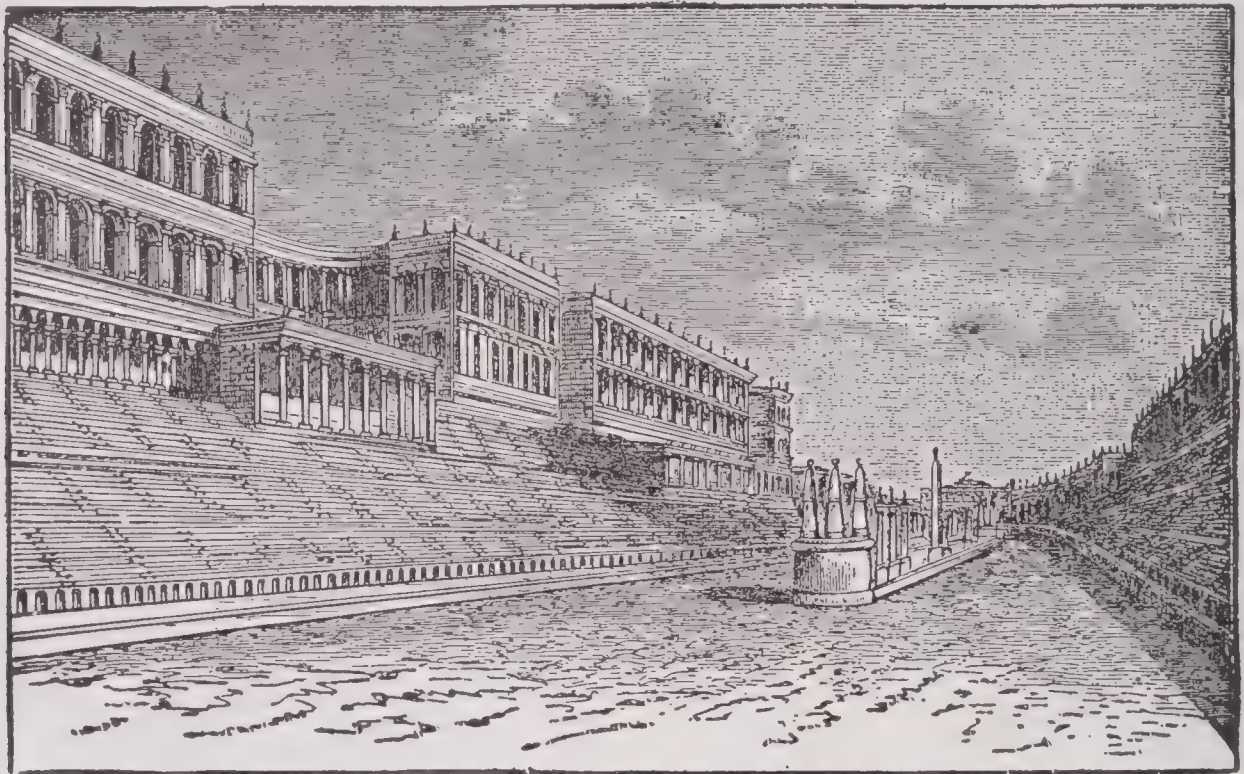
Circus, among the Romans, a nearly oblong building without a roof, in which public chariot-races and exhibitions of pugilism and wrestling, etc., took place. It was rectangular, except that one short side formed a half-circle; and on both sides, and on the semicircular end, were the seats of the spectators, rising gradually one above another, like steps. On the outside the circus was surrounded with colonnades, galleries, shops, and public places. The largest of these buildings in Rome was the Circus Maximus, capable, according to Pliny, of containing 260,000, and according to Aurelius Victor, 385,000 spectators. At present, however, but few vestiges of it remain, and the circus of Caracalla is in the best preservation. The games celebrated in these structures were known collectively by the name of *ludi circenses*, circensian games, or games of the circus, which under the emperors attained the greatest magnificence. The principal games of the circus

were the *ludi Romani* or *magni* (Roman or Great Games), which were celebrated Sept. 4-14, in honor of the great gods, so called. The passion of the common or poorer class of people for these shows appears from the cry with which they addressed their rulers—*panem et circenses* (bread and the games!).

The festival was opened by a splendid procession, or *pompa*, in which the magistrates, senate, priests, augurs, vestal virgins, and athletes, took part, carrying with them the images of the great gods, the Sibylline books, and sometimes the spoils of war. On reaching the circus the procession went round once in a circle, the sacrifices were performed, the spectators took their places, and the games commenced. These were: 1. Races with horses and chariots, in which men of the highest rank engaged. 2. The gymnastic contests. 3. The Trojan games, prize contests on horseback, revived by Julius Cæsar. 4. The combats

or supporting tissues of an organ. The process begins after a more or less hyperæmia of the parts in a growth of new connective tissue which is fibrous in character. This subsequently contracts, and in so doing interferes with the nutrition of the proper physiological tissue of the organ, causes it to atrophy or degenerate, and finally takes its place. The term was originally applied to the liver, and was due to alcoholic indulgence, producing what is known as gin-liver, or hob-nail liver.

Cirripedia, or Cirripeds, the animals which formed the genus *Lepas* of Linnæus, ranked by him among the multivalve *testacæ*, and by subsequent naturalists very generally regarded as an order of mollusks, until, in consequence of recent discoveries, a place has been assigned to them as a distinct class of *articulata*. The resemblance of Cirripedia to mollusks consists chiefly in their external appearance. The animal



THE CIRCUS MAXIMUS, AS RESTORED.

with wild beasts, in which beasts fought with beasts or with men (criminals or volunteers). 5. Representations of naval engagements (*naumachiæ*), for which purpose the circus could be laid under water. The expense of these games was often immense. Pompey, in his second consulship, brought forward 500 lions at one combat of wild beasts, which, with 18 elephants, were slain in five days.

The modern circus is a place where horses and other animals are trained to perform tricks, and where exhibitions of acrobats and various pageantries, including a large amount of buffoonery, are presented.

Cirrhosis, a chronic nonsuppurative inflammation affecting the interstitial con-

is protected by a conical shell formed of several pieces, with a multivalve conical movable lid, having an opening through which several pairs of long, many-jointed, hairy appendages are thrust, thus creating a current which sets in toward the mouth. The young have oval bodies, with a single eye, a pair of antennæ, with three pairs of legs. After swimming about for some time it attaches itself by its antennæ to some object, and now a strange backward metamorphosis begins. The body becomes inclosed by two valves, the stalk by which it is anchored grows larger, the feet become more numerous, and eventually the barnacle shape is attained. The goose-barnacle (*Lepas*) is not sessile, but is flat and tri-

Cirrus

angular, and attached to floating bits of wood or sea-weed by a long large soft stalk.

Cirrus (plural, Cirri), the tendril of a plant by means of which it climbs, usually a modified leaf or the prolongation of a midrib.

Cirrus. See CLOUD.

Cirta, the capital of the ancient Massylii in Numidia. After the defeat of Jugurtha it passed into the hands of the Romans, and was restored by Constantine, who gave it his own name. See CONSTANTINE.

Cisalpine Republic, a former State in North Italy. After the battle of Lodi, in May, 1796, General Bonaparte proceeded to organize two States—one on the S. of the Po, the Cispadane Republic, and one on the N., the Transpadane. These two were on July 9, 1797, united into one under the title of the Cisalpine Republic, which embraced Lombardy, Mantua, Bergamo, Brescia, Cremona, Verona, and Rovigo, the duchy of Modena, the principalities of Massa and Carrara, and the three legations of Bologna, Ferrara, and the Romagna. The republic had a territory of more than 16,000 square miles, and a population of 3,500,000. Milan was the seat of the government or Directory. The army consisted of 20,000 French troops, paid by the republic. The republic was dissolved for a time in 1799 by the victories of the Russians and Austrians, but was restored by Bonaparte after the victory of Marengo, with some modifications of constitution and increase of territory. In 1802 it took the name of the Italian Republic, and chose Bonaparte for its president. A deputation from the republic in 1805 conferred on the Emperor Napoleon the title of King of Italy; after which it formed the kingdom of Italy till 1814.

Cisleithania, or **Cisleithan Provinces**, Austria proper or Austria W. of the river Leitha, which partly forms the boundary between it and Hungary. See AUSTRIA.

Cisneros-Betancourt, Salvador, a Cuban patriot; born in Puerto Principe in 1832. He was a descendant of one of the best families of Spanish nobility, and possessed the hereditary title of Marquis of Santa Lucia. During the Revolution of 1868-1878, he was president of the Cuban House of Representatives, and during a part of the time president of the Cuban Republic. In 1895 he was reëlected president of the new Cuban Republic. His niece, Evangelina Cosío Cisneros, was imprisoned by the Spaniards for aiding the insurgents during the insurrection in 1896-1897, and made a sensational escape, coming to the United States, where she became a protégé of Mrs. Gen. John A. Logan. His daughter tendered her services to the

Cistercians

United States as an army nurse during the war with Spain in 1898.

Cissoid, a curve in geometry, the locus of the vortex of a parabola rolling upon equal parabola. If pairs of equal ordinates be drawn to the diameter of a circle, and through one extremity of this diameter and the point in the circumference through which one of the ordinates is let fall, a line be drawn, the locus of the intersection of this line and the equal ordinate is known as the Cissoid. This curve was discovered by Diocles while he was seeking



CISSOID CURVE.

the solution of the celebrated problem of the duplication of the cube.

Cist, a place of interment of an early or prehistoric period, consisting of a rectangular stone chest or inclosure formed of rows of stones set upright, and covered by similar flat stones. Such Cists are found in barrows or mounds, inclosing bones. In rocky districts Cists were sometimes hewn in the rock itself.

Cistaceæ, a natural order of *polypetalous exogens*, consisting of low, shrubby plants or herbs with entire leaves and crumpled, generally ephemeral, showy flowers. Some exude a balsamic resin, such as ladanum from a Levant species of cistus. Four species of the genus *Helianthemum* are found in Great Britain, and are popularly known as the "rock-rose."

Cistercians, a monastic order in connection with the Roman Catholic Church. In the year 1098, Robert, Abbot of Molesme, in Burgundy, having lost hope of inducing the monks, whose chief he was, to live up to the rule prescribed by St. Benedict, retired with 20 associates to Cîteaux and founded there a congregation which afterward developed into the order of the Cistercians. It went through the ordinary cycle of such monastic institutions, *i. e.*, at first its members were poor and really holy; then the fame of their sanctity spreading through Europe, branches of the order were established in many places. To aid men so deserving, large contributions were given by pious men and women, and before the 12th century had run its course, the Cistercian communities were wealthy. With the growth of this wealth, the gradual relaxation of the strict Benedictine rules took place, till finally the Cistercians lost their high reputation and sank to the level of the order against which their secession had been a protest, and to that of the monastic order generally. During the time that the order was rising in importance, it enjoyed the advocacy of the celebrated St. Bernard, of Clairvaux, who is regarded as

Cistern

its second parent and founder, so that it is sometimes called the Bernardine order, or the order of St. Bernard. Between them and the Cluniacensians there was considerable animosity, and even public controversy.

Cistern, a tank for holding water. Cisterns differ from wells in that they do not get their water from natural sources, such as springs, but through channels made by the hand of man. In hot countries, where the supply of water is not regular, or where rain water is used, cisterns are necessary for storing up water for future use. They are also largely used for the supply of locomotive boilers at railroad stations. Cistern water used for drinking should always be filtered.

Cistus, the rock-rose, a genus of elegant shrubs, with beautiful large red or white flowers, resembling a wild rose; order, *Cistaceæ*. It has an imperfectly five or ten-celled capsule, a character distinguishing it from the *helianthemum* of England, which has but three cells. The species are fine, showy shrubs with gaily colored but fugaceous flowers. Loudon enumerates 27 species as cultivated. The resinous balsamic substance called ladanum is obtained from *C. creticus*, *ledon* and *ladaniferus*. The latter two are sometimes called gum cisti.

Citation, a summons or official notice given to a person to appear in a court as a party or witness in a cause.

Cithæron, the modern ELATEA, a mountain of Greece, which, stretching N. W., separates Bœotia from Megaris and Attica. Its loftiest summit is 4,620 feet in height. On its N. slope stood the city of Plataea.

Cithern, or **Cittern**, an old instrument of the guitar kind, strung with wire instead of gut. Its eight strings were tuned to 4 notes, G, B, D, and E. It was frequently to be found in barbers' shops for the amusement of the waiting customers.

Cities of Refuge. Moses, at the command of God, set apart three cities on the E. of Jordan, and Joshua added three others on the W., whither any person might flee for refuge who had killed a human creature inadvertently. The three on the E. of Jordan were Bezer, Ramoth, and Golan; the three on the W. were Hebron, Shechem, and Kedesh. (Deut. iv: 43; Josh. xx: 1-8.)

Cities of the Plain, Sodom and Gomorrah, chief of those five cities which, according to the commonly received account, were destroyed by fire from heaven, and their sites overwhelmed by the waters of the Dead Sea.

Citizen, a member of a State or community, an inhabitant of any State or

Citron

place. The "civis Romanus," or Roman citizen, had various and high privileges over foreigners. (Acts xvi: 37-38; xxii: 25-29.) "All persons born or naturalized in the United States, and subject to the jurisdiction thereof, are citizens of the United States and of the State wherein they reside."—Constitution of the United States, Amend. xiv., Sec. 1.

Citric Acid, ($C_6H_8O_7 \cdot H_2O$); was first separated and distinguished by Scheele in 1784. It is a very widely distributed acid, being present in most common fruits, such as gooseberries, currants, lemons, citrons, cherries, and many others. It is generally prepared from lemon juice, the dark treacle-like fluid imported from Sicily, by fermenting it, filtering, and neutralizing with chalk and quicklime, by which citrate of calcium is precipitated. This, by decomposition with sulphuric acid, gives the acid, which is made pure by repeated crystallization. Several improvements have of late been introduced, both in preparing the crude lemon juice for exportation and in the subsequent purification and crystallization of the acid. Citric acid is white when pure; it crystallizes in two forms, one belonging to the trimetric system is the common form, and in it the acid has one proportion of water. The other form is different, and the acid contains half the quantity of water. The ordinary crystals effloresce in the air, in a warm room. Citric acid has a pleasant sour taste. It dissolves very readily in water, and is soluble in alcohol, but insoluble in ether. When heated it undergoes decomposition, and yields aconitic, itaconic, and citraconic acids, along with other products. It is acted on by nitric and sulphuric acids and by other reagents, yielding a variety of decompositions and derivatives.

Citric acid combines with the metals, forming citrates. They are crystalline salts, and many of them are soluble in water. Crude citric acid is largely employed by the calico printer as a resist and as a discharge.

Citron, a tree of the genus *Citrus*. *Citrus medica*, a small evergreen shrub introduced into the S. parts of Europe and Asia, is the citron proper. We import the fruit in a preserved state, and then usually the rind alone. It comes candied with sugar, or preserved in salt and water for the purpose of being candied afterward. The lemon is the fruit of *Citrus limonum*, a native of the Himalayan mountains in India, and has long been cultivated in the S. of Europe, whence several varieties of lemons are imported into Great Britain. The sweet orange is *Citrus aurantium*, now found in China, India, North and South Africa, South Europe, Turkey, islands of the Mediterranean, South America, etc. The bitter

orange is *Citrus vulgaris*, known in Europe long before the last species. The shaddock (*Citrus decumana*) was introduced into the West Indies from China by Captain Shaddock. Another species, named *Citrus paradisi*, the forbidden fruit, is sometimes used in England as an ornamental addition to the dessert; the pulp of the fruit is sweetish, and the rind is not so bitter as that of the shaddock. The genus *Citrus* furnishes the essential oils of orange and lemon peels; of orange flowers (*Oleum neroli*); of citron peel (*Oleum citronellæ*); of the bergamot orange (*Oleum bergamotæ*): and oil of the orange leaves, usually called *essence de petit grain* — all much esteemed in perfumery.

Lemon juice, which is one of the sharpest and most agreeable of all acids, is used in cookery, confectionery, medicine, and various other ways. By calico printers it is very extensively employed as a discharger of color, to produce with more clearness and effect the white-figured part of colored patterns dyed with colors formed from iron. In Sicily and other Mediterranean regions it forms an article of commerce. Being one of the most valuable remedies for scurvy, it generally constitutes part of the sea-stores of ships that are destined for long voyages. Several different modes have been recommended for the preserving of lemon juice. One of these is to put it into bottles with a small quantity of oil, which, floating on the surface, prevents the immediate contact of the air and retards the decomposition of the acid, though the original fresh taste soon gives place to one which is less grateful. In the East Indies lemon juice is sometimes evaporated by a gentle heat to the consistence of a thick extract. Sometimes it is crystallized into a white and acid salt; but what is sold in the shops under the name of essential salt of lemons, for taking out ink stains and iron mold spots from linen, is only a preparation from the juice of sorrel. The external part of the rind of the lemon has a grateful aromatic and bitter taste, which renders it useful in cookery. When dried it is considered a good stomachic, promotes the appetite, and is otherwise serviceable as a medicine. In distillation it yields a light, almost colorless oil, which is frequently employed as a perfume. Lemons are sometimes preserved in syrup. Small ones, with thick rinds, are converted into a grateful pickle. Marmalade and syrup are also made of them. For the purpose of keeping the fruit, it is recommended that a fine pack-thread, about $\frac{1}{4}$ yard long, should be run through the protuberance at the end of the lemon. The ends of the string are to be tied together and suspended on a hook, in an airy situation, in such a manner that the lemon may hang perfectly free and detached. The cultivation of the lime (*Citrus Limetta*)

a well-known species of this genus, like the lemon but much smaller, with a thin and very odorous rind, and very acid juice, is carried on in several parts of America and the West Indies. Its juice affords a more grateful acid than that of the lemon.

Citronwood, or **Citrus-wood**, the most costly furniture wood of Roman antiquity, is usually regarded as derived from *Biota* (*Thuja*) *orientalis*, or possibly from *Callitris quadrivalvis*, allied coniferous trees, both popularly known as *Arbor Vitæ* (Oriental and African). Cicero is said to have paid an enormous sum for a table of this wood.

Citrus, a genus of *Aurantiaceæ*, trees and shrubs of tropical, subtropical, and warm temperate Asia, but many of them now cultivated in all similar climates for their fruit. To it belong the orange, citron, lemon, lime, bergamot, shaddock, forbidden fruit, etc.

City (Latin *civitas*). The Greeks and Romans distinguished a city from a town, or mere assemblage of people living together under municipal laws, as an independent community or State possessing sovereign authority, and including any portion of the surrounding territory the inhabitants of which possessed the rights of citizenship, but excluding conquered or dependent territories. Thus Athens, Rome, and Carthage were all both towns and cities in different senses. In Europe the word city came to have two meanings, the one civil, the other ecclesiastical. The civil meaning corresponded with the Roman sense, in which the great Italian republics and the German free cities during the period of their independence corresponded with it. The fluctuations in the fate of such cities must necessarily have caused the word to lose the sense of territorial independence, and this change would be promoted by the rise of rivals to them in other respects having no such claim, so that in modern times a city has come to signify merely a town holding from extent of population, favorable situation, or other causes, a leading place in the community in which it is situated. The ecclesiastical sense of the term city is a town which is the see of a bishop. This seems to be the historical use of the term in England, and still possesses some authority there, but in general use it has been superseded by the wider one. In our historical retrospect we take the term in its least restricted sense.

The origin of cities belongs to the earliest period of history. According to Moses Cain was the first founder of a city, and Nimrod built three, among which Babylon was the most important. The Jews imagine that Shem erected the first city after the deluge. At the commencement of society the form of government was patriarchal.

City

The ruler was the head of the family or clan. Relationship, the innate wish of men to live in society, and more, perhaps, than both these causes, the necessity of providing means of defense against more powerful clans, brought together separate families into one spot. The fertility of the East also afforded facilities for men to give up the rambling life of nomads and to form permanent settlements. These settlers began to barter with those tribes who continued to wander with their herds from place to place. Thus cities sprung up. These were soon surrounded with walls to prevent the inroads of the wandering tribes. The bond of connection between their inhabitants thus became closer, and their organization more complete. As by degrees the chiefs of these family states died away, the citizens began to elect the most able or popular men for magistrates. Thus political institutions assumed a systematic character.

The earliest form of government succeeding the patriarchal state was probably monarchical. In this the religious, paternal, and political authority remained rudely mingled. When conquest extended the limits of these early kingdoms the authority of the king was weakened, his connection with the different parts of his dominions became imperfect, and the progress of civilization was promoted almost solely by the growth of the cities. These gave rise to the division of labor, the refinements of social intercourse, the development of laws, caused by the conflicting interests of many people living close together, the idea of equality of rights, the diminution of awe for a distant monarch, the growth of patriotism, springing from the sense of advantages enjoyed and the exertions necessary to maintain them. In Asia, Africa, Greece, and Italy cities were built first, and in the greatest number. The Phœnicians and Egyptians particularly distinguished themselves by the erection of cities, which soon attained a high degree of wealth, and consequently of civilization. The Egyptians considered their city of Thebes older than any of the Greek cities; and Pliny says that Cecropia, said to have been erected in Attica by Cecrops, 1582 B. C., and afterwards called Athens, was the oldest city of Greece. Heeren remarks that the rise of cities was the most important source of the republicanism of antiquity. This is particularly true of Greece. Cities are, by their very nature, of a democratic tendency.

Several confederations of cities existed in the ancient world; for instance, the Phœnician, consisting of the cities of Tyre, Sidon, etc., and the Achæan league, formed by the most important cities of Greece, in order to strengthen themselves against the power of Macedon. Under Augustus and his successors the Romans began to establish colonial cities in Germany, having

City

done the same long before in Gaul, Spain, Africa, etc. In Switzerland they first erected cities about A. D. 70, which, however, were mostly laid waste by the Alemanni, and subsequently rebuilt under the government of the Franks (A. D. 496). The Germans, accustomed to a wild, rambling life, did not show any disposition to live in cities till Charlemagne labored to collect them together in settled abodes from his desire to civilize them. Henry I. distinguished himself particularly in this way, and on this account has been called by some Henry the City-builder (*der Städterbauer*). He gave the cities great privileges, in order to induce his subjects to live in them, and thus laid the foundation of that power which at a future period contributed most to break down the feudal system. In many cities imperial castles were erected to protect the inhabitants, and the insupportable oppressions and even cruelties exercised by the feudal lords on their peasants, or by the wandering knights and robbers, drove many people into the cities. The attacks of the neighboring lords gave firmness to their union, and compelled them to cultivate their resources. Commerce and the various arts and trades were soon cultivated within their walls, and their wealth and respectability increased. They soon became sensible of the want of a better system of laws and political administration than prevailed around them, and the principle of equal rights and laws was quickly developed.

One of the most important remnants of ancient civilization was the cities of Italy. In spite of their bloody contests with each other, and the vices of an oligarchical government, Europe is mainly indebted to them for the cultivation of the commercial spirit, together with the toleration and love of liberty which it tends to foster, and for that ardor in the cultivation of arts, science, and literature which has always distinguished the best periods of Italian history, and from which the general revival of learning in Europe, called the Renaissance, took its rise. Under the reign of Conrad III. (1138-1152) the cities of Lombardy, and particularly Milan, which stood at their head, had acquired a high degree of wealth and power, and had formed themselves into a confederation. The struggles between the emperors and these cities form one of the most important portions of the history of the German empire and of Italy. Frederick I. in vain demolished the powerful city of Milan. It was soon rebuilt, and the cities of Lombardy, in alliance with the Pope, obliged the emperor to conclude with them a very disadvantageous peace at Constance. Two other confederations of cities, highly important, were formed during the interregnum of the German empire, between 1256 and 1272. One of them was the powerful Hansa, or

HANSEATIC LEAGUE (*q. v.*), the other the confederacy of the High German and Rhenish cities, from the foot of the Alps to the mouth of the Main, established by Walpode of Mentz in 1255. A similar confederacy, and a very important one, was that of the Suabian cities, instituted in 1488 to repel the outrages of the feudal lords and knights.

The cities of the Netherlands, from their central position between France and Germany, exercised a powerful influence on the growth of civilization and political liberty in Europe. Their favorable situation and the enterprise of their inhabitants early gave them great wealth and power. The democratic spirit, ultimately carried to the greatest height in Holland, was earliest manifested in the towns of Belgium, which began in the 12th century to manifest a turbulent disposition, and by frequently leaguering themselves with the enemies of their feudal superiors extended their political privileges, and acquired at times a premature independence, which, though ultimately extinguished in the spirit of nationality, contributed not a little to the breaking up the feudal system. In Spain municipalities were established at an early date. Leon received a charter in 1020, Sepulveda, Lograno, Sahagun, and Salamanca followed soon after. The constitution of the Spanish towns approached more nearly to the ancient idea of a city than was common in other large states of Europe, in this resembling the Italian cities. Their constitution was extremely democratic, and they ruled over a large extent of surrounding territory, which they were bound to defend. Deputies from the towns were admitted to the Cortes in the 12th century (1167 and 1188). The love of liberty rose high in these ancient Spanish cities, but from the isolation of the Iberian Peninsula they exercised little influence in Europe, and they soon lost their power and importance, most of them by the end of the 15th century having ceased to send their representatives to the Cortes. By degrees the cities acquired in the different countries of Europe the right of representation in the legislative bodies; and wealth, industry, knowledge, and equal laws spread from them through Europe. But the cities of Lombardy, though still flourishing and wealthy, had fallen, for the most part, under the rule of single families; their republican governments vanished, and their confederation was dissolved. The associations of German cities experienced a similar fate. By the peace of Westphalia the princes of the German empire were declared sovereign powers, and the more their authority increased the more did the relative weight of the cities diminish. These had formerly suffered from the oppressions of the feudal lords. They were now the victims of the policy of the neighboring princes, and many had lost their independence before

Napoleon dissolved the German empire. He took away the privileges of those which remained free; and the Congress of Vienna restored freedom to Lübeck, Hamburg, Bremen, and Frankfort. At the same time Cracow was declared an independent city.

Cities, as we have seen, naturally develop the democratic principle, and on this and several other accounts are to be considered among the firmest supports of liberty.

Much has been said on the immorality of large cities, and they have vices peculiar to themselves; but they are free from many of those of petty towns, and even of rural districts. The association of men in masses, when due surveillance is exercised, has an influence distinctly favorable to the maintenance of social order, the impartial administration of justice, and, above all, the suppression of all petty and local tyrannies, and the maintenance of individual liberties. It is by the influence of cities alone that a sufficient organization for the support of education and the means of enlightenment is obtained, even though that organization often fails to penetrate the entire mass of the cities themselves. It is to them that many of the facilities for progress in art and science are due. It is in them that public opinion is formed, and so organized as to act upon the administration, and, even independently of direct representation, upon the legislation of a country; and although the individual freedom enjoyed in great cities may often tend to license, its general influence in an otherwise healthy community is highly beneficial to the moral tone of the whole.

Medical Statistics of Cities.—The average number of deaths in cities is higher than in rural districts but probably no city has ever yet existed in which sanitary laws have been observed, not to say as well as they might be, but as well in one district of the city as in another. Thus the extreme difference of mortality between different districts in the same city may be quite as great as the average difference between town and country. This is a point which the accumulation of precise statistics may not yet be sufficient to determine; but it must be evident that with the best sanitary regulations the city has some advantages over the country for the preservation of health to counterbalance the undoubted advantages of the country, especially in purer air. It is much easier in the city to avoid undue exposure, and medical assistance, as well as all appliances for the preservation of health, can be commanded there more freely than in the country. Perhaps the mortality of London presents the strongest evidence that the mere living in a city is not necessarily unfavorable to longevity. Vastly as London exceeds all other cities in Europe in population, and imperfect as its sanitary arrangements in

Ciudad-Rodrigo

many respects are, its mortality is yet very moderate, and does not compare very unfavorably with the average mortality of the country. The mean rate of mortality in London, as shown by the returns of the registrar-general for the 31 years up to 1871, was 24.34 per 1,000 per annum. In 1888 it was 18.7; in 1898, 19.2. The mortality is higher than the mean in the E. and central districts, lower in the W. and N. In the low S. districts the mortality has decreased in consequence of drainage. In 1898 the mortality of Liverpool was 23.9; Manchester, 21.4; Salford, 21.9; Birmingham, 20.4; Sheffield, 20.6; Bristol, 17.5; Newcastle, 20.8; Glasgow, 21.5; Edinburgh, 19.5; Dublin, 26.2. As regards mortality, London compares favorably with most of the larger European cities, of which St. Petersburg and Moscow have the highest death rate (29 or 30). Cities in the United States and Canada seem to be much on a par with those of Great Britain. Asiatic cities stand much higher.

Ciudad-Rodrigo ("Roderick-town"), a fortress in Spain, in Leon, on the river Aguada. In the Peninsular War it was taken by storm by the British under Wellington, after a siege of 11 days. The Cortes gave him the title of Duke of Ciudad-Rodrigo.

Civet (*Viverra*, Linn.), a genus of carnivorous animals forming the type of the family *Viverridae*, natives of the warmer regions of Asia and Africa. They have a long head with a sharp muzzle, a ringed tail, a whitish throat, and crest of black hair on the back; and are particularly distinguished by having a pouch or secretory apparatus in which collects a powerfully odorous matter known by the name of civet. In general appearance the civets remind one of animals of the cat tribe, which they also resemble in habits; but the claws are by no means so sharp as those of the cat, though they are partially retractile or cat-like. The resemblance of the civet to animals of the feline race is increased by the pupils of the eyes, which contract in a straight line; and by the color of the fur, which most species have banded or spotted with black on a deep yellow or dun-colored ground. The tongue is studded with stout horny prickles, and the ears are of moderate size, straight and rounded to their tips. The pouch, situated near the anus, is a deep bag, sometimes divided into two cavities, whence a thick, oily, and strongly musk-like fluid is poured out. The civets are nocturnal and prey on birds and small mammals. They may be considered as forming the transition from animals of the weasel or marten kind to the feline or cat tribe. The chief species is the African civet (*V. civetta*), and among the others are the *zibeth* or Asiatic civet (*V. zibetha*), the Tangalung (*V. tangalunga*), inhabiting

Civil Drainage Acts

Malaysia, and *V. megaspila*, a species found in Malacca and Cochin-China. *Viverricula* is a closely allied genus including the *rasse*, of India, China, and other parts of Asia. The genets, forming the genus *Genetta*, have no scent pouch. The odoriferous substance which these animals yield, called, from them, civet, when good, is of a clear yellowish or brown color, and of about the consistence of butter; when diluted the smell is powerful and even offensive, but when largely diluted with oil or other materials it becomes an agreeable perfume. It contains stearin, olein, and other substances, together with a yellow coloring matter. At a time when perfumes were more fashionable than they are at present civet was very highly esteemed, being by many even preferred to musk. Young civet cats were purchased by the drug dealers of Holland, England, etc., and were brought up tame for the sake of the civet. The medical virtues once attributed to the civet were numerous and various; but in course of time it has been entirely laid aside, even as a perfume; so that at this time the words of poor King Lear, "Give me an ounce of civet, good apothecary, to sweeten my imagination," might be repeated in our large cities without obtaining the article. See plate at article CARNIVORA.

Civic Crown, among the Romans, the highest military reward, assigned to him who had preserved the life of a citizen. It bore the inscription "*Ob civem servatum*," that is, "for saving a citizen," and was made of oak leaves. The person who received the crown wore it in the theater, and sat next the senators, and when he came in all the assembly rose up as a mark of respect.

Civics, the science that treats of citizenship and the relations between citizens and the government. It embraces ethics, or social duties; civil law, or governmental methods; economics, or the principles of finance and exchange; and the history of civic development. The study of this science has been largely introduced into the schools of the United States, and is also attracting the attention of politicians and social economists elsewhere.

Civil Damage Acts, legislative bills, passed in several of the United States, giving to husbands, wives, children, parents, guardians, employers, and others who have sustained injury in person or property or means of support, by an intoxicated person in consequence of such intoxication, the right of action against the person who sold or gave away the liquor which caused such intoxication, have been held to be constitutional. In some cases the right of action has been extended to the owner of the premises where such intoxicating liquor has been obtained.

Civil Engineering, the science or art of constructing machinery for manufacturing purposes, constructions and excavations, for general transit, as canals, docks, railroads, etc. It is so called in contradistinction to military engineering, which is confined to war. Other branches of engineering are mechanical engineering, sanitary engineering, and electrical engineering.

Civilization. The influences by which men operate upon each other in society produce in their aggregate the particular state and tendencies of each society, and these constitute what is called the civilization of the society. Civilization, then, may be defined as the sum of the results of individual influences upon society. When these influences are on the whole beneficial, civilization is progressive; when they are injurious, it is retrograde. The common use of the word civilization as an equivalent of progress or refinement is a sufficient indication of the belief of mankind that these influences are on the whole beneficial; and the continued existence of society is in itself a confirmation of this belief. History, however, presents us with two distinct movements in civilization, a progressive and retrogressive one. These may be observed apart, according as the one or the other predominates. When a particular society is isolated from communication with others it has usually been found to retrograde until it has sunk to a point in the scale of civilization corresponding to the number of active influences to which it is still subjected. Thus among the various tribes of savages who have long lived in isolated situations beyond the reach of the general tide of civilization, many have been found who have shown no signs of original degradation of type, and whose low state of civilization is to be attributed exclusively to their comparative isolation. No other instance need be cited than our own ancestors, and the barbarous and semi-barbarous tribes which overthrew the Roman empire, and now constitute the most polished nations of Europe. On the other hand, when a State is advancing by conquest, commerce, or other means, in power and influence, and is brought into continual contact with other civilizations, its own advances rapidly until it attains a high level, and the progressive movement alone is visible in it. Such was the condition in their palmy days of Greece and Rome. A mean state between these two is still to be found. When a great nation like China isolates itself from communication with others it does not escape the common law, but its mere numbers prevent it from sinking so low as a thinly sown and partially organized population. In China we have, consequently, the remarkable phenomenon of a civilization advancing, up to a certain point, in parallel lines in almost every particular with the most advanced

European civilization, though without communication with it, and then stopping short, and remaining stationary for a succession of generations. Till recently Japan presented a case similar to that of China, but it is now rapidly bringing itself quite abreast of Western civilization.

When all these circumstances are considered in their details it will readily be perceived that the two contrary movements which make up the actual sum of civilization, do not operate independently and in distinct epochs, but are constantly at work together at the same time and in the same society, and that it is the balance of their influence only which determines the progressive, retrograde, or stationary condition of a community. This explains the endless variety and contradictory nature of the views held regarding civilization. It shows, for example, how two observers, both able and clear-sighted, looking at the same time at the same society can conclude, the one that it is progressing, the other that it is retrograding. Neither can see the whole influences to which the society is subject, and each judges from what he sees. Considering the influences to which society is subject in another light, they may be divided into two classes; stimulating influences, consisting of all these impulses, impressed upon society by the energy and originality of individual thought and action; and repressive influences, consisting of the whole power of repression exerted upon individual energy and originality by the combined action of society. Such are positive laws, habits founded on the instinct of imitation, the indolence and love of luxury promoted by wealth, the restraint of liberty resulting from dread of social censure, and innumerable other bonds increasing in stringency with the progressive complication of social organization to which society subjects the individual. These bonds are remarkably strong in modern society, and have a tendency, as they increase in strength, to produce a uniform type of individual character among all persons not possessed of unusual energy of thought or will, together with a similar sameness in social training and habits.

When we look back on the history of civilization we do not find a uniform progress among those peoples who have kept up the traditions of history and maintained an unbroken communication with the leading types of civilization in their day. The fall of the great empires formed by conquest or commerce, proceeding as it did mainly from internal causes, must be regarded as the break-down of an overstrained civilization, the culmination of retrograde influences slowly accumulating amid past prosperity. These crises have usually exercised a wide influence of an adverse kind upon the whole progress of civilization, while the highest

attainments in art, science, and literature of the peoples more immediately concerned have frequently perished in them. Thus while our modern civilization has descended directly from that of Greece and Rome, and these probably from the earlier civilizations of Eastern nations, there are remains of several cycles of ancient civilizations, each of which probably remains in some respects superior to the highest attainments of after-times. But although much has been lost in these crises all has not been lost. Somewhere the vital principles of the old civilization have always been grafted on a new stock, and a new cycle of progress has commenced, in which much that has been lost has had to be slowly relearned, but in which, through the very exertions made to reacquire and rediscover what has been lost, new acquisitions are made and new paths of improvement opened up.

In the progress of civilization another thing is to be observed. It is with communities as with individuals. The full attainments of age never fulfil the promise of youth. Among the possibilities of a rising civilization there must always be many which are doomed in the course of historical development to be extinguished. This explains a phenomenon which might otherwise seem unaccountable, that the rude and comparatively barren periods in the cycles of civilization are commonly the periods of the highest flights of poetry, and that the fulness of science on the other hand seems to extinguish the light of imagination. It is that the early ages of a nation's progress are its time of promise. There is then, too, comparatively little for men of contemplative mind to dwell on in the present. They are thrown upon the future, and expend the sagacity which might otherwise have been devoted to scientific research, in prophetic anticipations clothed in allegorical vision or fable; or if the past allures them, it is with the view of stimulating those around them to emulation and higher achievement. At the other end of the cycle of progress there are the innumerable failures of an advanced civilization to account for, and poetry loses itself in endless refinements.

The question of the influence of religion on civilization is one of the highest importance, but may for the present purpose be easily disposed of. The fact is undoubted that the religions of all peoples have at all times exercised a powerful influence upon their civilization. There can be no doubt that it is so at present, that a Mohammedan country, for example, differs widely in its civilization from a Christian one, from the mere fact of its being Mohammedan. In considering how far the influence of Christianity on our civilization has been beneficial one thing must be borne in mind—that CHRISTIANITY

(*q. v.*) never has existed in society in a state of perfect purity. It is an exoteric influence which has operated variously at various times according to the number of active ideas it has communicated to society for the time being. Christianity still exists independently of society in its moral precepts and historical facts, and its influence in the future will doubtless continue to vary as it has done in the past. The notion that it will diminish as science advances seems to be founded on a complete misconception. Individuals and society are influenced not merely by knowledge, but by passions and desires. These are controlled by moral motives, on which scientific facts have only a very feeble and remote influence, and to which the precepts of Christianity appeal directly and powerfully. As long as a people, then, retain a belief in Christianity as a system of morals not directly derived from science, its morality will continue to be based on its Christianity and not on its science, and this will both directly and indirectly influence its civilization in a degree little affected by the increase of scientific knowledge. It is true, however, that science has changed and may continue, without affecting our belief in it, to change our views of Christianity, and in this way may modify without destroying or even weakening its influence.

From this outline of the conditions of the problem of civilization we shall probably be justified in leaving to our readers the many questions that may arise from speculation on its future progress. From the past it may be predicted with tolerable safety that there will be progress on the whole; that the progress will be intermitted and interrupted; and that it will never, perhaps at the best, be quite as satisfactory as it might be.

Civil Law. I. The Romans understood by this term nearly the same as in modern times is implied by the phrase positive law, that is, the rules of right established by any government. They contradistinguished it from natural law (*jus naturale*), by which they meant a certain natural order followed by all living beings (animals not even excepted); also from the general laws of mankind, established by the agreement of all nations and governments (*jus gentium*). In this sense, therefore, it embraced the whole system of Roman law, both the private law (*jus privatum*), which relates to the various legal relations of the different members of the State, the citizens; and the public law (*jus publicum*), that is, the rules respecting the limits, rights, obligations, etc., of the public authorities.

II. As, however, the law of any State, particularly such a one as Rome, can rest only in part on positive and special decrees, and must always be developed in a great measure by the customs and religious

and philosophical opinions of the nation, and the decisions of the courts, further distinctions soon grew up. The supreme administration of justice in Rome was in the hands of the prætors; and these officers, on account of the paucity of positive enactments, soon acquired the power of supplying their deficiencies. To quote the words of Gibbon — "The art of respecting the name and eluding the efficacy of the laws was improved by successive prætors; and where the end was salutary the means were frequently absurd. The secret or probable wish of the dead was suffered to prevail over the order of succession and the forms of testaments, and the claimant who was excluded from the character of heir accepted with equal pleasure, from an indulgent prætor, the possession of the goods of the late kinsman or benefactor. In the redress of private wrongs compensation and fines were substituted for the obsolete rigor of the 12 tables, time and space were annihilated by fanciful suppositions, and the plea of youth, or fraud, or violence annulled the obligation or excused the performance of an inconvenient contract. A jurisdiction thus vague and arbitrary was exposed to the most dangerous abuse. But the errors or vices of each prætor expired with his annual office; and such maxims alone as had been approved by reason and practice were copied by succeeding judges."

The prætors made an annual declaration at the commencement of their term of office of the principles according to which they intended to administer justice (*edictum prætoris*). This was publicly exposed on a table (*album*); and uniformity was maintained in the series of prætorian edicts by the legal spirit of the nation. Under the Emperor Hadrian a new publication of the prætorian edicts, unalterable from that time (*edictum perpetuum*), took place, respecting the real extent of which scholars do not agree. The whole body of rules and remedies established by the prætors whose jurisdiction resembled in some respects that of the courts of equity of England, was called *jus honorarium*, and was opposed to the strict formal law (*jus civile*).

III. The Roman law, in the shape which it assumed after the whole was digested in the 6th century A. D., under the Emperor Justinian, was fully and formally admitted as binding in only a small part of Italy; but both here and in other ancient portions of the empire it retained great influence, even after the Teutonic tribes had established new governments in the territories which had been under the dominion of Rome. In the S. of France the collection of imperial decrees and decisions which Theodosius II. (A. D. 438) had prepared remained valid also under the Goths. After the 11th century Upper Italy, particularly the school

of Bologna, became the point where the body of the Roman law put together by the Emperor Justinian was formed by degrees into a system applicable to the wants of all nations. This system was introduced into almost all the countries of Europe, because the want of a well-digested body of law was seriously felt. After this model the ecclesiastical and papal decrees were arranged, and to a considerable degree the native laws of the new Teutonic States. From all these the Roman law was distinguished under the name of civil law. In this sense, therefore, civil law means ancient Roman law; it is contradistinguished from canon law and feudal law, though the feudal codes of the Lombards have been received into the *corpus juris civilis*.

IV. As the Roman code exerted the greatest influence on the private law of modern Europe, the expression civil law is also used to embrace all the rules relating to the private rights of citizens. Under the term civil law, therefore, on the continent of Europe, is to be understood not only the Roman law, but also the modern private law of the various countries; for example, in Germany, *Das gemeine Deutsche Privatrecht*; in France the *Code civil des Français* or *Code Napoléon*. In this sense it is chiefly opposed to criminal law, particularly in reference to the administration of justice, which is to be divided into civil justice and criminal justice. Having made these few remarks on the name and character of the civil law, we shall now proceed to a more particular account of its history.

The history of the Roman law, embracing its gradual development, its final completion under the later emperors, particularly under Justinian, and the great influence which it has exerted even down to the present period in Europe, is a most interesting and important subject. Rome may be said to have thrice conquered the world — namely, by its arms, by its laws, and by the decrees promulgated from the papal chair. The dominion of its laws has been the best founded and the most extensive. The Roman laws may be formally abolished, but their influence can never cease. Their effect is as permanent as that of Grecian art. At the same time it is not to be denied that the introduction of the civil law has in the case of several nations obstructed the development of their own peculiar systems of law, and in this respect produced evil consequences; but such is the nature of great agents which are beyond the control of human power. An acquaintance with a more perfect language, a more beautiful style of art, though we can hardly say with a purer religion, has likewise prevented the growth or completion of many institutions and modes of action which might have borne noble fruits. In considering the history of the civil law, as, in fact, of any system of law which has

sprung from the wants of the people among whom it grew up, we must take into view the public law and political history of the State, and the growth of its civilization.

The commencement of the history of Rome offers little that is original. Its institutions were such as existed in all the neighboring States. Greek views predominated throughout. The royal authority fell in Rome, as it had fallen in all the Greek governments, and the division of the nation into a hereditary body of nobles, and a comparatively powerless community of citizens, gave rise to numerous and lasting struggles. If manly firmness (*virtus*) constituted the *beau idéal* of a genuine Roman, the same quality was the basis of the Roman laws. These laws did not consider the individual principally in his connection with others, like the ancient German laws, which give a value to the individual chiefly as a member of a family or a community, but at an early period treated every one as an independent member of society, the head of a family, free from the restraints of relationship, or membership of corporations. Institutions like those of the Germans, recognizing a property common to a family or a corporation, hereditary or entailed, a body of attendants attached to the lord, feudal services, unequal right of inheritance among children, etc., are not to be found in the civil law. The relation between patricians and plebeians, between patrons and clients, was very different from the feudal connection. The expulsion of the kings was at first of advantage only to the higher classes of citizens (509 B. C.), but only 15 years afterward (494 B. C.) these were obliged to grant to the other citizens the college of the tribunes and the right of holding deliberative assemblies, which opened the way for the great compact of the 12 tables, drawn up by patrician decemvirs (451-450 B. C.), which the ancients considered as establishing equality of rights, though it was not till some years afterward that the patricians and plebeians were allowed to conclude valid marriages with each other (*lex Canuleia*, 445 B. C.); and not till a much later period were plebeians capable of being elected consuls (366 B. C.). An important point of that fundamental law or charter, if we may give it a modern name, was the establishment of such an order of legal procedure that the poorer class of citizens, and particularly those living without the city, should not, as had been too often the case, suffer from their causes being hurried through the courts. Another important point was the settlement of the legal independence of the individual.

Eighty years after the plebeians had been made capable of being elected to the consulship the senate was obliged to acknowledge the validity of the people's decrees (*plebis-scita*) by the *Iex Hortensia* (287 B. C.); and

from the first appointment of a *prætor urbanus* (366 B. C.) it was customary, as we have already said, for this officer to give public notice annually, at the beginning of his term of office, of the principles according to which he intended to decide the cases that should fall within its jurisdiction. These edicts of the prætors, in which the same rules, with few exceptions, were uniformly adopted, were a better means of keeping the system of laws in a constant state of development than special decrees would have been. By this means there grew up, besides the positive law (*jus civile*, in the stricter sense of the word), a whole body of acknowledged principles, a common law (*jus honorarium*), which supplied the chasms of the positive ordinances, mitigated their severity, or paved the way for the necessary reforms. Though the ancients, for example, Cicero, mention the great accumulation of these positive laws, yet their number, at least as far as respected private rights, appears very small compared with the laws of modern times. It was only as it regarded the regulation of public relations that there existed in the time of the republic such a mass of laws that Cæsar thought it a meritorious work to bring them into a system. But it ought not to be forgotten that the necessity which existed at that time of impressing the whole body of decisions on the memory of the lawyer made the mass troublesome sooner than if there had been abridgments, digests, registers, etc.

For the purpose of making legislative enactments there existed in the republic two concurrent authorities—the meeting of the citizens (*plebs*, under the tribunes, *in comitiis tributis*, whose resolutions are called *plebis-scita*), and the senate (whose decrees are called *senatus consulta*). In the beginning the provinces of the two were so separated, that each one passed decrees only on its own affairs and relations; but very soon it became necessary to acknowledge mutually a common authority (*lex Hortensia*). However, as long as Rome remained a republic, the interference of the senate in the enactment of laws was comparatively rare. After the great internal convulsions had broken out, the conquerors endeavored to establish their authority more firmly, and to gain the favor of the people by making important reforms in the laws, particularly those which concerned the punishment of crimes and political offenses, the regulation of legal processes, and some abuses in the public administration. This was done by Sylla (*leges Corneliæ*, 67 B. C.), by Julius Cæsar, but much more by Augustus, in whom, from 32 B. C., the power of all the branches of government and the direction of the senate and of the meetings of citizens were united (*leges Juliæ*, passed chiefly under the authority of Julius Cæsar and

Augustus). To the laws, strictly so called, previously customary (the *leges*, approved by the citizens), and the decrees of the senate, now were added the special ordinances (*constitutiones*) of the emperors, besides which the prætors in Rome and in the provinces still retained the right of contributing by their edicts to the development of the legal system. As soon, however, as the monarchical government became settled, the forms of the republic gradually disappeared. In the reign of Tiberius (A. D. 14-37) no *leges* are to be found after the year A. D. 24, and, 200 years later, the *senatus consulta* also merged entirely in the imperial decrees, constitutions, and rescripts. The annual edicts of the prætors, till then customary, were collected under Hadrian (A. D. 131), by the jurisconsult Salvius Julianus, into a form which was made unchangeable, called the *edictum perpetuum*.

It is worthy of remark that though, after Augustus, the most absolute despotism had become established in all public relations, and the penal laws had been made mere instruments of despotism, this very time is the most brilliant period of the scientific development of the civil law. This period begins with Augustus, but the brightest part of it falls under the Antonines (from A. D. 130 till A. D. 180), and one or two succeeding emperors. The great names of Gaius, Papinian, Ulpian, Paulus, belong to this last period. When the political privileges of the citizen had no guarantee but the good disposition of the emperors, which often proved a very imperfect security, the laws which regulated the relative rights of individuals, and protected them from mutual wrong, were continually approaching perfection. This subject deserves a more thorough investigation than it has yet received. All legal relations were expressed with admirable skill and consistency in distinct definitions, and the whole system was developed from a few principles which run through the whole, and the distinctness and simplicity of which are proved by the adoption of the Roman law among so many different nations. The process of development was in so far historical, as it was always connected with an adherence to the old forms; but it was entirely philosophical and rational, as it always strove to find out the real principles of rights and obligations, and to make the formal law dependent upon them. After the age of the Antonines (from A. D. 180), such a political confusion took place that the scientific spirit was lost. The judicial system was now continued only by the imperial constitutions, which treated but rarely of private law, while they entered much and often into the subject of public relations. The opinions of the ancient jurisconsults of the better period were regarded almost as legal authorities, and, to remedy the difficulties arising from their

different views, it was provided by Valentinian III. (A. D. 426) that the majority of opinions should decide. The number of the constitutions became such that collections of them were made, first by private persons ("Codex Gregorianus et Hermogenianus" about A. D. 365), then an official one by Theodosius II. ("Codex Theodosianus," A. D. 438), in 16 books, of which the last 11 have been preserved entire; of the first five, however, only fragments are extant. There was also an abridgement of this code, made in 506 for the use of the Visigoths (the "Breviarium Alaricianum").

Far the greater part of these decrees relates to the public law. Injurious consequences necessarily resulted from the cessation in the development of the Roman law after the time of the Antonines. It may be seen, from the expressions of Justinian, into what subtleties, what verbal and formal niceties, the lawyers had fallen in his time — a state of things in some respects not unlike the present state of law in England, from similar reasons. The public administration, at least as far as regarded its external form, had been reduced into tolerable order since the time of Diocletian and Constantine. Theodosius II. (408-450) had conceived the idea of arranging the immense mass of rules and authorities relating to the private law, but the difficulties on examination were considered too great, and no sovereign till Justinian (527-565) had the courage to meet them. He first ordered the imperial constitutions, which still remained in force, to be put into a new collection ("Codex Justinianus," commenced in 527), and decided, in and after the year 530, 50 legal questions which had been till then left doubtful. At the same time, a systematic abridgment of the writings of the jurisconsults was made by 17 commissioners, embracing 50 books of digests or pandects, and an introduction to the study of jurisprudence was prepared (*institutiones*): both works were published Dec. 30, 533, and invested with legal authority. In the following year a new collection of imperial decrees ("Codex Repitatae Prælectionis"), in 12 books, was published, and from that time another series of single decrees (13 edicts and 159 *novellæ constitutiones*), by which the Roman law may be considered as completed, because it was deprived of its capacity of further development, and left to mankind as a rich but lifeless treasure. The opinions respecting this work of Justinian are very various. If we consider merely the practical utility of his labors, as regards his age and people, it will not be denied that he conferred a great benefit on his subjects, and the changes themselves, which were made in the existing regulations, proceeded mostly from a sound view of the higher objects of law. The abolition of antiquated and useless forms, the simplifica-

tion of legal relations and legal processes, must be acknowledged to have been the principal objects of the changes made; and these changes were executed with judgment. If there are decrees of little value among them, these imperfections are not greater than we find in all ancient and modern codes.

Our limits will not allow us to mention here the different editions, abridgements, and translations of the work prepared for the Greek provinces (the Western provinces were soon lost forever). One Greek edition of a much later date was ordered by L. Basilius Macedo (867-886), and executed under his successor, Leo the Philosopher (886-912). This was called "*Libri Basilicorum*," or the "*Basilica*." The downfall of the Roman empire did not destroy the Roman law, but in some respects has enlarged its dominion. It was in force before the modern governments were established throughout the Roman empire in Europe, and when the Goths, Franks, Lombards, Burgundians, and other Teutonic tribes erected new empires, not only a large part of the public law of Rome was incorporated into the new constitution, but the private law also continued to be acknowledged as valid among the old inhabitants. The new rulers took care that, besides their different ordinances for the weal of the Germanic tribes, abridgements and modifications of the Roman law should be made, sometimes, it is true, rude and barbarous enough. Among these were the "*Breviarium Alaricianum*" of the Visigoths, 506; the "*Lex Romana*" of the Burgundians, or "*Papiani Responsa*," between 517 and 534. For the Lombards a *rifacimento* of the Roman law was prepared in the 8th and 9th centuries, and thus in the S. of France and Italy this law continued in authority uninterruptedly, as far as it was adapted to the new state of things. But this authority, of course, diminished in proportion as new forms of family relations and social connections and new species and tenures of property sprang up, particularly under the feudal system, and in proportion as the internal disturbances in the different States unsettled the idea of law in general. But this idea was awakened again after the States had gained a degree of stability. People began to perceive that there was a nobler and firmer basis of right than mere power; national union gained consistency and true value by means of commerce and industry; the lower classes demanded the extension of their privileges; the increasing activity produced more solid distinctions than those of birth; the insufficiency of the old laws began to be felt, and the blessings of a scientific cultivation began to be diffused, borrowed, in a considerable degree, from the Arabians in Spain.

In this state of things men rose, in Upper Italy, in the 11th century, who freed the

law books of Justinian from the obscurity in which they had been buried till then, and by these means gave a new impulse to the science of law. Irnerius, toward the end of the 11th and in the 12th century, is mentioned as the first of them. All the nations on the European continent seized eagerly on the treasure offered to them, after the model of which were now digested the papal decrees, the feudal law, and at a later period the Germanic laws. Thousands of scholars from all parts of Europe, went to Bologna and other cities of Italy to study law there. It was generally supposed at first that the Roman law was applicable to the whole of Christendom; but it was soon found out that there existed whole systems of laws and legal relations with which the rules of the civil law would not harmonize; and the peculiarities in the organization of the tribunals of different countries were long an obstacle to the formal adoption of the civil law. This adoption, therefore, did not take place in the various countries at the same time, nor to the same extent. In Italy and the S. of France it was introduced first and most completely; at a later period, and to a less degree, in the N. of France (in the *pays de droit coutumier*), where it has never, in fact, been acknowledged as binding, but only as an authority in regard to general principles of natural law (*raison écrite*), and still retains this degree of influence, notwithstanding the establishment of the *code civil*. In England it never has been received in the ordinary civil courts (it is, to some extent, in Scotland), but the spiritual courts have always been guided by it. It is, therefore, in force in such cases as fall under the jurisdiction of these courts, for example, such as relate to last wills. It is also in force in the admiralty courts, but in both with many modifications. In Germany the idea that the emperors were the successors of the Roman sovereigns contributed much to obtain legal authority for the Roman law in that country; and this has been confirmed by several laws of the empire and of the different States composing it.

But the native laws have everywhere prior authority and the Roman law can only be applied in cases where these make no provision; but all those of its rules which relate to institutions confined to Rome have no force. It is not allowed, moreover, to be applied to cases growing out of modern institutions, such as fiefs, primogeniture, bills of exchange, nor in questions belonging to the public law. Many cases, therefore, can happen in which there may be much doubt whether the Roman law is applicable or not. Prussia and Austria have codes; but in other German States, as in Saxony, there is a great confusion between the Roman and the native law. We

Civil List

have already observed that the effects of the Roman law never would cease, and its influence is perceivable in all the modern codes. See Amos's "History and Principles of the Civil Law"; Ortolan's "History of Roman Law"; Savigny's "Roman Law in the Middle Ages"; etc.

Civil List, in the United States, (1) a list of the entire expenses of the civil government, (2) the revenue appropriated to support the civil government, (3) the officers of the civil government who are paid from the public treasury.

In England, the list of expenses, the revenues and the dependents of the crown instead of the country.

Civil Service, The. The civil service is the name given to that part of the government service which discharges the civil and administrative functions. As such it is contrasted with the military and naval services. It is divided into the executive, legislative and judicial services, of which the largest in all countries is the executive civil service. This is in turn subdivided according to the various executive departments existing in the government. A large number of the positions in the civil service are clerical in character, but there are also included all classes and kinds of employees from common laborer to those employed in the highest grades of government work. It is impossible to classify these positions generally for all governments, as their number and duties depend upon the extent of the activities of each government.

The Civil Service of the United States.—The executive civil service of the United States included on June 30, 1904, 290,858 employees. This number is the result of a very rapid growth, particularly since the Civil War. In 1802, there were but 2,622 government employees; in 1817, 5,608; in 1867, over 60,000. Of the present large army of civil employees, only 25,325 are engaged in work at the seat of government; the rest are employed throughout the country under the direction of the departments in Washington. The Post-Office Department, with its large number of clerks and carriers and its 70,000 fourth-class postmasters, includes nearly two-thirds of the entire service. The government is a large employer of skilled labor in the Navy Yards and in the Government Printing Office, and of unskilled labor in the departments generally. In the Department of Agriculture, in the Smithsonian Institution and in the scientific bureaus it employs men of high scientific attainments.

The Constitution provides that the President "shall nominate, and by and with the advice and consent of the Senate, shall ap-

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point ambassadors, other public ministers and consuls, judges of the Supreme Court, and all other officers of the United States, whose appointments are not herein otherwise provided for, and which shall be established by law; but the Congress may by law vest the appointment of such inferior officers as they think proper in the President alone, in the courts of law, or in the heads of departments." By legislation a large majority of the government employees are now appointed by the heads of departments, but there still remains a large and important patronage in the hands of the President, in the distribution of which he is to a great degree controlled by the Senate. A thoroughly pernicious system has grown up, known as the "Courtesy of the Senate," by which the Senators have combined to control this patronage. It is based on the unsound theory that the Constitution in giving the Senate the power to advise as to appointments, justifies the individual Senator in proposing and, indeed, dictating all nominations to be made from his State; when, by the true interpretation, the President is given the sole power to nominate and the Senate as a body the power to confirm or reject the persons so nominated. The practice has been fostered by the custom, to which the Senate jealously adheres, of treating of all appointments in executive or secret session. The system is maintained by the equal distribution of patronage among the Senators of the party in power; and to this end they stand together and refuse to confirm any appointment at the behest of a single Senator who feels that a nomination infringes his rights. Some Presidents have practically surrendered their power both to nominate and to appoint, to the Senate; others have made a strong stand against the Senate. As it stands to-day, however, the President's power over the patronage is a source of weakness rather than of strength.

Growth of the Spoils System.—During the first thirty years after the adoption of the Constitution, practically no attempt was made to use the positions in the government service for partisan political advantage. Although party feeling ran as high as it ever has since, the Presidents of both parties belonged to the same social station and would have regarded such a general practice not only as disastrous but also as beneath contempt. The "midnight appointments" of John Adams and the thirty-nine removals made by Jefferson were the nearest approach to it. Down to the administration of Jackson there were only seventy-three removals of officers confirmed by the Senate, and apparently no removals, except for cause, from the inferior offices.

But by 1820 the new democratic spirit which eight years later was triumphantly

to elect Jackson and to sweep aside the old precedents of administration, was making itself felt. The Tenure-of-Office Act was passed, creating a four-year term of office for collectors of customs, navy agents, army paymasters and other officers of like responsibility. The offices began to be looked on not entirely as posts of trust and honor but as having a pecuniary value attached to them. As such they should be shared; no one man should be allowed to enjoy the benefits of an office indefinitely. With this appreciation of the value of an office as an office inevitably came the realization that it could be used as a weapon of partisan warfare and as a means of reward. Monroe and John Quincy Adams scrupulously abstained from making use of the Tenure-of-Office Act for their political advantage, but the inauguration of Jackson was the signal for a general proscription of those in office known not to be friendly to him.

Such a practice was already well known in New York politics. It was a New York politician, Senator Marcy, who gave to it the name of the "Spoils System" when he said in the course of a debate in the Senate: "The politicians of the United States are not so fastidious as some gentlemen are as to disclosing the principles upon which they act. They see nothing wrong in the rule that to the victor belong the spoils of the enemy."

In his first month in office President Jackson made more removals than had all his predecessors. His biographer, Parton, estimates at two thousand the number of removals during the first year, but this figure has been disputed. The policy of proscription was continued, and as fast as vacancies occurred they were filled by Jackson's adherents. By 1835 the abuse of the patronage had grown to such a scandal that a Senate committee, was appointed to investigate and report on the practicability of its reduction. Other committees followed; the Presidents following Van Buren recommended a return to the principles of earlier times, but the system had taken root and attempts to prevent its growth were blocked in Congress. In 1853, an act was passed requiring non-competitive or "pass" examinations for entrance to the service in four of the large departments, but this proved ineffective as a reform measure. During the Civil War public attention was engrossed with other matters, and the public service became more and more demoralized.

Civil Service Reform.—Once the war was over, the demand for a reform of the civil service began to make itself heard. Thomas Jenckes, a representative from Rhode Island, persisted in presenting the matter to an unwilling and inattentive Congress.

He made valuable reports upon the state of the public service, the growth of the patronage evil, and the measures adopted in other countries to cope with it.

A system of non-competitive or "pass" examinations for entrance to the public service had been adopted in England during the Melbourne ministry between 1834 and 1841. In 1853, this system was strengthened and the "Merit System," based on open competitive examination, was successfully introduced in the Indian Service. In 1870, after an exhaustive investigation, the competitive system was adopted in England and has been in force ever since. Those in the United States who were searching for some method by which to reform the civil service naturally turned to this English experience, and finding that it was producing satisfactory results, adopted the system of competitive examination, or the "Merit System," as their propaganda.

In 1871, Congress passed an act which is still in force, authorizing the President "to prescribe such regulations for the admission of persons into the civil service of the United States as may best promote the efficiency thereof." (Sec. 1753 R. S.) Acting under this authority, President Grant appointed a civil service commission, with George William Curtis as chairman, which proceeded to formulate rules and conduct competitive examinations. But Congress refused to uphold the system it had authorized. In 1874, the House voted to repeal the law; and although the Senate would not agree to this, the commission was left without the means to carry on its work, so well begun, through the failure of Congress to make an appropriation. In this dilemma President Grant suspended the operation of the rules.

But public opinion was becoming aroused. Civil service reform associations, composed of private citizens earnestly interested in securing the adoption of the Merit System, were formed as early as 1877. These associations grew rapidly in number and in influence, particularly in the East. In 1881 the local associations formed a federation, under the name of the National Civil Service Reform League, with George William Curtis as its president.

President Hayes favored the Merit System and caused the resumption of the operation of the rules in the custom-house and post-office in New York City. He also sent Dorman B. Eaton, one of the leaders in the reform movement, to England to report upon the English system. Mr. Eaton's report, which was transmitted to Congress and later published under the title of "Civil Service in Great Britain," was widely read. Nevertheless, in spite of the agitation for reform, the adoption of the Merit System in the Federal service might have been de-

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layed for many years by the spoilsmen in Congress had it not been for the murder of President Garfield by a disappointed office-seeker. In the face of public indignation over this tragedy the opposition quailed, and many voted for the passage of the civil service bill, which became a law on January 16, 1883, who have since bitterly opposed it.

The Civil Service Law.—This law, sometimes called the Pendleton Act, is still in force. Congress has shown a decided hostility to it, but it has never been amended, and the threats frequently made to refuse the appropriations necessary for its operation have never actually been carried out.

The law provides that the President shall appoint a Civil Service Commission of three who shall prepare the necessary rules for establishing a system of open competitive examinations for entrance to the public service. The administration and enforcement of the act is entrusted to this commission, but the rules must be promulgated by the President, and it is largely left to him to determine which positions in the government service shall be included within the scope of competition. All positions above the grade of common laborer and appointments which are not subject to confirmation by the Senate, may be so included. Appointments are to be apportioned among the States according to their population. All persons appointed as the result of competitive examination are to serve a term on probation, so that their efficiency in actual service may be tested before they receive permanent appointment. The examinations must be practical in character and relate to the duties of the position to be filled. Recommendations of Senators and Representatives are not to be received or considered, and the levying of assessments upon office-holders for campaign purposes is made a misdemeanor. The rules provide that the names of those who pass the examination shall be placed in the order of standing in examinations upon a list of eligibles. When an appointing officer makes requisition in order to fill a vacancy, the Commission certifies to him the names of the three eligibles standing highest upon the appropriate list and an appointment on probation of six months must be made from this certification. Originally the power of removal was unrestricted, but by a rule first adopted in 1897 the cause of removal must be stated to the employee and an opportunity given him to make answer in writing. The rules also regulate the methods of making transfers, promotions and reinstatements.

When the law was enacted it applied to only 13,924 positions out of a total estimated at 110,000. But President Arthur and his successors—with the exception of President McKinley, who withdrew about 10,000 places from the competitive class—

Civil War

have by successive orders and amendments to the rules rapidly increased the classified service. The largest additions were made by President Cleveland. President Roosevelt, who was a civil service commissioner from 1889 to 1895, has recently included many new branches. By June 30, 1904, 154,093 positions had been classified as competitive, out of a total service of 290,858. President Roosevelt has also promulgated rules under which unskilled laborers are appointed as the result of simple competitive tests, chiefly physical in character. A law based on the Federal statute was one of the first acts adopted by the Philippine Commission appointed by President McKinley and is now in full operation in the Islands.

Civil Service Reform in States and Cities.—The evils connected with the distribution of patronage were equally pronounced in state and city governments as in the national service and arose from precisely the same causes. The civil service reformers have directed their efforts in part toward securing the adoption of the Merit System in local government. Almost immediately after the passage of the Federal law the legislatures of New York and Massachusetts adopted similar acts. In these two States to-day the civil service law applies to cities as well as to the state service. In 1905 Wisconsin and Illinois adopted civil service laws, in the one case applying to the state service and in the other to the state charitable institutions. In addition to these States, a number of cities have civil service laws applying to the entire city service or to the police and fire departments only. The more important of these cities are Philadelphia, New Haven, Chicago, Milwaukee, Denver, Seattle, Portland, Ore., San Francisco and Los Angeles.

The introduction of the Merit System has resulted in greater economy and increased efficiency. It has also tended to purify political conditions. The civil service, where it has been divorced from politics, offers an attractive career; the salaries attaching to the positions are generally higher than those paid for similar work in private business, and appointments are eagerly sought.

ELLIOT H. GOODWIN.

Civil War, American, a war in the United States, caused by the attempt of the Southern States to establish an independent government under the name of the Confederate States of America. The first gun was fired on Jan. 9, 1861, by batteries in Charleston harbor, which drove back the steamer "Star of the West," bearing supplies to Fort Sumter. The actual outbreak of war, however, is dated from April 12,

when Fort Sumter was bombarded. The first blood was shed in Baltimore on April 19 in a street attack on the Sixth Massachusetts regiment, which was on its way to Washington. Bull Run (July 21, 1861) was the first great battle. It resulted in a severe defeat for the Union army; its effect was to encourage the South and raise a determined spirit in the North, and to unify both sections in support of their respective policies. The Mississippi was opened to Union vessels by the capture of New Orleans in April, 1862, and of Vicksburg and Port Hudson in July, 1863. The latter month also saw the Union victory of Gettysburg, by which the Confederate attempt to carry the war into the Northern States was overthrown. From July, 1863, the final victory of the National cause was assured. Sherman's march to the sea in the latter part of 1864 cut through the heart of the Confederacy and did incalculable damage to the Southern cause. The vigorous blows which, in 1864 and the spring of 1865, Grant dealt to Lee's army in Virginia, brought the war to a conclusion. Lee surrendered at Appomattox Court House on April 9, 1865. Johnston's army surrendered on April 26, and within two months more all the Confederate forces had laid down their arms.

The result of the war was to establish the fact that the United States is a nation and not a league of States, and that no State has the right to secede from the Union. It also resulted in the abolition of slavery. The proclamation of emancipation, issued by President Lincoln on Jan. 1, 1863, declared the freedom of all slaves within certain designated territory which was in rebellion, and the 13th Amendment to the Constitution, adopted after the war, extinguished slavery in the United States. During the Civil War there were 2,778,304 men mustered into service on the Union side and about 600,000 on the Confederate. The number of casualties in the volunteer and regular armies of the United States during the war, according to a statement prepared by the Adjutant-General's office, was as follows: Killed in battle, 67,058; died of wounds, 43,012; died of disease, 199,720; other causes, such as accidents, murder, Confederate prisons, etc., 40,154; total died, 349,944; total deserted, 199,105. Number of soldiers in the Confederate service who died of wounds or disease (partial statement), 133,821. Deserted (partial statement), 104,428. Number of United States troops captured during the war, 212,608; Confederate troops captured, 476,169. Number of United States troops paroled on the field, 16,431; Confederate troops paroled on the field, 248,599. Number of United States troops who died while prison-

ers, 30,156; Confederate troops who died while prisoners, 30,152.

Civil Wars of Rome, The, in their widest extent began with Tiberius Gracchus, and terminated with the election of Octavius Augustus to the empire, B. c. 133-131. In a more limited sense they mean the contest between Caius Marius and Cornelius Sylla, or Sulla (B. c. 88-78). The original cause of the civil war was the struggle between the oligarchy and the democracy of Rome. This struggle lasted till Sylla restored the Senate to sovereignty; but this sovereignty was soon disturbed by JULIUS CÆSAR (*q. v.*).

Civita Vecchia (chē-vē-tā'vek'ē-a), an Italian fortified port, 50 miles N. W. of Rome, on the Mediterranean. The harbor is both a commercial and naval one, and was originally constructed by the Emperor Trajan; the town indeed owed its origin entirely to the port of this emperor, and hence came to be known as Portus Trajani. The harbor is formed by two moles and a breakwater, on which latter is a lighthouse. The place, which became a free port under Pope Innocent XII. in 1696, is regularly visited by steamers from Marseilles, Genoa, Leghorn, Naples, Messina, and Malta. It suffered at the hands of the Goths and Saracens, and was occupied by the French in 1849. The Papal troops opened the gates of the fortress to the Italian general Bixio in 1870. Pop. (1901) 15,829.

Clabber Napper's Hole, a cavern near Gravesend, England. The odd name is by some thought to have been derived from a smuggler; but others derive it from the Celtic *Caer-ber-parber*, which means "Wartertown lower camp."

Cladium, a genus of plants, consisting of 21 species of wide distribution, natural order *Cyperaceæ* (or sedges). The *C. Mariscus*, or twig-rush, is a British perennial with keeled leaves, having a sharp point and prickly serratures. It is very common in certain fenny districts in Cambridgeshire, and is used for thatching.

Claflin, Mary Bucklin, an American prose-writer; born in Hopkinton, Mass., July, 1825. She was the wife of Governor Claflin, of Massachusetts. For 18 years she was a trustee of Boston University; and of Wellesley College from its foundation till her death. Among her publications are: "Brampton Sketches"; "Recollections of Whittier"; and "Under the Elms." She died in Whitinsville, Mass., June 13, 1896.

Claflin University, a co-educational institution in Orangeburg, S. C.; organized in 1869, under the auspices of the Methodist Episcopal Church, exclusively for the colored race; has grounds, buildings, scien-

Claiborne Group

tific apparatus, etc., valued at over \$300,000; volumes in the library, over 7,000; average annual receipts from all sources, about \$80,000; average number of faculty, 40; students in attendance, about 700; graduates, over 800.

Claiborne Group, a name given in the United States to certain beds of clay, lignite, shelly sands, and marly limestone which occur at Claiborne, Ala., and are believed to belong to the Eocene system.

Clairaut, Alexis Claude (klā-rō'), a French mathematician; born in Paris in 1713. In his 11th year he composed a treatise on the four curves of the third order, which, with his subsequent "Researches on Curves of Double Curvature" (1731), procured him a seat in the Academy at the age of 18. He accompanied Maupertuis to Lapland, to assist in measuring an arc of the meridian, and obtained the materials for his work "On the Shape of the Earth." In 1752 he published his "Theory of the Moon," and in 1759 calculated the perihelion of Halley's comet. He died in 1765. A brother, who died at the age of 12, published in his ninth year a treatise entitled "Divers Quadratures of Circular Elliptics."

Claire, St., or Santa Clara, Order of, founded in 1212 by a lady of this name, of noble birth, born at Spoleto, Italy, in 1193, died in 1253, and canonized in 1255. The order is divided into a severe sect, the Damianists, and a more moderate sect, the Urbanists. It has numerous convents in Europe and America.

Clairvaux (klār-vō'), a village of France, on the Aube, 10 miles S. E. of Barsur-Aube; is remarkable as the site of the once famous Cistercian Abbey, founded in 1115 by St. Bernard, who presided over it till his death in 1153, when he was buried in the church. The unwholesome, swampy valley became the smiling *Clara Vallis* under the efforts of the monks, who at Bernard's death numbered 700; afterward the founder's ascetic rule was disregarded, and the simple row of cells gave place to a palatial monastery, whose church was reckoned a masterpiece of architecture, but was destroyed at the Restoration. The abbey, which at one time possessed a revenue of 120,000 livres, was suppressed at the Revolution, and the extensive buildings are now used as a central prison for the 13 E. departments of France.

Clairvoyance, defined as the power of perceiving without the use of the organ of vision or under conditions in which the organ of vision with its natural powers alone would be useless. It comprises the sight of things past, present, or future. Various methods of clairvoyance are recounted; by

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direct vision of things at a distance (opaque substances being no hindrance); by looking into a black surface; by looking into water, into a crystal, etc.; or by laying the object to be described on the forehead or chest of the clairvoyant; but clairvoyants now usually represent the cerebral region as the seat of illumination. From remote antiquity the possession of such powers by favored individuals has been believed. In the Old Testament (II Kings vi: 15-17) is an account of the opening of the inner vision in the case of the servant of Elisha in answer to the prayer of the prophet.

Clairvoyant powers were claimed for the Pythia at Delphi. Apollonius of Tyana and Diodorus Siculus testify to the clairvoyance of the Indian sages. Macrobius gives an instance of clairvoyance on the part of the oracle of the Heliopolitan god when consulted by the Emperor Trajan. Tertullian speaks of a seeress who could prophesy and prescribe for the sick. Clairvoyance was known among the nations of antiquity, and is still generally accepted as an undoubted fact among Eastern nations. As instances of clairvoyants in later times may be mentioned Jacob Böhme (1575-1624) and Emanuel Swedenborg (1688-1772), the Swedish scientist and founder of the religious body called "The Church of the New Jerusalem."

The phenomena of clairvoyance have been carefully observed. The clairvoyant state seems to be intimately connected with the mesmeric, the somnambulistic, and the so-called "biological." Mesmeric somnambulism and clairvoyance were first brought to notice by Puysegur in 1784. The clairvoyant is usually in a state of trance, which may be induced by mesmeric passes. In this state he is sometimes conscious only of his mesmerizer; in others, his clairvoyance is unrestricted; but the clairvoyant may enter the trance state spontaneously, or he may even be in possession of his ordinary faculties, both of which characteristics are to be found in Zschokke, the German novelist. In "second-sight," as found in Denmark, parts of Germany, and especially in the Highlands of Scotland, the seer is not in a state of trance similar to that in other forms of clairvoyance.

Clam, the popular name of certain bivalvular shell-fish of various genera and species, *e. g.*, the thorny clam (*Chama Lazarus*), the yellow clam (*Tridacna crocea*), the giant clam (*T. gigas*), the common clam of the United States (*Mya arenaria*), etc. The giant clam has the largest shell known, and the animal is used as food in the Pacific. The common American clam is found in gravelly mud, sand, and other soft bottoms, especially between high and

low water mark. They are largely used for bait, and are a much-relished article of food.

Clan, a tribe or number of families, bearing the same surname, claiming to be descended from the same ancestor and united under a chieftain representing that ancestor. The clan system is essentially the same as that existing among the Arabs, the Tartars, and tribes similarly situated. The clan system was said to have sprung up in Scotland about 1008, while Malcolm II. was reigning, but it may have been of greater antiquity. In the Act 20 Geo. II. c. 43, passed in 1747, the legal authority of the chiefs over their followers was abolished as a punishment for the part which the former had taken in the insurrection which ended in 1745 at Culloden. While the clans flourished they were divided into two, the clans of the borders and those of the highlands.

Clapboard, a thin, narrow board commonly used for covering the sides of wooden buildings. Clapboards are usually of white pine, and are made much thinner on one edge than on the other, so that when nailed on to each other one can lap a little over the one next below it. This makes the covering of the building much tighter than if the boards were only set together one above the other, and keeps the rain from driving in. Clapboards are sawn out of solid logs, not by sawing them clear through, as in making common boards, but by sawing from the outside to the middle or heart of the log. They are thus made thicker on the outside than on the inside. They are afterward smoothed in a planing machine.

Clapham, a S. W. suburb of London, lying a mile S. of the Thames. Clapham Common is still an open common of 200 acres. Clapham Junction, in Battersea parish, is one of the busiest and most perplexing railway junctions in the world.

Clapham Sect, a name given by Sydney Smith to the Evangelical Party in the Church of England; the Rev. Henry Venn was the vicar of Clapham, and some of the most eminent Evangelicals—Zachary Macaulay, Wilberforce, and the Rev. W. Romaine—lived there. Thackeray's "New-comers" has made the phrase familiar to a later generation.

Clapnet, a ground net used by bird catchers, consisting of two equal parts about 12 yards long by 2½ wide, and each having a slight frame. They are placed about four yards apart, and are pulled over by a string so as to inclose any birds on the intervening space.

Clapperton, Hugh, an African traveler; born in Dumfriesshire, Scotland, in 1788. He entered the merchant service, but was

impressed into the navy, in which he became a lieutenant in 1816. He then accompanied Dr. Oudney and Lieut. Denham to Africa, where he remained till 1825, returning with valuable information, though the disputed question of the course of the Niger was left undecided. On his return to England Clapperton received the rank of captain, and immediately engaged in a second expedition, to start from the Bight of Benin. Leaving Badagry in December, 1825, he penetrated to Katunga, within 30 miles of the Quorra or Niger, but was not permitted to visit it. At Soccatoo the Sultan Bello refused to allow him to proceed to Bornu, and detained him a long time in his capital. The disappointment preyed on him, and he died, in April, 1827, at Chungary, a village near Soccatoo. He was the first European who traversed the whole of Central Africa from the Bight of Benin to the Mediterranean.

Claque (kläk), a body of hired applause-makers, openly employed in France and sometimes secretly resorted to elsewhere. M. Sauton, in 1820, established in Paris an office to insure the success of dramatic plays. He was the first to organize the Parisian claque. The manager sends an order to his office sometimes for as many as 500 claqueurs. The claque is divided into several ranks: Rieurs, pleureurs, chatouilleurs, bisseurs, etc. These officers, distributed in several parts of the theater, laugh, weep, gossip with their neighbors, cry encore, etc., under the direction of a fogle-man whose business it is to study the work produced, and after consultation with the author, the performers, and the stage-manager, to direct and regulate the reception of certain portions of the entertainment.

Clara Vallis. See CLAIRVAUX.

Clare, John, an English poet; born in Helpstone, near Peterborough, July 13, 1793. He was an agricultural laborer, absolutely uneducated; and wrote "Poems, Descriptive of Rural Life and Scenery," in which a talent not far removed from genius attains many fervent and moving effects. He died in Northampton, May 20, 1864.

Clare, St., born in 1193, of a noble family of Assisi; in 1212 retired to the Portiuncula of St. Francis, and in the same year founded the order of Franciscan nuns, which spread rapidly through Europe. She died Aug. 11, 1253. Two years afterward, she was canonized by Alexander IV.; her festival falls on Aug. 12. The NUNS OF THE ORDER OF ST. CLARA (also called the Poor Clares) at first observed the strictest Benedictine rule, but the austerity of this rule was mitigated by St. Francis in 1224, and further modified by Urban IV. in 1265. Several convents adhered to the first and

Clare College

strictest rule; but the large proportion of the nuns adopted Urban's rule, and are distinguished as Urbanists. The existing convents are chiefly devoted to the education of girls.

Clare College, a college of the University of Cambridge, founded in 1326 by Elizabeth, sister of the Earl of Clare. It has much-admired buildings in the Renaissance style.

Claremont, a town in Sullivan Co., New Hampshire; on the Connecticut river, and the Boston and Maine railroad; 48 miles N. W. of Concord. Claremont has numerous local cotton and woolen mills, paper and shoe factories, and machine shops.

Clarence, George, Duke of, son of Richard, Duke of York, and brother of Edward IV., King of England. On his brother's accession, in 1461, he was created Duke of Clarence, and in 1462 Lord-Lieutenant of Ireland, but afterward joined the disaffected Warwick, and married his daughter. On the eve of battle he rejoined his brother, and was afterward involved in a quarrel with his brother Richard, who had married Warwick's younger daughter, about the inheritance of their father-in-law. On the death of his wife Clarence sought the hand of Mary of Burgundy, but Edward interposed and a serious breach ensued. A gentleman of the household of Clarence having at this time been condemned for using necromancy against the king, Clarence interfered with the execution of the sentence. He was impeached by the king in person, condemned in 1478, and secretly made away with in the Tower.

Clarendon, Constitutions of, a code of laws adopted in the 10th year of Henry II. (1164), at a council of prelates and barons held in the village of Clarendon, in Wiltshire, in January of the above year. These laws, which were finally digested into 16 articles, were brought forward by the king as "the ancient customs of the realm," and were enacted as such by the council. They consisted, however, partly at least, of reforms introduced by the king himself. Ten of the articles were condemned, and six allowed by Pope Alexander III. The six articles approved of were of comparatively slight importance, mostly confirming the privileges of the ecclesiastical order; among the condemned articles the most important were the 1st, which provided that disputes between laymen and ecclesiastics as to advowsons should be tried in the king's court; 3d, that ecclesiastics accused of any offense against justice should be answerable to the civil courts for the civil offense, and to the ecclesiastical courts for the ecclesiastical offense; 4th, that ecclesiastical dignitaries should not go out of the kingdom without the king's leave;

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8th, that appeals should be made from the court of the archbishop to the king's court, and should not go further (that is, to the Pope) without the king's consent; 9th, that in the event of a dispute between a layman and an ecclesiastic as to whether the civil or ecclesiastical court should have jurisdiction in certain cases of tenure of property, the tribunal should be determined by the king's chief justice upon a recognition of 12 lawful men; 12th, that pleas of debt should belong to the king's jurisdiction. Notwithstanding the entreaties of the other prelates, and in defiance of the rage of the king, Becket, after a momentary appearance of yielding, peremptorily refused his signature to the articles. After the murder of the archbishop, the king, on his reconciliation with the Pope in 1172, was compelled to promise the abolition of all laws and customs hostile to the clergy; and at the council of Northampton in 1176 the Constitutions of Clarendon were materially modified in favor of the ecclesiastical order.

Clarendon, Edward Hyde, Earl of, Lord High Chancellor of England; born in Dinton, Wiltshire, in 1608. During the civil wars he zealously attached himself to the royal cause, was made successively chancellor of the exchequer and privy councillor, and was the chief adviser of the king. After the failure of the royalist arms he took refuge in Jersey, and then joined Prince Charles in Holland. He contributed to the Restoration, accompanied Charles II. to London, and was made lord chancellor. In his judicial capacity his conduct was irreproachable, and he was the defender of his country's freedom against the abuses of the royal power; but he at length became unpopular, was removed from his high employments, and banished by act of Parliament. His "History of the Rebellion," though considered by some as a partial, inaccurate, and untrustworthy narrative, is one of the most remarkable works in the literature of his time. His daughter Anne was married to the Duke of York, afterward James II., and two daughters, Anne and Mary, the fruit of this marriage, both ascended the English throne. He died in Rouen in 1674.

Clarendon, George William Frederick Villiers, 4th Earl of; born Jan. 12, 1800; was minister plenipotentiary at the court of Madrid from 1833 to 1839. In 1847 he became Lord-Lieutenant of Ireland, which post he held till 1852. He was appointed secretary for foreign affairs in 1853, which office he held till the retirement of Lord Palmerston in 1859. In 1864 he joined Lord Palmerston's second government, retiring with his colleagues in June, 1866; and, in 1868, on the accession of the Gladstone ministry to power, he was again ap-

Claret

pointed foreign secretary. Lord Clarendon, who was descended from the brother of Villiers, the favorite of James I., and maternally from Lord Clarendon, was brother of Charles Pelham Villiers, the advocate of free trade. He died June 27, 1870.

Claret, a name originally given to wines of a light-red color, but now applied to the red wines imported from France, chiefly from Bordeaux. These wines vary in composition according to the locality, season, and age, but the produce of each vineyard usually retains its own peculiar characteristics. The most esteemed are those produced at the vineyards of Lafitte, Latour, Château Margaux, and others. Many of the clarets formerly sold in the United States were nothing more than the *vin ordinaire* used by the French peasants and working classes, but since the development of the California grape industry, as good domestic claret can be obtained here as anywhere. A genuine claret should contain from 16 to 20 per cent. of proof-spirit.

Fictitious clarets were sometimes prepared by mixing a rough cider with a cheap French wine, and coloring with cochineal, logwood, elderberry, hollyhock, indigo, litmus, red cabbage, beet-root, or ros-aniline. To detect these coloring matters the following method may be adopted: Make a jelly by dissolving five grammes of gelatine in 100 cubic centimeters of warm water, and pour it into a square flat mold. From this cake of jelly cubes about three-quarters of an inch square are cut with a sharp, wet knife, and are immersed in the wine; they are taken out after 24 to 48 hours, washed slightly, and sections cut in order to see how far the coloring matter has penetrated. If the wine is pure, the color will be confined to the edges of the slice, or will not have penetrated more than one-eighth of an inch. The coloring matters mentioned above permeate rapidly, and color the jelly.

Claretie, Jules (klär-tē'), a French novelist and dramatist; born in Limoges, Dec. 3, 1840. He has written a long series of very successful novels, the most noteworthy of them being: "Madeleine Bertin" (1868); "The Million" (1882); "Monsieur the Minister" (1882); "Noris, Manners of the Time" (1883); "The American Woman" (1892). He wrote also some striking chapters of contemporary history, as "The Revolution of 1870-1871"; "Paris Besieged"; "Five Years After: Alsace and Lorraine Since Annexation." His dramatic compositions relate mostly to the time of the great Revolution. He became administrator of the Comédie Française in 1885, and was chosen member of the Academy in 1888.

Clarification, the act or process of making any liquor clear and bright by freeing

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it from visible impurities by chemical or other means. It differs from purification in that a liquid, though bright and clear to the sight, may still contain a large amount of impure and injurious substances. The clarifiers most frequently employed are albumen, gelatine, acids, salts, blood, lime, plaster of paris, alum, heat, or alcohol.

Clarinet, Clarionet, a musical instrument akin to the clarion. It was modified from the ancient shawm, its first maker being John Christopher Denner, of Leipsic, who produced it after 1690. It has since been much improved. It consists essentially of a mouth-piece furnished with a single beating reed, a cylindrical tube ending in a bell, and provided with 18 openings in the side, half of which are closed by the fingers and half by the keys.

Clark, Abraham, an American patriot; born in Elizabethtown, N. J., Feb. 15, 1726. He studied for the bar and practiced in his native State with success. After serving as sheriff of Essex county, he was chosen a delegate to the Continental Congress in 1776 and signed the Declaration of Independence. He was a member of the Constitutional Convention of 1789, and aided in framing the Constitution of the United States. He died in Rahway, N. J., Sept. 15, 1794.

Clark, Alexander, an American clergyman and writer; born in Jefferson county, Ohio, in 1834; was editor of the "Methodist Recorder" (1870-1879). He wrote: "The Old Log Schoolhouse" (1864); "Workaday Christianity" (1870); "Rambles in Europe" (1877); "Ripples on the River", verse; etc. He died in Georgia, July 6, 1879.

Clark, Alonzo Howard, an American scientist; born in Boston, April 13, 1850. He left his studies at Wesleyan University to enter the service of the United States Fish Commission, making a thorough study of the work. He has written: "History of Fishery Industries of the United States"; "Whales and Sea Fisheries"; "History of the Mackerel Fisheries"; and similar works. Since 1881 he has been connected with the Smithsonian Institution.

Clark, Alvan, an American astronomical-instrument maker; born in Ashfield, Mass., March 3, 1804. He was at one time a portrait painter in Boston; but in 1844 his attention was turned to telescope making. Two years later he definitely adopted the business of astronomical-instrument making, and in time achieved a world-wide reputation. His famous telescopes include the Chicago 18½-inch, the Washington 26-inch, the Russian 30-inch, and the California 36-inch. He died in Cambridge,

Clark

Mass., Aug. 9, 1887. His son, **ALVAN GRAHAM CLARK**, born in Fall River, Mass., July 10, 1832, received a grammar school education; and was associated with his father and his brother, George, in the manufacture of telescopes. He has supervised the construction of various famous lenses and made discoveries of stars with instruments of his own manufacture.

Clark, Sir Andrew, a Scotch physician; born in Aberdeen, Oct. 28, 1826; educated at Aberdeen and Edinburgh. After an unusually brilliant career as a student of medicine at Edinburgh, he assisted Dr. Hughes Bennett and Dr. Robert Knox, the anatomist, and next had charge for four years of the pathological department at the Haslar Naval Hospital. After graduating at Aberdeen in 1854, he settled in London, where he acquired a high reputation for his skill in the treatment of diseases affecting the respiratory, renal, and digestive organs. Among his patients were some of the most eminent men in the political and literary world of his time, and he will live in remembrance as the "beloved physician" of George Eliot. He made numerous important contributions to medical science, both in papers contributed to the special journals and in such books as "Evidences of the Arrestment of Phthisis"; "Lectures on the Anatomy of the Lung"; "The Theory of Asthma"; "The History of Dry Pleurisy in Relation to Lung Disease"; "Renal Inadequacy"; "The Anæmia of Girls"; "Neurasthenia"; and "Mucous Disease of the Colon." He died Nov. 6, 1893.

Clark, Champ, an American politician, born in Anderson county, Kentucky, March 7, 1850. He was graduated at Bethany College and Cincinnati Law School, and in 1873-1874, was president of Marshall College, West Virginia. He has attained distinction as a Democratic campaign speaker, and since 1893 has been, with an intermission of one term, a member of Congress from Missouri.

Clark, Charles Dickson, an American jurist; born in Laurel Cove, Tenn., Oct. 7, 1847. He was graduated at Cumberland University in 1875, and practiced as a lawyer in his native State until 1895, when he was appointed judge of the United States Court for the Eastern and Middle Districts of Tennessee. He died March 14, 1908.

Clark, Charles Edgar, an American naval officer; born in Bradford, Vt., Aug. 10, 1843. He entered the naval service in 1860; took part in the battle of Mobile Bay and in the bombardment of Fort Morgan; and was promoted captain in 1896. In March, 1898, he took command of the battleship "Oregon" at the Mare Island navy yard, San Francisco, and when war with Spain was deemed inevitable, he received orders

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to proceed to Key West, Fla., with all haste. After a most remarkable voyage of over 14,000 miles, he joined the American fleet in Cuban waters on May 26, and on July 3, commanded his ship at the battle of Santiago. In March, 1899, he was assigned to duty at the League Island navy yard. He was promoted rear-admiral, June 16, 1902.

Clark, Daniel, a Canadian pathologist; born in Granton, Scotland, Aug. 29, 1836. He was taken to Canada when a child; was graduated at Victoria University in 1858; and practiced medicine in Ontario with great success. He has paid especial attention to mental diseases and the care of the insane. Since 1875 he has been at the head of the Provincial Asylum for the Insane at Toronto, and was later made Professor of Psychology and Mental Diseases in Toronto University. He was also twice elected President of the College of Physicians and Surgeons of Ontario.

Clark, Edward, an American architect; born in Philadelphia, in 1824. He studied architecture under Thomas W. Walter, and after serving as assistant, was made chief architect of the United States Capitol in 1864, serving till his death. He was a member of the leading architectural commissions of the National Government, including that for the completion of the Washington monument. He died Jan. 6, 1902.

Clark, Francis Edward, an American clergyman; born in Aylmer, Quebec, Sept. 12, 1851; graduated from Dartmouth College in 1873, and continued his studies at Andover Theological Seminary. He became pastor of a Congregational Church at Portland, Me., and there organized the first Young People's Society of Christian Endeavor, Feb. 2, 1881. In 1887 he was made president of the United Society of Christian Endeavor and also became editor of the "Golden Rule," the official organ of the society.

Clark, George Hunt, an American poet; born in Northampton, Mass., 1809. He was a frequent contributor to "Putnam's," "Knickerbocker," and other journals. His published poems include: "Now and Then"; "The News"; and a collection of humorous and sentimental pieces, entitled "Undertow of a Trade-Wind Surf." He died in Hartford, Conn., Aug. 20, 1881.

Clark, or Clarke, George Rogers, an American pioneer; born near Monticello, Va., Nov. 19, 1752. He studied surveying, and settled in Ohio, serving in the Indian wars of that time and region. He removed to Kentucky in 1775, procuring the organization of that territory. On the outbreak of the Revolutionary War he led the patriot army on the frontier, campaigning against the British throughout Illinois, Ohio, and

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Kentucky. His success in this saved much territory to the colonies in the final treaty of peace with Great Britain. He fell into penury in his latter years, and died in neglect near Louisville, Ky., Feb. 18, 1818. See his brother, CLARK, WILLIAM.

Clark, Henry James, an American naturalist and prose-writer; born in Easton, Mass., June 22, 1826; was associated in work with Agassiz for several years; also was professor in many of our leading colleges and universities. Among his many contributions to literature are: "Mind in Nature, or the Origin of Life, and the Mode of Development of Animals" (1865); "Claims for Scientific Property" (1863). He died in Amherst, Mass., July 1, 1873.

Clark, James Gowdy, an American balladist; born in Constantia, N. Y., June 28, 1830. He was well known as a concert singer and song writer, and his career was closely associated with those of Dodge, Willis, Morris and other poets. Among his most popular songs are "Star of My Soul," "The Awakening," "The Beautiful Hills," "The Children of the Battlefield," "Freedom's Battle Hymn," "The Evergreen Mountains of Life," and "The Old Mountain Tree." He served as a volunteer during the Civil War, and died in Pasadena, Cal., in September, 1897.

Clark, Sir James, a Scotch physician; born in Banffshire, in 1788. After taking his arts degree at Aberdeen he studied medicine at Edinburgh, and served in the navy as surgeon from 1809 till 1815, when he returned to Edinburgh. He took his degree in 1817, practiced in Rome from 1818 to 1826, returned to England in 1826, became physician to the Duchess of Kent in 1835, and on the accession of Queen Victoria was appointed first physician in ordinary to the Queen, and shortly afterward made a baronet. His chief works were treatises on the "Sanative Influence of Climate" (1829), and on "Pulmonary Consumption and Scrofula" (1835). He died in 1870.

Clark, John Bates, an American economist; born in Providence, R. I., Jan. 26, 1847. He was graduated at Amherst in 1872, and has been prominent as a political economist since the publication of his "Philosophy of Wealth," "Capital and its Earnings," and "The Distribution of Wealth." In 1900 he was Professor of Political Economy at Columbia University.

Clark, John Emory, an American scientist; born in Northampton, N. Y., Aug. 8, 1832. He was graduated at the University of Michigan in 1856, and studied at Heidelberg. After serving in the Civil War as captain and colonel, he became Professor of Astronomy at Antioch College. Since 1873 he has been Professor of Mathematics at the

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Sheffield Scientific School of Yale University.

Clark, Jonas Gilman, an American philanthropist; born in Hubbardston, Mass., Feb. 1, 1815. He began life as a carriage maker and acquired a fortune in business and real estate investments. He is noted as the founder of Clark University (*q. v.*), at Worcester, Mass., which he endowed with \$2,000,000 in 1887. He also conferred gifts on his native town. He died in Worcester, Mass., May 23, 1900, and bequeathed \$200,000 to the university outright and \$1,000,000 and the residue of his estate, proved in 1903 at \$2,000,000.

Clark, Lewis Gaylord, an American journalist and humorous writer; born in Otisco, N. Y., March 5, 1810. In 1834 he became editor of the "Knickerbocker Magazine," and with Irving, Bryant, Longfellow, Halleck, and Willis, as contributors, made it the foremost literary publication of that time, and an inspiration to a higher standard of periodical literature. The "Editor's Table," written by him, overflowed with amusing stories and witty sayings. The "Knickerbocker Sketch-Book" (1850), and "Knick-Knacks from an Editor's Table" (1853), are his only publications in book form. He died in Piermont, N. Y., Nov. 3, 1873.

Clark, Lewis George, an American slave and freedman; born about 1811. He was reared a slave, but escaping, lectured for emancipation in 1841-1850. He claimed to be the original of "Uncle Tom," in Mrs. Stowe's novel. This the authoress denied. He died in Lexington, Ky., Dec. 16, 1897.

Clark, Thomas March, an American clergyman; born in Newburyport, Mass., July 4, 1812. He was graduated at Yale in 1831, and four years later entered the Presbyterian ministry. In 1836 he became an Episcopalian priest, and after holding various rectorships was chosen Bishop of Rhode Island in 1854. He was author of "Formation of Character" and similar works. He died Sept. 7, 1903.

Clark, Walter, an American jurist; born in Halifax, N. C., Aug. 19, 1846. He was graduated at the University of North Carolina in 1864; became a lawyer in 1868, judge of the Superior Court in 1885, and of the Supreme Court in 1889. He is a contributor to leading magazines on current topics and a law writer of authority, his best known work being "Overruled Cases."

Clark, William, an explorer; brother of George Rogers Clark (*q. v.*); born in Virginia, Aug. 1, 1770; emigrated with his family at the age of 14 to the falls of the Ohio, in Kentucky, on the present site of Louisville. In 1808 he was appointed in conjunction with Capt. Meriwether Lewis to the command of an expedition designed to ex-

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plore the N. W. territory lying between the Mississippi and the Pacific Ocean. He acquitted himself with consummate ability in this hazardous employment, which required the combination of military and scientific skill. His journal and the account kept by him of the astronomical observations made by him and Captain Lewis have been published. He was appointed in 1813 governor of the Northwest Territory and superintendent of Indian affairs, which offices he retained till 1820, when Missouri was created a State. Two years afterward he was again appointed commissioner and superintendent of Indian affairs. He died in St. Louis, Mo., Sept. 1, 1838.

Clark, William Andrews, an American capitalist; born near Connellsville, Pa., Jan. 8, 1839. He was educated at Laurel Hill Academy, and at Mt. Pleasant University, in Iowa. After studying law and teaching school he settled in Montana in 1863, and acquired a great fortune in copper mining. He was the Democratic choice for United States Senator from Montana in 1890 and 1896, and in 1899 the Legislature elected him. In April, 1900, the United States Senate declared his election void; but his legislature reelected him Jan. 16, 1901. He paid \$42,000 for Fortuny's masterpiece, "The Choice of a Model."

Clark, William Bullock, an American scientist; born in Brattleboro, Vt., Dec. 15, 1860. He was graduated at Amherst College in 1884. After a course of European study he became instructor in Geology at Johns Hopkins University, in 1887, and since 1894 has been Professor of Geology there. In 1891 he was appointed Director of the Maryland Weather Service.

Clark, Willis Gaylord, an American poet, twin brother of Lewis Gaylord; born in Otisco, N. Y., March 5, 1810; became associate editor of the "Columbian Star," a religious weekly paper (1830), but resigned shortly after to take charge of the Philadelphia "Gazette." His longest poem is "The Spirit of Life" (1833). A complete edition of his poems, edited by his brother, appeared in 1847. He died in Philadelphia, Pa., June 12, 1841.

Clarke, Sir Andrew, an English military officer; born in Hampshire, July 27, 1824. He rose to the grade of Lieutenant-General in the army, and distinguished himself as designer of the great docks at Malta, Bermuda, and Portsmouth. He did similar work in India and was Minister of Public Works in Victoria. He died March 31, 1902.

Clarke, Augustus Peck, an American physician; born in Pawtucket, R. I., Sept. 24, 1833. He was graduated at Brown University in 1861, and at the Harvard

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Medical School in 1863. He was an army surgeon during part of the Civil War, and subsequently entered private practice. He has been sent to every International Medical Congress since 1887, and since 1894 has been Dean of the College of Physicians and Surgeons in Boston. He has attained special eminence in the domain of obstetrics and gynecology.

Clarke, Benjamin Franklin, an American educator; born in Newport, Me., July 14, 1831. He was graduated at Brown University in 1863, and subsequently became Professor of Mechanical Engineering there. In 1898 he was chosen president of the university.

Clarke, Charles Cowden, an English prose-writer and poet; born in Enfield, Middlesex, Dec. 15, 1787; produced "Tales from Chaucer" and "Shakespeare's Characters," besides lectures and essays innumerable; and "Carmina Minima," a volume of verse. He died in Genoa, March 13, 1877. See also MARY COWDEN CLARKE.

Clarke, Creston, an American actor; born in Philadelphia, Aug. 20, 1865. He was educated at academies in Paris and London with a view to the stage, John Sleeper Clarke being his father and Edwin Booth an uncle. He made his début in London, 1882, and has attained success in tragic roles. He has written "The Last of His Race" and other plays.

Clarke, Edith Emily, an American librarian; born in Syracuse, N. Y., Nov. 5, 1859. She was graduated at Syracuse University in 1881, and after teaching school some years, took up library work. Having served as cataloguer at Columbia University Library and at the Newberry Library in Chicago, she became chief cataloguer of public documents for the National Government in 1895, and librarian of the University of Vermont in 1898.

Clarke, Edward Daniel, an English traveler and writer; born in Willington, Essex, June 5, 1769. He investigated the topographical and kindred antiquities of Greece and the Hellene lands most thoroughly, his great work being "Travels in Various Countries of Europe, Asia, and Africa" (1810-1823); but a dissertation on "The Tomb of Alexander" (1805) is particularly scholarly, its subject being the sarcophagus now in the British Museum. He died in London, March 9, 1822.

Clarke, Frank Wigglesworth, an American scientist; born in Boston, Mass., March 19, 1847. He was graduated at the Lawrence Scientific School of Harvard in 1867; was Professor of Chemistry and Physics at the University of Cincinnati from 1874 to 1883, and since 1883 has been chief chemist of the United States Geological Survey.

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He has written "Constants of Nature" and similar works.

Clarke, Hyde, an English author; born in London, in 1815. In diplomacy, civil engineering, and scholarship he was equally at home, his versatility being conspicuous in "Theory of Railway Investment," "Colonization in our Indian Empire" (1857), "Comparative Philology" (1858), and "Examination of the Legend of Atlantis" (1886). He also compiled a useful abridged English Dictionary. He died in London, Dec. 22, 1878.

Clarke, James Freeman, an American Unitarian clergyman and author; born in Hanover, N. H., April 4, 1810; lived in Louisville, Ky., in 1833-1840; settled in Boston, Mass., in 1841; and was pastor of the Church of the Disciples which was organized especially for him, and of which he had charge till his death. He was one of the clearest thinkers and most lucid and graceful writers of the United States. He was a leader in all reform and educational movements. From 1867-1871 he was Professor of Natural Religion and Christian Doctrine, in Harvard University. Together with Emerson and William H. Channing, he prepared the "Memoirs of Margaret Fuller d'Ossoli." His chief work was "Ten Great Religions." Among others were: "Service Hymn-book and Hymn-book of the Church of the Disciples"; "Christian Doctrine of Prayer"; "The Hour Which Cometh"; "Orthodoxy: Its Truths and Errors"; "Steps of Belief"; "Events and Epochs in Religious History"; "The Ideas of the Apostle Paul"; "Self-Culture"; "Anti-Slavery Days"; "Every-Day Religion"; and "Vexed Questions." He died in Boston, Mass., June 8, 1888.

Clarke, John Mason, an American scientist; born in Canandaigua, N. Y., April 15, 1857. He studied at Amherst and Göttingen, and from 1881 to 1884 was Professor of Geology at Smith College. He subsequently became State Palæontologist of New York, and has written numerous pamphlets and papers on geology and palæontology.

Clarke, John Sleeper, an American actor; born in Baltimore, Md., Sept. 3, 1833. He began his stage career in childhood and played comedy parts with success from 1851 to 1869. He then became a theatrical manager and with his brother-in-law, Edwin Booth, made paying ventures in various houses of amusement in the United States and England. He died in London, England, Sept. 14, 1899.

Clarke, Marcus Andrew Hyslop, an Australian novelist; born in London, April 24, 1846. He went to the island in his 24th year, took up journalism, and ac-

Clarke

quired the experience of bush life and the knowledge of antipodean men and things of which such brilliant use is made in "His Natural Life," a striking convict story; "Holiday Peak"; "Old Tales of a New Country," and other vivid fictions. He died in Melbourne, Australia, Aug. 2, 1881.

Clarke, McDonald, an American poet; born in Bath, Me., June 18, 1798. He was an eccentric character, familiarly known as "the mad poet"; and was the subject of an amusing poem by Halleck, called "The Discarded." The subjects of Clarke's verses were usually the belles of the city and topics of the day. His works include: "Poetic Sketches" (1826), and "The Belles of Broadway" (1833). One of his poems was "Now Twilight Lets Her Curtain Down." He died in New York, March 5, 1842.

Clarke, Mary Bayard, an American author; born in Raleigh, N. C., about 1830. While living in Cuba, she published verses signed "Tenella" in the periodicals. After her return in 1855 she wrote "Reminiscences of Cuba" for the "Southern Literary Messenger." Among her works are war lyrics and translations from Victor Hugo; also prose articles signed "Stuart Leigh." In 1870 was published her poem, "Clytie and Zenobia, or the Lily and the Palm," and "Wood Notes," a compilation of North Carolina verse.

Clarke, Mary Cowden, an English story-writer, essayist, and Shakespearean scholar; born (Novello) in London, June 22, 1809. She married Charles Cowden Clarke, with whom she wrote the "Shakespeare Key" and compiled an edition of Shakespeare's plays. Her own "Complete Concordance" is universally known. Her novels are: "A Rambling Story" and "The Iron Cousin," pleasing and graceful prose idyls. "World-Noted Women" contains able biographical studies. She died in Italy, Jan. 12, 1898.

Clarke, Rebecca Sophia ("Sophie May"), an American novelist and writer of children's stories; born at Norridgewock, Me., 1833. She has written, for children, the "Dotty Dimple" series, "Flaxie Frizzle" stories, etc., and of novels: "Her Friend's Lover," "The Asbury Twins," "Quinnebasset Girls," etc. Died in 1906.

Clarke, Richard Henry, an American author; born in Washington, D. C., July 3, 1827. He was made president of the Society of American Authors in 1891. "The New Crusade of the Nineteenth Century," relating to the Church and slavery, was an important work. Other works of his are: "Socialism in America," "Biography of Commodore John Barry, Founder of the American Navy," "Father Sebastian Rale,"

an answer to Gladstone on "Maryland Toleration," and an "Illustrated History of the Catholic Church in the United States."

Clarke, Samuel, an English theological and philosophical writer; born in Norwich, in 1675; educated at Caius College, Cambridge. He became chaplain to Dr. More, bishop of Norwich, and between 1699 and 1701 published "Essays on Baptism, Confirmation and Repentance," replied to Toland's "Amyntor," and issued a paraphrase of the Gospels. He was then presented with two livings, and in 1704 and 1705 twice delivered the Boyle lectures at Oxford on "The Being and Attributes of God," and on "The Evidences of Natural and Revealed Religion." In 1706 he published a letter to Mr. Dodwell on the "Immortality of the Soul," and a Latin version of Newton's "Optics." He was then appointed rector of St. Bennet's, London, and shortly afterward rector of St. James's and chaplain to Queen Anne. In 1712 he edited Cæsar's "Commentaries," and published his "Scripture Doctrine of the Trinity," which became a subject of much controversy and of complaint in the Lower House of Convocation. His chief subsequent productions were his discussions with Leibnitz and Collins on the "Freedom of the Will," his Latin version of part of the "Iliad," and a considerable number of sermons. His philosophic fame rests on his *a priori* argument for the existence of God, his theory of the nature and obligation of virtue as conformity to certain relations involved in the eternal fitness of things, and his opposition to Hobbes, Spinoza, Locke, Leibnitz, and others. He died in 1729.

Clarkson, Thomas, an English emancipationist; born in Wisbeach, Cambridgeshire, in 1760. He was originally intended for the Church, and studied at St. John's College, Cambridge, where he gained the vice-chancellor's prize for a Latin essay on the theme, "*Anne liceat invitos in servitudinem dare?*" (Is it lawful to make slaves of men against their will?) His researches for this dissertation roused in him a passionate antagonism to the slave-trade, and he allied himself with the Quakers and with Wilberforce. While the latter advocated the cause in Parliament, Clarkson conducted the agitation throughout England, even crossing to France to obtain the coöperation of the National Convention. His labors went far to secure the prohibition of the slave-trade in 1807 and the emancipation act of 1833. His literary works comprise: "A Portraiture of Quakerism" (1806), "History of the Abolition of the Slave Trade" (1808). He died in 1846.

Clarksville, a city and county-seat of Montgomery Co., Tenn.; is on the Cumber-

land and Red rivers, and the Elkton and Guthrie and the Louisville and Nashville railroads, 50 miles N. W. of Nashville. It is the center of the great "dark tobacco belt," and has 18 tobacco factories, with an annual output of over 15,000 hogsheads. A bridge crosses the Red river here, and the city has steamboat communications with all river ports. It is the seat of the Southwestern University (Presb., 1874), and the State Odd Fellows' Home; has several manufactories, daily and weekly newspapers, a female academy, high and graded public schools, 2 National banks, and an assessed property valuation of \$3,000,000. Pop. (1900) 9,431; (1910) 8,548.

Clark University, a co-educational institution in Atlanta, Ga.; organized in 1870 under the auspices of the Methodist Episcopal Church, exclusively for the colored race; has grounds, buildings, scientific apparatus, etc., valued at over \$525,000; average number of faculty, 25; students, about 570.

Clark University, an institution at Worcester, Mass., founded in 1887 by JONAS G. CLARK (*q. v.*), and devoted exclusively to post-graduate work in the sciences; has a collegiate and ten scientific departments; endowment funds aggregating \$4,000,000; grounds and buildings valued at over \$530,000; scientific apparatus, \$80,000; volumes in the libraries, over 50,000; average number of faculty, 16; average student attendance, 100; fellowships, 24.

Clary, the name given to certain menthaceous plants of the genus *Salvia*. *S. sclarea* is the common clary. It is a native of Italy, Syria, Bithynia, etc., and is cultivated in gardens in the United States. *S. pratensis* is the meadow clary, and *S. verbenaca*, the wild clary, or vervain clary.

Classic, the name given to the citizens belonging to the first or highest of the six classes into which the Romans were divided. Hence the Greek and Roman authors have been in modern times called classics, that is, the excellent, the models. The Germans, however, soon gave the word *klassisch* (classical) a wider sense, making it embrace: (1) the standard works of any nation; and, (2) ancient literature and art, in contradistinction to the modern; and their example was followed by both the British and the French. A third use of the term, in contradistinction to Romantic, is scarcely comprised under those cited, implying adherence to the established literary or artistic convention of some previous period, as opposed to the insurgence of new elements shaping a new convention. In this sense classic usually implies the predominance of form over emotion and thought, while its antonym Romantic implies the predomi-

Claude

nance of emotion and the departure from the old formal standards. From its vagueness in this regard many writers have vainly proposed to dispense with the term.

Claude Lorraine, a landscape-painter whose real name was Claude Gelée, but who was called Lorraine from the province where he was born in 1600. When 12 years old he went to live with his brother, an engraver in wood at Friburg, went from him to study under Godfrey Waats at Naples, and was afterward employed at Rome by the painter Agostino Tassi, to grind his colors and do the household drudgery. On leaving Tassi he traveled in Italy, France, and Germany, but settled in 1627 in Rome, where his works were greatly sought for, and where he lived much at his ease until 1682, when he died of gout. The principal galleries of Italy, France, England, Spain, and Germany are adorned with his paintings; that on which he himself set the greatest value being the painting of a small wood belonging to the Villa Madama (Rome). He excelled in luminous atmospheric effects, of which he made loving and elaborate studies. His figure work, however, was inferior, and the figures in many of his paintings were supplied by Lauri and Francesco Allegrini. He made small copies of all his pictures in six books known as "Libri di Verità" (Books of Truth), which form a work of great value (usually called the Liber Veritatis), and much esteemed by students.

Claudianus, Claudius, a Roman poet of the 4th century. He stood high in favor with the Emperors Honorius and Arcadius, and was promoted to the highest honors of the State. He was the last of the non-Christian poets of Rome, and stands high above his contemporaries, though his style and matter have the faults and blemishes of that decadent period,—bombastic expression and flattery of the great. His greatest work is an epic, "The Rape of Proserpine." His "Epithalamium on the Marriage of Honorius" has appended to it some "Fescennine Verses," both, especially the latter, would seem to continue the true Roman poetic tradition for that kind of compositions. Such poems would not be tolerated at a marriage feast in our times. Besides the works named, there is a considerable number of other poems by Claudianus.

Claudius I., Tiberius Drusus Nero, surnamed GERMANICUS and BRITANNICUS, the fourth Emperor of Rome; born in Lyons, B. C. 10. After spending 50 years of his life in a private station, unhonored, and but little known, he was, on the murder of Caligula, his nephew, A. D. 41, proclaimed Emperor by the soldiers, and confirmed in the sovereignty by the Senate. At first he

Claudius

performed some praiseworthy acts, but he soon became contemptible for his debauchery and voluptuousness; and he died, A. D. 54, of poison administered by his second wife, Agrippina. Claudius went to Britain two years after his accession, and made it a Roman province. He built the port of Ostia, the Claudian aqueduct, and executed other great works.

Claudius II., Marcus Aurelius Flavius, surnamed

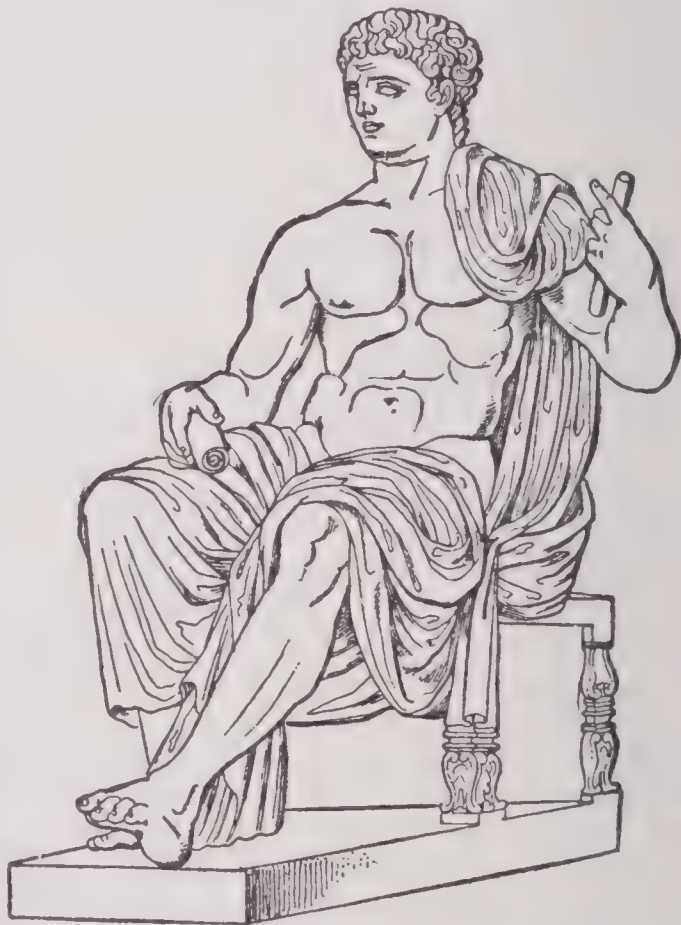
GOthicus, Roman Emperor; born in Illyria, A. D. 214, was raised

to the throne on the death of Gallienus, in 268, and by his virtues as well as his splendid victories over the Goths, he proved himself worthy of his exalted station. He died in 270 A. D.

Claudius, Appius, a Roman decemvir (451 and 450 B. C.), who gained the high favor of his fellow-citizens by his ability



EMPEROR CLAUDIUS.



APPIUS CLAUDIUS.

and activity. In the latter year, however, he began to show his real aims toward absolute and illegal power. The growing indignation of the Roman populace reached a height on account of his grossly tyrannous action toward Virginia, daughter of a respected plebeian named Lucius Virginius,

Claudius

who was abroad with the army. The proud patrician gained possession of the person of the maiden by pretending that she was the born slave of one of his clients. Her lover Icilius summoned her father Virginius from the army, but another mock-trial again adjudged the girl to be the property of the decemvir's client. To save his daughter from dishonor, the unhappy father seized a knife and slew her. The popular indignation and the father's appeal to the army overthrew the decemviri, and the proud Appius was flung into prison, where he died by his own hand. The story is specially familiar to English readers from Macaulay's "Lays."

Claudius, Matthias, a German poet, whose prose and poetry bear a peculiar stamp of humor, frankness and cordiality; born in Rheinfeld, Holstein, Aug. 15, 1740. In 1775 he made a collection of his compositions, which had appeared in the "Wandsbeck Messenger" and other periodicals, with the addition of some which had not been printed, and gave the collection the title "Asmus omnia sua Secum Portans," or "Complete Works of the Wandsbeck Messenger." All his works are written in a natural, intelligible, and often humorous style, and support the cause of good morals, benevolence, patriotism, and piety, while they attack folly and vice with the weapons of ridicule and scorn. Many of his songs have been set to music by the first composers, and have become a part of the national melodies. In the latter part of his life he became a convert to religious mysticism, and died in Hamburg, Jan. 21, 1815, after having filled several public offices.

Clausel, Bertrand (klō-ze'), a marshal of France; born in Mirepoix in 1773. After gaining a high reputation by his services on the Pyrenees, in Haiti, Italy and Dalmatia, he accompanied Junot and Massena to Spain in 1810. He laid siege to Ciudad Rodrigo, and was wounded at Salamanca. By his skill and conduct the army of Portugal was preserved and led into Spain. In 1813 Napoleon rewarded his valor by conferring on him the chief command of the forces in the N. of Spain. On the restoration of the Bourbons he came to the United States, and lived here for a long time in retirement, but when Charles X. was overthrown, in 1830, he received from Louis Philippe the command of the French troops in Algeria, which he retained till 1836, when he resigned in consequence of the defeat he had sustained at Constantine. He died in 1842.

Clausewitz, Karl von (klouz'e-vêtz), a Prussian military officer; born in Burg, June 1, 1780. He served with distinction

Clavicle

in several campaigns in the Prussian and Russian services in 1815, became chief of a Prussian army corps, and was ultimately director of the army school, and inspector of artillery. He died in Breslau, Nov. 16, 1831. Of his works the best known are his great book "Of War" (3 vols., 4th ed. 1880), and his life of Scharnhorst.

Clausius, Rudolf, a German physicist; born in Köslin, Pomerania, Jan. 2, 1822. He studied at Berlin, and afterward lectured on natural philosophy as *privat-docent* at Berlin, and as professor at the Zürich Polytechnic School. In 1869 he was appointed to the chair of Natural Philosophy at Bonn, and there he died, Aug. 24, 1888. He was elected a foreign member of the Royal Society in 1868, and in 1879 was given its highest honor, the Copley Medal. His scientific labors cover parts of the field of optics and of electricity, but his especial work was his contribution to the science of thermo-dynamics, the honor of establishing which on a scientific basis he divides with Rankine and Thomson. His mathematical methods he also applied to the theory of the steam-engine, the dynamical or kinetic theory of gases, and to electricity and electro-dynamics. His great work is his "Theory of Thermo-Dynamics."

Clava Coronæ ("the Key of the Crown"), one of the names given to the star Alpha Coronæ Borealis, the brightest in the Northern Crown. The more common name is that of Arabic derivation, Alphecca.

Clavagella, a genus of mollusks, family *Gastrochænidæ*. The shell is oblong, the two valves flat, the left one cemented to the side of the long tubular burrow in which the animal is found. Six recent species are known, from the Mediterranean, the Pacific, and the Australian seas, and fourteen fossil, the latter from the Upper Greensand onward.

Clavaria, a genus of fungi, some species of which are edible.

Claverhouse. See GRAHAM, JOHN.

Clavichord, a key and stringed instrument, not now in use, being superseded by the pianoforte; a clarichord. Its form is that of a small pianoforte; it has no quills, jacks, or hammers. The strings are all muffled, and the tone is produced by little brass wedges, placed at the ends of the keys, which, when pulled down, press against the middle of the strings, acting as a bridge to each.

Clavicle, the collar-bone. It extends transversely outward, with an inclination backward from the summit of the sternum to the acromion process of the scapula. It connects the upper limb with the trunk. The corresponding bone in birds is the one popularly called the merrythought.

Clavicorn Beetles

Clavicorn Beetles, a large family of coleopterous insects, distinguished by the club-shaped character of the antennæ. Burying-beetles and bacon-beetles are typical examples, and there are aquatic as well as terrestrial species.

Clavigero, Francesco Saverio (klä-vē-hā'ro), a Spanish historian; born in Vera Cruz, Mexico, about 1720. He was educated as an ecclesiastic, and resided 36 years in the provinces of New Spain, where he acquired the languages of the Mexicans and other indigenous nations, collected many of their traditions, and studied their historical paintings and other monuments of antiquity. On the suppression of the Jesuits by the Spanish government in 1767 Clavigero went to Italy, the Pope assigning him a residence in Cesena, where he wrote his "Mexican History," and died in 1793.

Claws, sharp hardenings of the skin at the end of appendages. The term is often applied to the *chela* and similar structures at the end of arthropod limbs, but is best restricted to the epidermic tips found at the ends of the digits in most reptiles, on the toes, and often on the thumb and first finger of birds, but seen in perfection in many mammals — *e. g.*, *carnivores*, *insectivores*, *edentates*.

Claxton, Kate (MRS. CHARLES A. STEVENSON), an American actress; born in New York city in 1848. She made her début at Daly's Theater before she was out of her teens, but her success dates from 1873 when she acted Mathilda in "Led Astray." As Louise in "The Two Orphans" she attained great celebrity. She was playing the part at the Brooklyn Theater when, on the night of Dec. 5, 1876, that structure was destroyed by fire with great loss of life. Since 1896 she has been touring the country in emotional plays.

Clay, the name of various earths, which consist of hydrated silicate of aluminium, with small proportions of the silicates of iron, calcium, magnesium, potassium, and sodium. All the varieties are characterized by being firmly coherent, weighty, compact, and hard when dry, but plastic when moist, smooth to touch, not readily diffusible in water, but when mixed not readily subsiding in it. Their tenacity and ductility when moist and their hardness when dry has made them from the earliest times the materials of bricks, tiles, pottery, etc. Of the chief varieties porcelain clay, kaolin, or China clay, a white clay with occasional gray and yellow tones, is the purest. Potter's clay and pipe clay, which are similar but less pure, are generally of a yellowish or grayish color, from the presence of iron. Fire clay is a very refractory variety, always found lying immediately below the coal; it is used for making fire

Clay

bricks, crucibles, etc. Loam is the same substance mixed with sand, oxide of iron, and various other foreign ingredients. The boles, which are of a red or yellow color from the presence of oxide of iron, are distinguished by their conchoidal fracture. The ochres are similar to the boles, containing only more oxide of iron. Other varieties are fuller's-earth, Tripoli, and boulder clay, the last a hard clay of a dark-brown color, with rounded masses of rock of all sizes embedded in it, the result of glacial action. The distinctive property of clays as ingredients of the soil is their power of absorbing ammonia and other gases and vapors generated on fertile and manured lands; indeed no soil will long remain fertile unless it has a fair proportion of clay in its composition. The best wheats both in America and Europe are grown on calcareous clays, as also the finest fruits and flowers of the rosaceous kind. Clays of various kinds are exceedingly plentiful in the United States, and they are extensively employed in the making of all kinds of earthenwares.

The following shows the value of the clay industry in the United States for the calendar year 1908:

Common brick	\$44,765,614
Front brick	6,935,600
Vitrified paving brick.....	10,657,475
Fancy ornamental brick.....	920,418
Fire brick	10,696,216
Drain tile	8,661,476
Sewer pipe	11,003,731
Ornamental terra cotta.....	4,577,367
Fireproofing	3,168,037
Tile (not drain).....	3,877,780
Miscellaneous	2,798,493

Total brick and tile.....	\$108,062,207
Total pottery	\$25,135,555

Total	\$133,197,762
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Clay, Cassius Marcellus, an American diplomatist; born in Madison county, Ky., Oct. 19, 1810. He was graduated at Yale College in 1832, and three years later was elected to the Legislature of Kentucky. He opposed the annexation of Texas, supported Henry Clay, and served in the Mexican War. He was an opponent of slavery and supported Lincoln for the Presidency. From 1862 to 1869 he was Minister to Russia. In 1896 he supported the "Gold Democrat" ticket. He died July 21, 1903, leaving several wills of public interest.

Clay, Frederic, an English composer; born in Paris, Aug. 3, 1840. He studied music at Paris, and settled in London as a composer, his most successful production being "The Black Crook." He died in London, Nov. 27, 1889.

Clay, Henry, an American statesman; born in "The Slashes" district, Hanover county, Va., April 12, 1777. Becoming a student of law, in his 21st year, he was admitted to the bar, and began practice at

Clay

Lexington, Ky. His success was signal and immediate. About 1804 he entered politics, and in 1806 became United States Senator for a single year, to fill the unexpired term of Mr. Adair; and in 1811 was elected to, and chosen speaker of, the House of Representatives, remaining in that post till 1814, when he was sent abroad as one of the commissioners to negotiate the treaty of peace with England at Ghent. On his return he was again sent to Congress, and reelected to his old position as speaker. Clay at this time took an active part in acknowledging the independence of the Hispano-American republics, and the encouragement of American industry by a protective tariff. He had also a prominent share in the vehement discussions about slavery which were excited in 1820 by the question respecting the admission of Missouri into the Union; and he was (if not the author) the earnest advocate of the famous "compromise" on that subject, which established the line of $36^{\circ} 30''$ as the N. limit of slaveholding territory. In 1824 he was a candidate for the Presidency against J. Q. Adams, General Jackson, and W. H. Crawford, and no choice being effected in the Electoral College, when the matter came up to the House of Representatives Clay and his friends voted for Mr. Adams, thereby securing his election. During the entire period of the Adams administration, 1825-1829, Clay was Secretary of State, and performed the duties of that office with consummate ability. In 1831, he returned to the United States Senate, and became the leader of the opposition to General Jackson's government, and strove, but ineffectually, against the removal of the deposits from the United States Bank. Through his influence also, the "Compromise Bill," as it was called, was passed through Congress, which put an end to the Nullification controversy by a partial abandonment of the protective system.

In 1832, he was again the candidate of his party for the presidency, though with little chance of success, owing to the overwhelming popularity of General Jackson, who was reelected. In March, 1842, he resigned his seat in the Senate, and retired into private life, till 1844, when he came forward a third time as a candidate for the Presidential chair. In one of the most exciting political contests that ever occurred in the United States he was again defeated, but by a very small numerical majority, obtained mainly through the influence of the administration,—then in the hands of his political opponents,—and the obstinacy of the so-called "liberty party." The immediate consequence of this defeat was the annexation of Texas, a measure to which he had given his strenuous opposition. This was virtually the termination of his public

Clayton

career, though, in 1849, he consented to resume his seat in the Senate, in view of the perilous contest which was then impending between the slave-holding party and its opponents, on the California and territorial questions. He was the author of the celebrated "Compromise of 1850," as it was termed, by which, after a long and vehement struggle, this dispute was, for the time being, adjusted.

This was the third occasion in his career in which, by giving the whole weight of his abilities and influence to an intermediate course between two extremes, he put an end to a violent conflict of opinion, which menaced the peace of the country, and the duration of the Union. On the question of slavery, he always favored moderate counsels, and a pacificatory policy. The excitement and exhaustion occasioned by this last great controversy gave the final blow to his already enfeebled constitution, and he died in Washington, June 29, 1852.

Clay Ironstone, a granular or compact admixture of the mineral siderite (ferrous carbonate) and clay. It occurs as nodules or in thin beds in various geological systems, but especially in the carboniferous strata. It frequently contains organic matter. When very highly carbonaceous, it passes into the variety called blackband ironstone.

Claymore, formerly the large two-handed, double-edged sword of the Scotch Highlanders; now a basket-hilted, double-edged broadsword.

Claypole, Edward Waller, an American geologist; born in England, June 1, 1835; was graduated at the University of London in 1862; was engaged in teaching for 40 years; Professor of Geology and Biology in the California Polytechnic Institute in Pasadena, and for a time was on the geological survey of Pennsylvania. He was the author of numerous reports on the geology of Perry Co., Pa., and of papers and essays on geological and biological subjects. He was a member of a number of geological societies in London, Edinburgh, and America, and of the American Association for the Advancement of Sciences. He died in Long Beach, Cal., Aug. 17, 1901.

Clay Slate, in geology, a rock consisting of clay which has been hardened and otherwise changed, for the most part extremely fissile and often affording good roofing-slate. In color it varies from greenish or bluish gray to lead color.

Clayton, John Middleton, an American statesman; born in Sussex county, Del., in 1796; was elected United States Senator in 1829, and held office till the close of 1836, when he resigned. He was then appointed chief-justice of his native State, and continued on the bench for nearly three years.

Clayton

In 1845 he was again sent to the Senate, and remained there till March, 1849, when he became Secretary of State under Gen. Taylor. In this capacity he negotiated the Clayton-Bulwer Treaty (*q. v.*), adjusting the respective claims of Great Britain and this country in Central America. Clayton resigned office on General Taylor's death in 1850, but remained in the Senate till his death, Nov. 9, 1856. He was a zealous Whig, an able debater, and a statesman of high talent and upright character.

Clayton, Powell, an American military officer; born in Bethel, Pa., Aug. 7, 1833; received an academic education in Bristol, Pa.; later studied civil engineering, and went to Leavenworth, Kan., as engineer and surveyor in 1859. When the Civil War broke out he entered the Union army as captain of the 1st Kansas Infantry. In May, 1863, he led a successful expedition against a band of guerillas on the White River, Ark., and also to destroy Confederate stores; and in 1864 was promoted Brigadier-General of volunteers. At the close of the war he settled in Arkansas; was elected governor in 1868; United States Senator in 1871-1877; appointed minister to Mexico in 1897, and raised to rank of ambassador in 1899.

Clayton-Bulwer Treaty, a convention between the United States and Great Britain, concluded April 19, 1850, and deriving its name from John M. Clayton, Secretary of State of the United States, and Sir Henry Bulwer, British Minister at Washington. The object of the treaty was to aid the construction of an inter-oceanic canal on either the Nicaragua or Panama routes. It contains nine articles, of which the first and most important was the following:

"Article 1. The Governments of the United States and of Great Britain hereby declare that neither the one nor the other will ever obtain or maintain for itself any exclusive control over the said ship canal; agreeing that neither will ever erect or maintain any fortifications commanding the same, or in the vicinity thereof, or occupy, or fortify, or colonize, or assume, or exercise any dominion over Nicaragua, Costa Rica, the Mosquito Coast, or any part of Central America; nor will either make use of any protection which either affords, or may afford, or any alliance which either has, or may have, to, or with, any State or people, for the purpose of erecting or maintaining any such fortifications, or of occupying, fortifying or colonizing Nicaragua, Costa Rica, the Mosquito Coast, or any part of Central America, or of assuming or exercising dominion over the same; nor will the United States or Great Britain take advantage of any intimacy, or use any al-

Clearing-house

liance, connection or influence, that either may possess, with any State or Government through whose territory the said canal may pass, for the purpose of acquiring or holding, directly or indirectly, for the citizens or subjects of the one, any rights or advantages in regard to commerce or navigation through the said canal which shall not be offered on the same terms to the citizens or subjects of the other."

Three years after its negotiation the treaty became the subject of controversy between the two governments, and for many years the United States attempted to secure the repeal or modification of Article I., but without avail till 1900. In January, 1899, Congress adopted a bill providing for the construction of a Nicaragua canal, the bill also requesting the President to open negotiations for the abrogation of the Clayton-Bulwer treaty. Under the last clause a new convention was signed in Washington on Feb. 5, 1900, by John Hay, Secretary of State, and Lord Pauncefoot, British Ambassador, which annulled the original compact for joint control of such a canal, vested in the United States the right to build and manage it, guaranteed its neutrality, and pledged the United States to refrain from fortifying it. When the treaty came before the United States Senate that body so amended it that Great Britain declined to approve of it in its new form; but on Nov. 18, 1901, a new convention was signed in Washington. A treaty was ratified at Washington, Feb. 21, 1902. See PANAMA; PANAMA CANAL.

Cleanthes, a Greek Stoic philosopher of the 3d century B. c. He was a native of Assus, in Lydia; but, visiting Athens, he became a zealous disciple of Zeno, and to enable him to attend on that master in the day, he was accustomed to labor by night. His mental and bodily strength was immense, and despite all obstacles, he studied so successfully as to become, B. c. 263, Zeno's successor. Of his writings only some fragments remain, among which is his noble "Hymn to Zeus."

Clearance of Vessels, the examination of them by the proper custom-house officers, and the giving of a certificate that the regulations have been duly complied with. Vessels are said to clear inward or outward according as they arrive or depart.

Clearchus (klē-är'kus), a Spartan general who commanded about 13,000 Greeks in the army of Cyrus the Younger when he tried to conquer the throne of Persia from his brother, Artaxerxes II. When Cyrus was defeated at Cunaxa (401 B. c.), Clearchus and his chief officers were seized by treachery and put to death.

Clearing-house, a financial institution which makes daily adjustment of debits

Clearing-House

and credits among the banks constituting its membership.

In the old days before the American clearing-houses were established, Bank No. 1 sent a runner to Bank No. 2 with the check to get it cashed; and if No. 2 had a check on No. 1, it sent its runner over; and so on through all the banks. But now each morning the clearing-house clerks of a bank report at the clearing-house, and make out a list of all the checks payable to that bank by or through other banks; then the clearing-house people take these lists, and compare them. They find, for instance, that Bank A owes B \$1,000 and C \$500; that B owes A \$500 and C \$1,000; and that C owes A \$500 and B \$500. Comparing these, we see that A owes B \$500 clear of what B owes A, and that A and C stand off; that B owes nothing to A, and owes \$500 to C; and that C owes nothing to A, and is owed \$500 by B. That is, that A owes B \$500, and B owes C \$500. Then if A pays C \$500, \$4,000 of mutual debts is settled for \$500. When this settlement is worked out, the clearing-house clerks report back to their banks, and before 1 o'clock sums of money are sent from each bank to the clearing-house in settlement of balances, and the checks drawn on each bank are returned to it, to be charged against the different individual depositors. In addition to the time which is saved by this method of conducting the business, each bank at once learns the balance for or against it. The clearing-house in New York city is by far the most important in the United States, but nearly every city has a similar institution.

The following table shows the amount of exchanges at the various clearing-houses of the United States in the year ending Sept. 30, 1900:

New York	\$51,964,588,572
Boston	6,299,128,611
Chicago	6,811,052,828
Philadelphia	4,679,455,332
St. Louis	1,656,343,626
San Francisco	1,017,115,942
Baltimore	1,072,172,396
Pittsburg	1,189,590,102
Cincinnati	792,434,950
Galveston	159,272,400
Kansas City	738,817,138
New Orleans	500,671,071
Minneapolis	583,193,116
Buffalo	262,861,063
Milwaukee	298,024,593
Detroit	424,771,513
Louisville	414,413,359
Houston	123,862,708
Providence	330,400,500
St. Paul	248,512,369
Cleveland	417,838,383
Denver	214,477,526
Omaha	316,063,773
Indianapolis	158,286,998
Memphis	131,114,710
Columbus	270,798,600
Evansville	38,748,700
Scranton	58,348,394
Nashville	72,253,687
Hartford	129,316,922
Portland, Ore.	102,047,454

Clear Lake

Fort Worth	46,497,492
Peoria	102,957,946
Washington, D. C.	131,528,901
St. Joseph	160,420,121
New Haven	77,385,669
Salt Lake	121,450,448
Rochester	106,446,820
Albany	103,827,077
Savannah	218,617,796
Springfield, Mass.	68,108,413
Davenport	45,377,736
Helena	32,245,277
Worcester	66,792,371
Portland, Me.	56,966,243
Norfolk	57,042,416
Tacoma	52,662,471
Springfield, Ill.	23,140,618
Lowell	28,126,766
Grand Rapids	62,706,383
Sioux City	57,764,020
Syracuse	58,351,799
Seattle	126,214,329
Los Angeles	114,859,127
Wilmington	48,148,948
Youngstown	17,168,582
Knoxville	28,868,099
Des Moines	74,155,803
Chattanooga	20,133,725
Wichita	25,924,424
New Bedford	22,503,115
Lexington	22,697,218
Topeka	36,120,817
Macon	33,269,000
Dayton	57,546,200
Birmingham	42,597,101
Binghamton	20,525,900
Canton	13,852,194
Springfield, O.	15,389,799
Fremont	6,949,470
Richmond	169,157,724
Atlanta	92,061,051
Little Rock	24,431,793
Augusta, Ga.	58,477,974
Akron	21,679,960
Sioux Falls	7,758,581
Jacksonville	12,710,389
Rockford	15,434,204
Kalamazoo	20,175,808
Hastings	8,523,137
Toledo	113,155,429
Spokane	60,616,841
Fargo	18,306,153
Fall River	43,478,438

Total.....\$84,546,685,444
Total in year ending Sept. 30,
1910.....\$169,025,172,600

Clearing Nut, the nut of *strychnos potatorum*, which is used in India for clearing water from sediment. The natives prefer pond or river water to clear well water, but purify what they take by rubbing the inside of the unglazed earthen vessel for a minute or two with the seed of the clearing nut. The impurities in a short time fall to the bottom, and the water becomes clear. The nuts are sold for this use in the bazars, and travelers commonly carry some with them. The tree bearing the nut is small, and is very abundant in the forests of India. Its bark is deeply fissured; leaves smooth, ovate, and pointed, the fruit is black and pulpy, with but one seed. The wood, very hard, is employed for many purposes.

Clear Lake, a body of water lying in a picturesque region in Lake Co., Cal.; 110 miles N. of San Francisco. It is 25 miles long, and from 2 to 6 miles wide.

Cleary

Cleary, James Vincent, a Canadian clergyman; born in Waterford, Ireland, Sept. 18, 1828. He was educated at Royal College, Maynooth, and ordained to the Roman Catholic priesthood in 1851. He became president of St. John's College, Waterford, in 1873, and in 1880 was appointed Bishop of Kingston, Canada, the see being made an archbishopric in 1889. In 1896 he reopened the Theological Seminary of Regiopolis College in Kingston.

Cleavage, the manner or direction in which substances regularly cleave or split. The regular structure of most crystallized bodies becomes manifest as soon as they are broken. Each fragment presents the form of a small polyhedron, and the very dust appears under the microscope an assemblage of minute solids, regularly terminated. The directions in which such bodies thus break up are called their planes of cleavage; and the cleavage is called basal, cubic, diagonal, or lateral (or peritomous), according as it is parallel to the base of a crystal, to the faces of a cube, to a diagonal plane, or to the lateral planes. In certain rocks again there is a tendency to split along planes which may coincide with the original plane of stratification, but which more frequently cross it at an angle. This tendency is the consequence of the readjustment by pressure and heat of the components of rocks, which is one of the phases of metamorphism.

Cleaver, a plant, *galium aparine*, called Cleavers, or formerly "Clever," from its habit of cleaving to objects with which it is brought in contact. It is called also goose-grass. The leaves are 6-8 in a whorl, hispid, their margins and midrib near the angles of the stem very rough, with reflexed prickles; the flowers are white; the bristles of the fruit are hooked. It is a long, weak, straggling plant, which is often seen in hedges, and more rarely in corn-fields. It flowers in June and July. The word is also the name of a kind of meat ax.

Cleef (I.), **Joseph van**, surnamed the Fool; born at Antwerp in 1480, one of the most celebrated painters of his time, and in regard to beauty of coloring may challenge comparison with the Italian masters. He died insane in 1529. (2) **JOHN**, a painter; born at Rome in 1646, belongs to the Flemish school, of which he is one of the most eminent masters. His works show more breadth of style than skill in coloring. He died in 1716.

Clef, a character placed at the beginning of a stave, to show the elevation of that particular stave in the general claviary or system, and to determine the names of the notes according to their positions on the stave. There are three clefs; the G clef, generally known as the treble clef, which

Clemens

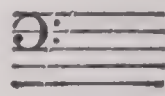
is placed on the second line of the treble stave; the C clef, which is used either as the alto, tenor, or (rarely), soprano clef, according to its position on the third, fourth or first line of the stave; and the F clef,



G Clef.



C Clef.



F Clef.

which is either bass or baritone (rare) clef, according to its position on the fourth or third line of the stave.

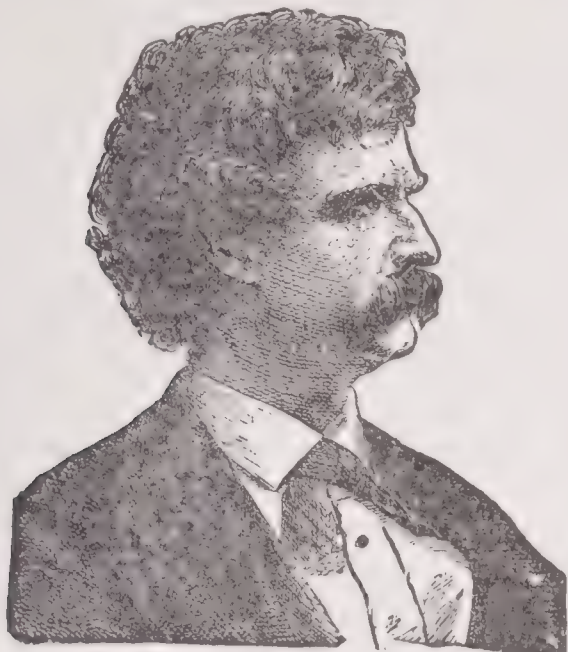
Cleg, a name applied to various insects which are troublesome to horses, cattle, and even to man from their blood-sucking propensities. Such are the great horse-fly, gad-fly, or breeze (*Tabanus bovinus*), the *Chrysops cæcutiens*, and the *Hæmatopöta pluviälis*.

Clematis, also known as the Traveler's Joy, or Virgin Bower, a genus of plants, order *Ranunculaceæ*, tribe *Clemateæ*. Sepals, 4-6; petals, none; stamens and styles many; achenes terminated by a long, generally feathery awn. The species are numerous. *C. Vitalba*, the common traveler's joy or virgin's bower, is a climbing plant with pinnate leaflets, twining petioles and greenish-white flowers. It occurs wild in the middle and S. of England. *C. Gouriana* and *C. Wightiana* are not uncommon in India, on the Western Ghauts, in the Decan, etc., and there are other Indian species. On the continent of Europe, *C. erecta* and *C. flammula* are used by beggars to produce artificial ulcers on their limbs, while in the United States, according to Geyer, the root of a clematis is employed by the North American Indians as a stimulant to horses which fall down at their races. The scraped end of the root is held to the nostrils of the fallen animal, which begins to tremble, and then rising is conducted to water to refresh itself. Various species of clematis are found in English gardens and greenhouses.

Clemens, Samuel Langhorne (best known by his pen name of MARK TWAIN), an American humorist; born in Florida, Mo., Nov. 30, 1835. He worked for some time as a compositor in Philadelphia and New York, and then in 1851 learned the business of pilot on the Mississippi. Thence he went to the Nevada mines; became in 1862 local editor of a newspaper in Virginia City; went to San Francisco; was for some time a reporter; and worked in the Calaveras gold-diggings. In 1884 he founded the publishing firm of C. L. Webster & Co., which failed some years later, though it had published successful works, including General Grant's "Personal Recollections," on which over \$300,000 in royalties were

Clemens

paid. After the failure Mr. Clemens made a lecturing tour of the world for the purpose of paying the firm's indebtedness, which he insisted on doing in full, though



SAMUEL L. CLEMENS.

the creditors offered to settle for half of the amount. His works include: "The Jumping Frog"; "The Innocents Abroad"; "Roughing It"; "A Tramp Abroad"; "The Prince and the Pauper"; "Life on the Mississippi"; "The Gilded Age" (with Charles Dudley Warner); "Old Times on the Mississippi"; "Tom Sawyer"; "Huckleberry Finn"; "A Yankee at King Arthur's Court"; "Pudd'nhead Wilson"; "The Surviving Innocent Abroad"; "What is Man?" (in serious vein); and his autobiography. He died April 21, 1910.

Clemens, Titus Flavius, known as CLEMENT OF ALEXANDRIA, one of the fathers of the Church; born about the middle of the 2d century. Of his early career so little is known that it is doubtful whether he was born at Alexandria or at Athens; but about the year 189 he succeeded Pantænus in the catechetical school of the former city and taught there until 202 when the edict of Severus compelled him to seek a new abode. In 210 he was in Cappadocia. He died about 220.

Clement I., Clemens Romanus, Pope, and one of the apostolic fathers; born about A. D. 30. It is supposed that he is the same Clement mentioned by St. Paul (Phil. iv: 3) as one of his fellow-laborers. The identity is asserted in Euseb. (H. E. iii: 4), Origen (vol. i, p. 262, ed. Lommatzsch) and Jerome (Scriptor, Eccl. p. 176). He was, according to Catholic tradition, baptized by St. Peter, and ordained Bishop of Rome in 91, succeeding to Anacletus. Among the writings which are attributed to him are one epistle exhorting to unity (generally admitted as genuine); two other epistles preserved by the Syriac Church;

Clement VII.

the two collections or apostolical canons and constitutions; and the "Clementines," a narrative of his life, and of his connection and journeys with St. Peter. He is accounted a saint and martyr in the Roman calendar, his festival being Nov. 23. He died about 100, and was succeeded by Evaristus.

Clement II. (SUIDGER), was of Saxon birth, and in 1046 succeeded Gregory VI., who was Pope during the dynasty of Benedict IX. He crowned Henry III. Emperor, and died 1047; and at his death, Benedict was restored to the papal see.

Clement III., succeeded Gregory VIII. in 1187, preached a crusade against the Saracens; died 1191, and was succeeded by Cælestine III.

Clement IV. (GUIDO FULCUDI), succeeded Urban IV. in 1265. He signed, with St. Louis of France the "Pragmatic Sanction," which put an end to the differences existing between Rome and France. He died in Viterbo, 1268. His death was followed by a long interregnum.

Clement V. (BERTRAND DE GOT), succeeded Benedict XI. in 1305, and removed the residence of the Popes from Rome to Avignon. He was the tool of Philip the Fair of France, and, at his desire, suppressed the order of Knights Templar. He died in 1314, and had no immediate successor.

Clement VI. (PIERRE ROGER), a native of Limousin, succeeded Benedict XII. in 1342. During his pontificate, Rienzi attempted to establish the republic at Rome. His learning and eloquence are applauded by Petrarch. He died in Avignon, 1352. His successor was Innocent VI.



CLEMENT VII.

Clement VII. (GIULIO DE MEDICI), nephew of Lorenzo the Magnificent, and

Clement VIII.

cousin of Leo X., succeeded Adrian VI. in 1523. He entered into the "holy league" with Francis I. of France, the Italian princes, and Henry VIII. of England, against the Emperor Charles V. In the war which ensued, Rome was taken and plundered, and the Pope himself was shut up in the castle of St. Angelo. He had, consequently, to make terms with Charles. Subsequently, Henry VIII. having repudiated Catharine of Aragon and married Anne Boleyn, Clement excommunicated him in 1534. This occasioned a schism, and ultimately resulted in the separation of England from the Romish Church. He died in 1534, and was succeeded by Paul III.

Clement VIII. (IPPOLITO ALDOBRANDINI), born in Fano, 1536, was elected in 1592, succeeding Innocent IX. He absolved Henry IV. of France, upon that monarch making public profession of Catholicism, and was chiefly instrumental in bringing about the peace of Vervins in 1598. He elevated to the rank of cardinal, Baronius, Bellarmine, and other distinguished men, and was a learned and sagacious pontiff. He died in 1605 and was succeeded by Leo XI.

Clement IX. (GIULIO ROSSPIGLIOSI), born in Pistoia, 1600; succeeded Alexander VII. in 1667. During his pontificate, Candia was taken from the Venetians by the Turks. He died in 1666, and was succeeded by

Clement X. (EMILIO ALTIERI), born in 1590. Being of great age, the government was left in the hands of Cardinal Paluzzi, a distant relative. He died in 1676, and was succeeded by Innocent XI.

Clement XI. (GIOVANNI FRANCESCO ALBANI), born in Pesaro, 1649, succeeded Innocent XII., 1700. His pontificate was disturbed by the quarrels of the Jesuits and the Jansenists, and on issuing the famous bull "Unigenitus," a schism was produced, which lasted many years, between France and Rome. He died in 1721, and was succeeded by Innocent XIII.

Clement XII. (LORENZO DI CORSINI), born in Florence, 1652, succeeded Benedict XIII. in 1730, and reformed many abuses of the Church. He died in 1740, and was succeeded by Benedict XIV.

Clement XIII. (CARLO REZZONICO), born in Venice, 1693, succeeded Benedict XIV., 1758. The Jesuits having been expelled from France, Spain, Portugal, and Naples, he made great but useless efforts to reinstate them. In 1763 he lost Avignon and Benevento. He died in 1769. There is a splendid mausoleum to him in St. Peter's, executed by Canova, who was eight years employed on it. He was succeeded by

Clemson College

Clement XIV. (GIOVANNI VINCENZO ANTONIO GANGANELLI), born in St. Arcangelo, 1705. Being of a conciliating disposition, he lived on good terms with all the European courts, and recovered Avignon and Benevento, which had been lost under the preceding pontiff. Pressed to decide the question of the abolition of the order of the Jesuits, he, in 1773, after temporizing for several years, issued the bull ordaining their suppression. He died in 1774, and was succeeded by Pius VI.

Clement, Jacques, the assassin of Henry III. of France; born in 1567, became a Dominican and the fanatical tool of the Dukes of Mayenne and Aumale and the Duchesse de Montpensier. Having fatally stabbed the king, he was at once killed by the courtiers; but the populace, instigated by the priests, regarded him as a martyr; and Pope Sixtus V. even pronounced his panegyric.

Clement, William Henry Pope, a Canadian lawyer; born in Vienna, Ont., May 13, 1858. He was graduated at Toronto University in 1878, and became a lawyer in 1880, practicing with success in Toronto. He has written "The Law of the Canadian Constitution" (1892), a work that was made a text-book in the principal colleges and universities of the Dominion.

Clementi, Muzio, an Italian pianist and composer; born in Rome in 1752. As early as his 12th year he wrote a successful mass for four voices, and had made such progress in the pianoforte that an Englishman, Mr. Beckford, took him to England to complete his studies. He was then engaged as director of the orchestra of the opera in London, and his fame having rapidly increased, he went in 1780 to Paris, and in 1781 to Vienna, where he played with Mozart before the emperor. In 1784 he repeated his visit to Paris, but after that remained in England till 1802, when he went back to the Continent. He returned in 1810 to England, where he settled down as superintendent of one of the principal musical establishments in London. His most important compositions were his 60 sonatas for the pianoforte and the great collection of studies known as the "*Gradus ad Parnassum*," a work of high educative value. He represented perhaps the highest point of technique of his day, and his influence on modern execution has led to his being characterized as "the father of pianoforte playing." He died in 1832, and was interred in Westminster Abbey.

Clemson Agricultural College, an educational (non-sect.) institution in Clemson College Station, S. C.; organized in 1890; has grounds and buildings valued at over \$600,000; scientific apparatus, \$325,000; productive funds, \$250,000; average total in-

Cleobis

come, about \$250,000; volumes in the library, over 30,000; average faculty, 45; student attendance, about 670; graduates, over 600.

Cleobis and Biton, two youths, sons of Cydippe, the priestess of Juno, at Argos. When oxen could not be procured to draw their mother's chariot to the Temple of Juno, they put themselves under the yoke, and drew it, amid the acclamations of the multitude, who congratulated the mother on the piety of her sons. Cydippe entreated the goddess to reward them with the best gift that could be granted to mortals. When Cydippe came forth from the temple, she found her sons "asleep forever" in each other's arms.

Cleobulus, one of the seven wise men of Greece, was a native of the Isle of Rhodes, and lived in the sixth century B. C.

Cleombrotus, King of Sparta, gave battle, at Leuctra, to the Thebans, headed by Epaminondas, and was there killed, 371 B. C. This battle, when the Spartan army was almost entirely destroyed, put an end to the preëminence of Sparta in Greece.

Cleomedes, author of a Greek treatise, in two books, "On the Circular Theory of the Heavenly Bodies," which sets forth the Stoic theory of the universe, and which is remarkable as containing, amid much error and ignorance, several truths of modern science—such as the spherical shape of the earth. Nothing is known definitely regarding his life, but it seems most probable that he flourished in the 2d century A. D.

Cleomenes, the King of Sparta who assisted in the expulsion of Hippias from Athens, and interfered in its domestic affairs in other respects, about the years 510, 508, and 504 B. C.

Cleomenes, a Spartan king, who attempted to revive the constitution of Lycurgus. He was defeated by the Achæan League at Sellasia in 22 B. C., and killed himself soon afterward.

Cleon, an Athenian demagogue, originally a tanner by trade. He was well known in public before the death of Pericles, and in 427 B. C. distinguished himself by the proposal to put to death the adult males of the revolted Mytileneans and sell the women and children as slaves. In 425 he took Sphacteria from the Spartans; but in 423 and 422 he was violently attacked by Aristophanes in the Knights and in the Wasps. He was sent, however, in 422 against Brasidas, but allowed himself to be taken unawares, and was slain while attempting to flee.

Cleopatra. Among several Egyptian princesses of this name, the most renowned was the eldest daughter of Ptolemy Auletes,

Cleopatra

wife of his eldest son Ptolemy, with whom she shared the throne of Egypt. Both were minors at the death of their father, and were placed under the guardianship of Pothinus and Achillas, who deprived Cleopatra of her share in the government (49 B. C.). She went to Syria, and was forming plans for obtaining her rights by force, when Cæsar went to Alexandria, and, captivated with her youthful charms, seconded her claims; and though the people of Alexandria were excited to a revolt by the arts of her brother, Cæsar succeeded in pacifying them, and procured Cleopatra her share of the throne.



DEATH OF CLEOPATRA.

But Pothinus stirred up a second revolt, upon which the Alexandrian war commenced, in which the elder Ptolemy, losing his life, Cæsar proclaimed Cleopatra Queen of Egypt. Cæsar continued some time at Cleopatra's court, and had a son by her named Cæsarion, who was afterward put to death by Augustus. After Cæsar's departure she governed undisturbed. When her brother, at the age of 14, demanded his share in the government Cleopatra poisoned him, and remained sole possessor of the regal power. During the civil war in Rome she took the part of the triumvirs, and after the battle of Philippi she sailed to join Antony at Tarsus. She appeared in a magnificently decorated ship, under a golden canopy, arrayed as Venus, surrounded by beautiful boys and girls, who represented Cupids and Graces. Her meeting with Antony was attended by the most splendid festivals. After having accompanied him to Tyre she returned to Egypt. Antony followed her, and gave herself up to the most extravagant pleasures. She accompanied him on his march against the Parthians, and when he parted from her on the Euphrates he bestowed Cyrene, Cyprus, Cœlosyria, Phœnicia, Cilicia, and Crete on her, to which he added part of Judea and Arabia at her request. Now commenced the war between Augustus and Antony, but instead of acting promptly against his adversary, Antony lost a whole year in festivals and amusements with Cleopatra at Ephesus, Samos, and Athens, and at last determined

Cleopatra's Needles

to decide the contest by a naval battle. At ACTIUM (*q. v.*) the fleets met. Cleopatra, who had brought Antony a reinforcement of 60 vessels, suddenly took to flight, and thus caused the defeat of her party; for Antony, as if under the influence of frenzy, immediately followed her. They fled to Egypt, and declared to Augustus that if Egypt were left to Cleopatra's children they would thenceforth live in retirement. But Augustus demanded Antony's death, and advanced toward Alexandria, which Antony hastened to defend. Cleopatra determined to burn herself with all her treasures, but Augustus pacified her by private messages. These communications, however, did not remain concealed from Antony, who, supposing Cleopatra treacherous, hastened to her to avenge himself by her death. She, however, escaped, and took refuge in the mausoleum which she had erected near the Temple of Isis, and caused the report of her suicide to be circulated. Antony now threw himself upon his sword; but before he expired was informed that Cleopatra was still living, on which he caused himself to be carried into her presence, and breathed his last in her arms. Augustus succeeded in getting Cleopatra into his power, who still hoped to subdue him by her charms; but her arts were unavailing, and becoming aware that her life was spared only that she might grace the conqueror's triumph, she determined to escape this ignominy by a voluntary death. She ordered a splendid feast to be prepared, desired her attendants to leave her, and put an asp, which a faithful servant had brought her, concealed among flowers, on her arm, the bite of which caused her death almost immediately (30 B. C.). At the time of her death she was 39 years old, and had reigned 22 years.

Cleopatra's Needles, two obelisks that were set up at the entrance of the Temple of the Sun, in Heliopolis, Egypt, by Thothmes III., about 1831 B. C. There are no means of knowing when they were built, or by whom, except from the inscriptions on them, which indicates the above time. The material of which they were cut is granite, brought from Syene, near the first cataract of the Nile. Two centuries after their erection Rameses II. had the stones nearly covered with carvings setting out his own greatness and achievements. Twenty-three years before Christ, Augustus Cæsar moved the obelisks from Heliopolis to Alexandria and set them up in the Cæsarium, a palace now a mere mass of ruins near the station of the railroad to Cairo. In 1819 one of these obelisks was presented by the Egyptian Government to England, but as no one knew how to move them, it was not taken to London until 1878. Later the other obelisk was presented to the United States, and is now in Central Park, New York city.

Clerk

Clere-story, or **Clear-story**, the upper part of the nave in Gothic churches, above the triforium where a triforium is present, and formed by walls supported on the arches of the nave, and rising above the roof of the side aisles. In these walls windows are inserted for the purpose of increasing the light in the nave.

Clergy, the body or order of men chosen or set apart to the service of God, in the Christian Church; in contradistinction to the lay worshipers, or laity. This use of the term is very ancient, and appears to have gradually become prevalent, as the ministers of religion more and more exclusively, instead of the members of the Christian Church equally, began to be regarded as God's "heritage" and "priesthood" (1 Pet. ii: 9, and v: 3), consecrated to him, and peculiarly his. The distinction between the clergy and the laity became more marked through the multiplication of offices and titles among the clergy, the ascription to them of a place in the Christian Church similar to that of the priests and Levites in the Jewish Church, with peculiar rights and privileges; the growth of monastic institutions, and the introduction of celibacy. In harmony with the notions on which this distinction is founded, is that of an indelible character derived from ordination, so that a renunciation of the clerical office is either viewed as an impossibility, or a sort of apostasy. These notions in their highest degree belong to the Roman Catholic Church. In the Protestant churches, the distinction between clergy and laity is much less wide; and though the same terms are often used, it is rather conventionally than in their full signification. Among the privileges accorded to the clergy by the Roman emperors, and in the Middle Ages, was exemption from civil offices; among the rights asserted by them, and which caused much dispute, was exemption from lay-jurisdiction, even in cases of felony. The term "secular clergy" is the designation of priests of the Roman Catholic Church who are not of any religious order, but have the care of parishes. Monks who are in holy orders are designated "regular clergy."

Clerk, one who has charge of an office or department, subject to a higher authority as a board, corporation, etc.; a secretary, as, the clerk of the House of Representatives or Senate; clerks of the various courts, etc. In England a parish officer, a layman, whose business used to be to lead the responses in the church services and to perform other duties connected with the parish; a parish clerk.

Clerk, John, a naval tactician; born in Eldon, near Edinburgh, in 1728; for whom is claimed the invention of the maneuver

Clerk-Maxwell

"of breaking the enemy's line," put forth in an essay on "Naval Tactics," published in 1790, afterward employed with signal effect by Howe, St. Vincent, Duncan, and Nelson. He died in 1812. His son, John, Lord Eldon, born 1757, died 1832, was a distinguished Scottish judge.

Clerk-Maxwell. See MAXWELL.

Clermont (klār-mōn'), a town of France, in the department of Oise, 36 miles N. of Paris; was the capital of a mediæval county, and has a town hall, a church, and a castle—now used as a reformatory—all dating from that period, during which it was a place of considerable importance. In the wars with the English it was often captured and retaken. It has a large insane asylum. Pop. (1901) 5,723.

Clermont, The, the name given by Robert Fulton to the steamboat in which he made his first trip from New York city to Albany in 1807.

Clermont-Ferrand (klār-mōn'-fā-rān'), a town of France, capital of the department of Puy-de-Dôme; on a hill at the foot of the volcanic range in which the summit of the Puy is conspicuous. It possessed considerable importance under the Romans, and became a bishop's see at a very early period. It is an antique and gloomy town built of dark volcanic stone. The most remarkable edifices are the cathedral, a huge, irregular, gloomy pile, and the Church of Notre Dame, founded in 580. The manufactures are more numerous than extensive; but the position of the town makes it an important center of trade. Pop. (1901) 52,933.

Clermont-Tonnerre (klār-mōn'-tōn-nār'), the name of a noble French family, of whom one of the most celebrated was Count Stanislas, born in 1747. At the breaking out of the Revolution of 1789 he endeavored to promote the establishment of a constitutional monarchy, founding with Malouet the Monarchical Club, and with Fontanes the "Journal des Impartiaux." In 1791 he was charged with assisting the King in his attempt to escape, but was set free on swearing fidelity to the Assembly. In 1792, however, he was murdered by the mob at the house of the Countess de Brissac.

Cleveland, a city of Ohio, the largest city in the State and the seventh largest in the United States, county-seat of Cuyahoga co. It is situated on the S. shore of Lake Erie, at the mouth of the Cuyahoga river, about 623 miles W. of New York, and 357 miles E. of Chicago. Its shore line along the lake is over 12 miles, its frontage on either side of the river about 8 miles, its length from E. to W. about 10 miles, and its width from N. to S. about 7 miles. Its area is a little over 45 square miles, and its population was estimated in 1907 at about 500,000. Pretty suburbs surround

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it on every side. On the E. are Collinwood, East Cleveland, Euclid Heights, Cleveland Heights, Mayfield Heights, and Warrensville; on the S., Newburg and South Brooklyn; on the W., Lakewood. Cleveland is in the middle of the base of a triangle formed by Fairport on the Grand river, to the E., Akron on the Ohio and Erie canal, to the S., and Lorain on the Black river, to the W. Each of these cities is about 30 miles from Cleveland.

Natural Features.—The city commands an exceedingly pleasant view from its position on a plateau, which at places, on bluffs along the lake shore, has elevations reaching about 75 feet above the water, and rises gradually toward the S. E. to 115 feet, and on the extreme E. limits to more than 200 feet, or about 800 feet above sea level. The surface has been cut deeply by the Cuyahoga river, which pursues a very crooked course through a valley from $\frac{1}{2}$ to $1\frac{1}{2}$ miles in width, and divides the city into a larger eastern and a smaller western half. In this valley lie many industrial works, lumber yards, etc. The river is navigable for a distance of 6 miles from its mouth, has a width of from 200 to 300 feet, and is lined with docks on both sides. This natural harbor has been deepened and improved, and a commodious ship channel has been added to it as a western arm. Each of the two parts of the city is intersected by a small stream emptying into the Cuyahoga river, the east side by Kingsbury run, and the west side by the now almost obliterated Walworth run. Another branch of the Cuyahoga is Big creek, which flows along the S. boundary of the west side. Mill creek is a small stream in the S. E. of the city. Doan brook flows through the N. E. section of the city into the lake.

Viaducts and Bridges.—The streams and valleys have been bridged over by about 70 viaducts and bridges, owned partly by the city and partly by the railroads. There are about 50 stationary bridges, about 20 swing or draw bridges, and 1 bascule or lift bridge that spans the Cuyahoga at Seneca street. The most remarkable of these bridges, and among the finest works of their kind, are the two great viaducts or elevated roadways over the Cuyahoga valley, owned by the city. The Superior Street viaduct was begun in August, 1874, and completed in December, 1878, at a cost of \$1,600,000. It is 3,211 feet long and 64 feet wide. The main portion is of stone, but the central drawbridge, 332 feet long and 68 feet above water, is of iron lattice-work. The Central viaduct was begun in May, 1886, and completed in December, 1888, at a cost of nearly \$676,000. It consists of two sections, the Cuyahoga section and the Walworth Run section, having a combined length of 3,931 feet (5,229 feet,

including approaches), a width of 56 feet, and a height of 101 feet. Another and a smaller viaduct owned by the city is that known as the Kingsbury Run or Humboldt Street viaduct, 834 feet long, which was begun in November, 1884, and completed in June, 1886, at a cost of \$250,000. In 1907 plans were under way for the construction of a third great viaduct across the Cuyahoga. Other notable viaducts are the Brooklyn bridge, which crosses Big creek; the Wilson Avenue viaduct, built jointly by the city and the New York Central and St. Louis railroads, 1,134 feet long; and the Pearl Street viaduct over Walworth run, 365 feet long. Over \$100,000 a year is spent by the city for the maintenance of bridges.

Streets.—The streets are of unusual width, none being less than 60 feet wide, while many are 80 to 100 feet, and at least one is 132 feet wide. There are over 2,000 streets with a total length of 650 miles, of which 355 miles are paved with brick, dressed stone blocks, or asphalt; and they are so much in the shade of maple, elm, and other trees that Cleveland has become known as the "Forest City." The forestry department, established in 1905, has planted over 6,000 trees along various streets, and during the spring, summer, and fall a force of men is engaged in trimming, spraying, and otherwise taking care of them. The heart of the city is about $\frac{1}{2}$ mile from the lake, a short distance to the E. of the Cuyahoga river, and is known as the Public square or Monumental park. From this point the principal streets of the east side radiate at various angles, and some streets are carried over the viaducts of the Cuyahoga valley into the west side. The manufacturing quarters of the city are located along the lake front, in the valley of the Cuyahoga, and on the west side. The business section is centered in the E. portion from the mouth of the river to the neighborhood of Superior street, which is the main business thoroughfare and 132 feet wide. The famous Euclid avenue, from 80 to 99 feet wide, extends from Public square to the E. limits of the city, and is prolonged through East Cleveland, being paved throughout this distance. This avenue is used for business purposes, chiefly retail, for about half a mile from Public square, but for the remainder of its length it is lined with handsome private residences, surrounded by park-like grounds. As a road much traveled by automobilists, it continues as far as Buffalo, N. Y. Just S. of Euclid avenue is Prospect street, hardly inferior in stateliness. Other fine residence streets are Wilson and Case avenues, which run at right angles to Euclid avenue and are 99 feet wide, East Madison, Amesbury, and Engleside. Woodland and Kinsman avenues and Broadway are among the longest thoroughfares of the east side; Detroit,

Lorain, and Scranton avenues, among those of the west side.

Parks and Cemeteries.—Besides a number of small neighborhood parks, there are in both halves of the city several large parks connected by a system of boulevards and driveways. Public square contains the statue of Moses Cleaveland, the founder of the city, and the monument to the soldiers and sailors who died during the Civil War, consisting of a central shaft, 125 feet high, and a base or memorial room. Lake View park ($10\frac{1}{2}$ acres), situated on the lake shore E. of the Cuyahoga river, is nearly midway between Edgewater park (89 acres), which is situated a short distance from the W. limits of the city, and Gordon park (122 acres), which adjoins its E. limits. Both of these parks are on the lake shore and are popular boating and bathing resorts. The boulevard connecting them continues from Gordon park southward to Wade park (62 acres), which contains statues of Commodore Perry and Kosciusko, a zoölogical collection, and a pond for boating and skating. From Wade park the boulevard continues through Rockefeller park, a tract of land 7 miles in length, covering 800 acres. A large part of this park was donated to the city in 1896 by John D. Rockefeller, who gave the 276 acres necessary to complete its ownership of the Doan brook valley, and at the same time restored to the city nearly \$260,000, which it had paid on various occasions for land purchases in this valley. The four magnificent stone archways between Euclid avenue and the lake were also built mainly at Mr. Rockefeller's expense. The principal divisions of the park bearing his name are the picnic grounds adjacent to Gordon park; the Doan brook parkway, between Gordon and Wade parks, over 2 miles long and from $\frac{1}{8}$ to $\frac{1}{4}$ mile wide, consisting of one driveway through the ravine and another driveway along the edge of the bluffs on the E. side of the brook, from 40 to 60 feet above the valley; Cedar parkway, connecting Wade park and Ambler parkway; and Eastern parkway, connecting Ambler parkway with Shaker Heights park. The last-mentioned park is situated in the township of East Cleveland, a short distance from the city limits, covers 279 acres, and contains two lakes covering about 50 acres, which are the source of Doan brook. Other notable public parks are Garfield park (160 acres) in the S. E., and Beachside park (139 acres), which lies W. of the viaduct connecting with South Brooklyn across Big creek. The entire park system, including the boulevards, contains about 2,200 acres, while the length of the boulevards is over 28 miles.

The principal cemeteries are West Park and Riverside, in the west side; Woodland, in the center of the east side; Calvary, just

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outside the city limits, to the S. E.; and Lake View, to the E. of Wade park. The last mentioned contains 300 acres, and is one of the most beautiful cemeteries in the country. Here is the Garfield Memorial, completed in 1890 at a cost of \$200,000. It stands on an eminence 250 feet above the lake level, and the balcony near the top, 165 feet high, commands a fine view of lake, city, and suburbs. The monument is built principally of Ohio sandstone, and its base contains a chapel, in which are a statue of Garfield and panels with reliefs symbolical of his career. In a crypt below are his remains.

Buildings.—Cleveland is a home city. According to the census of 1900 there were 63,205 separate dwellings occupied by 81,519 families. Of late years, however, there have been built over 300 apartment houses of all classes. Among the big modern business structures may be mentioned the Rose building, the largest of its kind in Ohio, and the Citizens', Rockefeller, Perry-Payne, Society for Savings, and Chamber of Commerce buildings. The Arcade, between the Public square and Bond street, is 400 feet long, 180 feet wide, and 144 feet high. It consists of a series of stores, 4 stories high, inclosing a wide court covered with an arched roof of iron and glass. To the right of this is the Colonial Arcade, a similar though smaller structure, with the Colonial hotel at the Prospect street end. There are a large number of excellent and commodious hotels, and 8 theaters. Among the numerous club houses are notable those of the Union League, on Euclid avenue; the Euclid, on Euclid heights; and the Country, situated on the lake shore about 6 miles E. of the city. Plymouth Congregational Church, St. Paul's Episcopal Church, the First Methodist Episcopal and the First Presbyterian churches, the Roman Catholic Cathedral, and the new Trinity Cathedral, are among the finest religious edifices in the city.

Within a few years Cleveland will have as magnificent a group of public buildings as can be found anywhere in the United States. It will consist, at its N. end, of the court house and the city hall, which will overlook Lake Erie from the bluff on which they are situated. South of these buildings, at a distance of 1,000 feet, will be the post office and the public library. The width of the mall connecting the two former with the two latter buildings is over 600 feet. At each end of the mall will be, respectively, a music hall and an art gallery. All of these buildings will be of granite and in the classical style. The post office, which also houses the Federal courts, the custom house, and all the other Federal offices, has already been completed at a cost of about \$3,000,000. The Central armory, completed in 1896 at a cost of \$400,000 to the county, is a massive

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stone structure, used for public lectures and mass meetings. Its seating capacity exceeds 5,000.

Churches and Charities.—Cleveland has about 300 churches of all denominations. Some of those especially notable for their architecture have been mentioned above. The first formally organized church was the Trinity Protestant Episcopal, established in 1816. The charitable and philanthropic institutions are unusually numerous, and some of them have exceptionally fine buildings and grounds. There are 16 hospitals, among the largest of these being the Cleveland General hospital, with 90 beds; the Cleveland State hospital, a State institution for the insane, situated in the extreme S. E. of the city, on grounds embracing 98 acres and with a building that has accommodations for 1,500 patients; the St. Vincent's Charity and St. Alexis hospitals, each treating over 1,500 patients annually; and the Lakeside hospital. Among the orphan asylums are St. Vincent's, for boys (R. C.); St. Mary's (R. C.), accommodating 150 girls; the Protestant, with about 150 children; and the Jewish, with about 500 children. There are several infant asylums, the Cleveland Humane Society alone giving shelter to some 65 infants every year. The Western Seaman's Friend Society maintains the Bethel Home. The Goodrich, Alta, and Hiram houses are social settlements. Altogether it is estimated that the institutions for the benefit of the poor and afflicted have endowments in lands and buildings amounting to over \$5,000,000. A unique institution is the recently established "Brotherhood," made up of men who had been to the workhouse, or, as it is now called, the "Farm." This institution is managed by themselves and supported by their own earnings.

Educational Institutions.—At the head of the numerous educational institutions of the city stands the Western Reserve University, consisting of Adelbert College, a college for women, a graduate department, and schools of law, medicine, and dentistry, with over 1,800 students. Its grounds and buildings are situated in one of the most attractive sections of the city, facing Wade park. The libraries of its various schools, Adelbert College having the largest, aggregate over 80,000 volumes, besides some 20,000 pamphlets. The Case School of Applied Science, situated in the same part of the city, has chemical, mechanical, and electrical laboratories, a library with about 61,000 volumes, property valued at over \$2,000,000, and about 450 students. The Cleveland College of Physicians and Surgeons is affiliated with the Ohio Wesleyan University. Other professional schools are the Homeopathic College, the School of Pharmacy, and the Art School. There is also a school for the deaf, dumb, and blind. Among the learned so-

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cieties may be mentioned the Western Reserve Historical Society, which has published over 90 tracts and has a library of 30,000 volumes; the Medical Society, with a library containing 18,000 volumes; and the Institute of Anthropology, which publishes a journal devoted to its special subject. For secondary instruction there are the "university school," a private preparatory institution, and 5 high schools forming a part of the public school system. The latter includes also kindergartens, elementary, manual training, evening, and vacation schools, and a normal school for the training of teachers. The number of pupils registered in the public schools is about 70,000, the average attendance is about 55,000, the number of teachers is about 1,600, and the annual expenditure is about \$2,600,000. The board of education is elective, and has full independent power in all school matters, including taxation for school purposes. Besides the public schools, there are also many parochial schools, and a number of kindergartens and day nurseries are maintained by a private association for the benefit of children whose mothers are compelled to engage in industrial occupations.

There are published 9 general daily newspapers, including those in the German, Hungarian, Bohemian, and Polish languages. There are also several weekly and monthly publications, mostly of a financial, commercial, or technical nature. The first newspaper to appear in the city was dated July 31, 1818, and was styled "The Gazette and Commercial Register."

Industries.—The Census of Manufactures of 1905 showed that Cleveland ranked foremost among the cities of Ohio as a manufacturing center, having outstripped Cincinnati since 1900. Chief among the industries that have contributed to this remarkable growth is iron and steel. At the census of 1905 this industry was first in importance, having employed in 12 establishments \$31,021,000 of capital and 9,518 wage-earners (exclusive of salaried officials and clerks), who received \$5,583,000 in yearly wages, used materials amounting to \$27,766,000, and turned out a product that was valued at \$38,398,000. The allied industry of foundry and machine shop products was carried on in 134 establishments, with \$21,865,000 of capital, 9,782 wage-earners, who received \$5,539,000 in wages, \$7,674,000 cost of materials, and a product valued at

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\$18,832,000. Two other allied industries—those of iron and steel forgings, and bolts, nuts, rivets, etc.—were carried on in 15 establishments, with \$4,629,000 of capital, 2,441 wage-earners receiving \$1,072,000 in wages, \$2,565,000 cost of materials, and a product valued at \$4,533,000. Other great industries are slaughtering and meat packing, with a product valued at \$10,317,000; clothing, \$10,406,000; printing and publishing, \$5,762,000; automobiles, \$4,257,000; malt liquors, \$3,986,000. The following industries reported products valued at over \$2,000,000: bread and other bakery products; electrical machinery, apparatus, and supplies; hardware; lumber and planing mill products; paints; gas and oil stoves; and structural ironwork. The following industries reported products between \$1,000,000 and \$2,000,000: wooden packing boxes; railway cars and repair shops; confectionery; hosiery and knit goods; shoddy manufactures; tobacco, cigars, and cigarettes; tools; varnishes; and wirework, including wire rope and cable. Among the numerous smaller industries may be mentioned brick and tile making from good clay deposits in the vicinity, and the extensive quarries of sandstone located near the city. The Berea quarries of Cuyahoga co. have furnished the sandstone for many public buildings in the United States and Canada. But there are several great industries located within the city the statistics of which, in order to avoid disclosing individual operations, are not published. The greatest of these is the refining of petroleum. The oil refineries, covering many acres, are situated at the S. end of Wilson avenue, and Cleveland is the seat of the chief office of the Standard Oil Co. Other great industries under this head are the building of iron and wooden ships, Cleveland being one of the great ship-building centers of the world, and the foremost in the United States, having built in 1906 15 vessels with a capacity of 116,500 tons; the manufacture of sewing machines, of which about 200,000 are reported to be turned out every year; worsted goods; and rubber and elastic goods. In addition to the great industries that receive attention in statistical reports, Cleveland has numerous special trades of a more private nature that also possess unusual importance.

The exceptionally rapid growth of Cleveland as a manufacturing center since 1880 is shown in the following table:

Year	Number of Establishments	Capital	Wage-Earners	Wages	Cost of Materials Used	Value of Products
1880	1,055	\$19,431,000	21,724	\$8,503,000	\$31,630,000	\$48,604,000
1890	2,307	69,733,000	45,915	23,508,000	65,646,000	113,240,000
1900	2,927	98,304,000	58,810	27,893,000	71,598,000	139,850,000

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The special United States Census of Manufactures of 1905 was confined to industries carried on under the factory system, to the exclusion of neighborhood industries and hand'trades. Compared with the corresponding figures of 1900, the growth of the factory industries in five years has been as follows:

6,445,000 and 6,047,000 tons respectively were in the domestic trade, while 1,148,000 and 1,583,000 tons respectively were in the foreign trade. Iron, coal, lumber, and grain make up the bulk of the lake traffic. The receipts of iron ore amounted in 1906 to 6,677,000 tons, and the shipments to 5,708,000 tons, in both instances nearly all by

Year	Number of Establishments	Capital	Wage-Earners	Wages	Miscellaneous Expenses (Rent, Interest, etc.)	Cost of Materials Used	Value of Products
1900.....	1,349	\$93,021,000	52,862	\$24,692,000	\$9,991,000	\$66,084,000	\$126,157,000
1905.....	1,617	156,509,000	64,095	33,472,000	15,063,000	97,702,000	172,115,000
Per cent. increase....	19.9	68.3	21.2	35.6	50.8	47.8	36.4

Commerce and Transportation.—The lake, the Cuyahoga river, the Ohio canal, and the excellent railway communications afford conditions favorable to commercial greatness. The Cuyahoga has been dredged to a depth of 20 feet for a distance of more than 5 miles, thus enabling the largest boats to come into this port, principally ore carriers, carrying as high as 13,000 tons of ore. With the modern ore-handling facilities these boats are unloaded in from 10 to 12 hours. The ore docks stretch out for 2 miles, and over 26,000 tons can be handled daily. Storage for over 3,000,000 tons of ore is provided on the lake front and the river docks. In addition to the double dockage fronted by 5 miles of river, the Federal government is constructing a breakwater in Lake Erie, ¾ of a mile from shore. It is to be 7 miles in length, and more than 3 miles had in 1907 been completed. This breakwater will furnish a quiet basin, where the shipping may be handled regardless of all storms. The Ohio canal extends from Cleveland throughout the State to Portsmouth, on the Ohio, a distance of 317 miles, with branches to Columbus and other points. Of late its usefulness has greatly diminished, owing to neglect, but efforts have been made to rehabilitate it, and the legislature has made a considerable appropriation for this purpose. The railroad connections, direct and indirect, are of the most extensive character, and trolley lines connect the city with all the principal towns within a radius of 50 miles. The total freight received and forwarded by lake and rail increased from 12,116,000 tons in 1894 to 33,666,000 tons in 1906. The total freight received by rail amounted in 1906 to 12,412,000 tons, and that forwarded to 9,872,000 tons, while the total freight received by lake was 7,575,000 tons, and that forwarded, 3,807,000 tons. The tonnage movement of the port amounted in 1906 to 7,593,000 tons for entrances and 7,630,000 for clearances; of this total

lake. In the same year the receipts of anthracite and bituminous coal (mostly the latter) and of coke amounted to 6,827,000 tons, nearly all by rail, while the shipments amounted to 3,200,000 tons, nearly all by lake. The receipts of pig, bloom, and railroad iron and castings amounted to 1,371,000 tons, and the shipments to 1,614,000 tons, in both cases nearly all by rail. The receipts of lumber and other forest products amounted to 39,325 carloads, less than one-half arriving by lake. The receipts of cattle, hogs, sheep, and other live stock amounted to 1,351,596 head, and those of wheat, corn, oats, barley, and rye to 19,215,119 bushels. Cleveland is the largest market in the United States for fresh-water and salted fish, the catch on Lake Erie surpassing that on all the other Great Lakes combined. Among the fish taken are sturgeon, which sometimes weigh as high as 130 pounds, whitefish, trout, perch, and pickerel. From 60,000 to 75,000 tons of fish is the annual catch, one-half of this amount consisting of a species of whitefish, locally known as herring. Grape culture in the near-by counties is of great extent, and grapes are sent from Cleveland to all parts of the country. The jobbing and wholesale trade is estimated at \$75,000,000 annually, the wholesale millinery trade being particularly extensive. Cleveland is a port of entry. The value of imports increased from \$853,611 in 1890 to \$3,709,418 in 1906, and the value of exports from \$468,286 in 1890 to \$5,844,707 in 1906. The number of vessels registered in the Cleveland customs district in 1906 was 328, with a registered gross tonnage of 680,860, against 241 vessels of 73,184 tons in 1876. Of banks there were 38 in 1906, including 8 National banks, 16 trust companies, and 14 savings banks. Their aggregate capital amounted to \$21,662,000; deposits, \$236,788,000; loans and discounts, \$159,264,000; liabilities, \$285,793,000; and total ex-

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changes, \$837,548,000. The clearing house transactions amounted in the year ending Sept. 30, 1906, to \$812,973,000.

Administration and Public Interests.—The city is governed in accordance with the Municipal Code of 1902, which applies to all cities in the State. The chief executive is the mayor, elected biennially. The other elective officers are the 3 members of the board of public service, the treasurer, solicitor, and auditor. The board of public service has charge of the public works, the workhouse, city charities, streets, parks, and boulevards. The mayor appoints all other city employees, including the 3 members of the board of public safety, which has charge of the police and fire departments. The council is composed of 32 members, 1 being elected from each ward and 6 at large. The council elects the city clerk and some minor officials. The municipal expenditure is over \$9,000,000 a year, of which only about one-third is received from direct taxation, the other two-thirds being derived from bonds, rents, fees, etc. The municipal debt amounted in 1906 to \$18,041,695.

Cleveland has gone further into the development of municipal ownership than any other city in the United States. The water works, valued at \$11,000,000, are owned by the city. Water is pumped through a tunnel 9 feet in diameter, 60 feet below the surface of the lake, from an intake situated at a distance of 26,500 feet from the shore. The pumping capacity is 120,000,000 gallons daily. The municipal electric light plant furnishes lights at \$34 per arc a year. The municipal garbage plant collects and reduces to fertilizer 200 tons of garbage a day. The sale of the fertilizer more than pays for the cost of reduction, the only expense to the city being that of collecting. The streets are cleaned by the wet process, the flushing wagons working two shifts of 8 hours each a day. The city maintains 6 bathhouses erected in the sections where dwellings are not equipped with bathrooms. The average daily number of baths to each bathhouse is 1,165. Since Nov. 1, 1906, the street cars have been operated by the Municipal Traction Co., which leased them from the Forest City Railway Co. on condition that the stock is never to pay more than 6 per cent., all profits above this figure to be used in increasing the service or reducing the fare, which in 1907 was 3 cents. At that date the city had no authority directly to own and operate its street car system.

The reformatory institutions of Cleveland have also attracted wide interest. Instead of a workhouse, there is a large farm containing over 1,600 acres, on which the unfortunates are set to work, and punishment is forgotten in the effort at reformation. The city's poor, who were formerly housed in a large building, also live on this farm, in cottages containing from 15 to 20

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each, and apply their labor to the land. "Boyville Home" is another farm, 22 miles from the city, for incorrigible boys. Here, too, the cottage plan has replaced the large central building. The cottages contain from 8 to 10 rooms, and are presided over by a man and his wife, whom the boys call father and mother. The boys elect officials from among themselves, and for the most part control their own discipline. The city also maintains a children's hospital, a hospital for adults, and a tuberculosis sanatorium. In the latter good food and outdoor exercise have supplanted drugs and medicines, and cures instead of deaths are now the rule.

History and Population.—The site of Cleveland is included in the territory formerly known as the Western Reserve, extending 120 miles westward from the W. limits of Pennsylvania, and constituting nearly a third of the eastern portion of Ohio. To this territory Connecticut reserved her claims after the surrender by the various States to the United States of their claims in Western territory, on Sept. 14, 1786. The bulk of the Western Reserve, amounting to nearly 3,000,000 acres, was sold by the State of Connecticut to the Connecticut Land Co. for \$1,200,000. Gen. Moses Cleaveland, as agent of this company, visited the site of the present city in July, 1796. He laid out on the E. bank of the Cuyahoga a village, which took his name, though the "a" was dropped in 1830. By act of Congress the Western Reserve was included in 1800 in the Northwest Territory. The first vessel built in Cleveland was the "Zephyr," in 1808, a 30-ton schooner. During the War of 1812 Cleveland was a place of rendezvous for troops and a depot of supplies. Perry's victory on Lake Erie, Sept. 10, 1813, dissipated all fears of attack. On July 4, 1825, began the construction of the Ohio canal, which was opened from Cleveland to Akron on July 4, 1827, and to Portsmouth, on the Ohio, five years later. The city of Cleveland was incorporated on March 5, 1836; Ohio City, on the W. side of the river, having been incorporated two days earlier. The first railway train arrived on Feb. 21, 1851, on the Cleveland, Columbus, and Cincinnati line, then completed as far as Hudson, Ohio. In 1854 the two cities were united, the final ordinance being passed by Ohio City June 6 of that year. The limits of the city were successively extended by the annexation of a part of Newburg township, in 1870; of a part of East Cleveland, in 1872; of the village of Newburg, in 1873; of another portion of East Cleveland and of the village of Brooklyn, in 1894; of Linndale, in 1903; and of South Brooklyn, Glenville, and the rest of Newburg, in 1905. In July, 1896, the city celebrated the centennial of its founding. Since its incorporation the city has had several forms of government, among them the so-

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called "federal plan," secured from the State in 1891. Under this charter the mayor had the power of appointing and dismissing the several heads of departments. It remained in force until 1902, when the present Municipal Code came into effect.

The population of Cleveland was 57 in 1810; 150 in 1820; 1,076 in 1830; 6,671 in 1840; 17,034 in 1850; 43,417 in 1860; 92,820 in 1870; 160,146 in 1880; 261,353 in 1890; 381,768 in 1900; 560,663 (census) in 1910. In 1900 the population was composed of 192,616 males and 189,152 females, and included 5,988 negroes—1.6 per cent. of the total population. The foreign born numbered 124,631, or 32.6 per cent. of the total, the most numerous elements being 40,648 Germans; 27,787 Austrians; 14,290 English, Scotch, and Welsh; 13,120 Irish; 8,611 Canadians; and the remainder Poles, Russians, Italians, etc.

Cleveland, Grover, an American statesman; twice president of the United States; born in Caldwell, Essex co., N. J., March 18, 1837; son of the Rev. Richard F. Cleveland, a Presbyterian clergyman, and a descendant of Moses Cleveland, who in 1635 emigrated from Ipswich, England, and settled in Massachusetts. In 1841 Grover Cleveland's father removed with his family to Fayetteville, N. Y., and later to Clinton, N. Y., in which places Grover Cleveland was a pupil in the public schools. He went to Buffalo in 1855, studied law, was admitted to the bar in 1859, in 1863 became assistant district attorney of Erie co., N. Y., and in 1870 was elected sheriff of the county. In 1881 he was elected, on the Democratic ticket, mayor of Buffalo, a strongly Republican city. His administration brought him great credit through its effectual reforms, and led to his nomination as governor of New York in 1882, and to his election by the enormous plurality of 192,854. As governor he maintained the reputation he had won, and in 1884 he was the Democratic nominee for the presidency, and was elected, receiving 219 electoral votes against 182 for James G. Blaine, the Republican candidate. During his term he vetoed many bills, advocated reduction of the tariff, and advanced civil service and pension reform. He was renominated in 1888, but was defeated by Benjamin Harrison. After a successful law practice of four years he was again nominated, by the Democratic National Convention of 1892, in spite of the opposition of the delegation from his own State, and was elected, receiving 277 electoral votes against 145 for Harrison, the Republican candidate, and 22 for Weaver, candidate of the People's party. Some of the leading measures of his administration were the settlement of the Venezuelan boundary question with Great Britain, the consolidating of post offices in large centers so as to increase the scope of the civil service rules,

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and the negotiating of a general arbitration treaty with Great Britain, which, however, was rejected by the Senate. President Cleveland also withdrew from the Senate the Hawaiian Annexation Treaty negotiated by President Harrison, secured the repeal of the silver-purchasing clause of the Sherman Act (*q. v.*), stood firmly for the gold standard, maintained the gold reserve by issuing government bonds, allowed the Wilson Tariff bill to become a law without his signature, ordered out the United States troops to "prevent the obstruction of the mails" during the railroad strike in Chicago in 1894, and signalized his second administration by many other acts of national importance. Possessed of great independence of character and persistence in carrying out policies once determined on, he often aroused criticism and hostility in the ranks of his own party. On the other hand, these qualities won him admiration in many quarters. During 1896-97 he maintained an attitude of friendliness for Spain in the midst of great popular clamor in behalf of the Cuban cause, offering the services of the United States in composing the differences on a basis of home rule for Cuba. In 1903 he publicly declined to be again the nominee of his party for the presidency. After his retirement he lived in Princeton, N. J., where he delivered at Princeton University a series of lectures of which a volume, "Presidential Problems," was published in 1904. In 1905 he became connected in an advisory capacity with the Equitable Life Assurance Society, New York, after the legislative investigation of its affairs. He died at Princeton, N. J., June 24, 1908.

Cleveland, John, an English poet; born in Loughborough in June, 1613; was an adherent of the Royalist party during the Civil War. He was arrested and imprisoned in 1655, but was released by Cromwell. He died April 29, 1658.

Cleveland, Rose Elizabeth, an American prose-writer, sister of Grover Cleveland; born in Fayetteville, N. Y., 1846. After the inauguration of her brother (1885) she became the mistress of the White House, remaining there until 1886. Miss Cleveland published "George Eliot's Poetry, and Other Studies" (1885), and "The Long Run," a novel (1886).

Clevenger, Shobal Vail, an American sculptor; born in Middletown, Ohio, Oct. 22, 1812. After working as a stone cutter in Cincinnati, where he displayed artistic talent, in 1838 he opened a studio in New York city, and there he executed busts of many distinguished persons, among whom were William Henry Harrison, Martin Van Buren, Edward Everett, Daniel Webster, Henry Clay, Washington Allston, John Quincy Adams, and others of like eminence. His bust of Webster is regarded as the best likeness of that famous statesman, and it has been used on a United States postage

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stamp. He went to Italy in 1840, and in Rome he produced his "North American Indian," which exhibits the strong characteristics that give permanent value to his work. His career was cut short by his death when on his way home from Europe. He died Sept. 27, 1843.

Clevenger, Shobal Vail, an American physician, son of the preceding; born in Florence, Italy, March 24, 1843. During the Civil War he served in the engineer corps, reaching the rank of 2d lieutenant, later was United States deputy surveyor in Montana and Dakota, and in 1879 was graduated at the Chicago Medical College. He settled in Chicago as a specialist in nervous and mental diseases, and became professor and lecturer in several colleges. His works include: "Treatise on Government Surveying" (1874); "Comparative Physiology and Psychology" (1884); "Artistic Anatomy and the Sciences Useful to the Artist" (1885); "Medical Jurisprudence of Insanity" (1898); "Evolution of Man and His Mind" (1903); and others.

Cleves (German, Kleve), a town in Rhenish Prussia; 70 miles N. W. of Cologne; in a pleasant plain; $4\frac{1}{2}$ miles from the Rhine, with which it is connected by a canal. It has manufactures of machinery, tobacco, leather, and cotton. In the center of the town rises the old and renowned Schwanenburg (Swan's Castle), the ancient residence of the dukes of Cleves, founded, says tradition, by Julius Cæsar. The collegiate church, dating from the fourteenth century, contains monuments of the counts and dukes of Cleves, Cleves having been long a county and from 1417 a duchy. Prussia (Brandenburg) acquired Cleves in 1609. Pop. (1900) 14,684.

Clews, Henry, an American banker; born in Staffordshire, England. At the age of 15 he left school to enter mercantile life in New York, his father having taken him there on a visit. After connection with several firms, in 1877 he established the firm of Henry Clews & Co. He was for many years treasurer of the American Geographical Society, was treasurer of the Society for the Prevention of Cruelty to Animals, and a founder of the Union League Club, New York city. His published works are "Twenty-eight Years in Wall Street" (1888) and "The Wall Street Point of View" (1900).

Clanthus, a genus of papilionaceous plants, having crimson, scarlet, and flesh-colored flowers; sub-tribe, *Galegeæ*; growing in Australia, New Zealand, the Philippines, etc. The name means "glory blossom"; derived from their glorious appearance.

Cliché (klē-shā'), an electrotpe or a stereotype cast from an engraving, especially from a wood-cut.

Clichy-la-Garenne (Latin, Cligiacum), a town of France, department of Seine; in

Cliff Dwellers

a beautiful plain near the right bank of the Seine, and on the railway between Paris and St. Germain; about 4 miles N. W. of Paris. It is a place of considerable antiquity; and in the seventh century, during the reign of Dagobert, who had a palace here to which he was particularly attached, was frequently the residence of the court. It contains a parish church, the erection of which is due to the celebrated Vincent de Paul, who was curate of Clichy in 1612; and has manufactures of white-lead, chemical products, glue, varnish, rolled lead, etc. Pop. (1901) 39,521; (1906) 41,787.

Click-beetle, any beetle belonging to the family *Elateridæ*. The hinder portion of the præsternum terminates in a point, which the insect can at will fit into a cavity of the breast with the effect of enabling it, if lying on the back, to leap up with a slightly clicking sound.

Clients, in ancient Rome, citizens of the lower ranks who chose a patron from the higher classes, whose duty it was to assist them in legal cases, to take a paternal care of them, and to provide for their security. The clients, on the other hand, were obliged to portion the daughters of the patron if he had not sufficient fortune, to follow him to the wars, to ransom him if taken prisoner, and to vote for him if he was candidate for an office. If a client died without issue, and had made no will, his property fell to the patron. Clients and patrons were under mutual obligation not to accuse each other, not to bear witness against each other, and in general not to do one another injury. This relation continued till the time of the emperors. It is certainly among the most interesting and curious which history mentions, and must be considered as one of the first attempts at a regular government—as the transition from a patriarchal state, in which family relations are predominant, to a well-developed political system, securing the rights and independence of the individual. In modern times the word client is used for a party to a lawsuit who has put his cause into the hands of a lawyer.

Cliff Dwellers, a race of Indians who lived in the cliffs bordering on the valleys of the Rio Grande and Rio Colorado. Their homes were built in the recesses of these cliffs at a height often of several hundred feet from the ground, and at the present time seemingly inaccessible, as the former paths that led to them have nearly all been destroyed by the crumbling away of the rocks. These dwellings sometimes consisted of many rooms, and in some cases were two or more stories high, hewn in the rock, with wooden lintels in the doors and windows, which were probably closed with skins or blankets. The walls were finished with a plaster of clay. How the inhabitants subsisted is not known, but probably mainly by hunting and fishing, as the soil

Clifford

about these localities is barren. The Pueblo Indians, who are still to be found in that section, are probably descendants of the Cliff Dwellers, and possess considerable skill in making articles of pottery, etc.

Clifford, the name of a very old English family, several members of which have played an important part in history. The founder of the family, Walter, son of Richard Fitz-Ponce, a Norman baron, acquired the castle of Clifford, in Herefordshire, under Henry II., and hence took the name of Clifford. In 1523 the Cliffords became Earls of Cumberland, but in 1643 this title became extinct. The male line of the Cliffords is at present represented by the baronial family Clifford of Chudleigh. The first Baron Clifford of Chudleigh was Thomas Clifford, one of the members of the Cabal, who was raised to this dignity in 1672.

Clifford, George, Earl of Cumberland, a celebrated English navigator, born in 1558, died in 1605.

Clifford, William Kingdon, an English mathematician; born in 1845; educated at King's College, London, and at Trinity College, Cambridge, where he graduated as second wrangler. In 1871 he was appointed Professor of Applied Mathematics at University College, London. In 1876 his health gave way, but was restored by a summer spent in Spain and Algiers, though not permanently, for two years later he again broke down, and died in Madeira, March 3, 1879. In mathematics his teaching and writings are regarded as marking an epoch in the history of the science in England. His "Canonical Dissection of a Riemann's Surface," his theory of "Biquaternions," and his memoir "On the Classification of Loci," may be mentioned as his most important contributions to this subject. He also wrote on philosophical subjects.

Climacteric, critical, dangerous; pertaining to the great climacteric, or to any one of lesser peril. One of certain periods of a man's life in which his constitution is said to undergo great changes, involving him in danger till they are over. They are multiples of 7 or of 9, as 35, 49, etc. The most perilous of these, called by way of eminence the grand climacteric, is his 63d year — for $9 \times 7 = 63$. The 7th year of life is also dangerous. The grand climacteric of life is said to have been recognized by Hippocrates.

A climacteric disease is a disease affecting both men and women, but more obvious in the former. It may be looked for about the 63d year of age, but varies in the time of its coming, according to the constitution of the individual, the limits being in the one direction 50, and in the other 75. Its most common predisposing cause is

Climbing Plants

mental anxiety or suffering. The expression of the countenance alters for the worse, the pulse becomes accelerated, the flesh wastes away without obvious cause; there are sleepless nights, and wandering pains flit through the head and chest, and sleep is either deficient or brings little refreshment. After a time recovery as a rule takes place, but the countenance never recovers its former aspect, or the constitution its vigor.

Climate, in its most general acceptance, embraces all those modifications of the atmosphere by which our organs are sensibly affected; such as temperature, humidity, variations of barometric pressure, the tranquillity of the atmosphere or the effects of winds, the purity of the air, or its mixture with gaseous emanations more or less salubrious; and lastly, the habitual diaphanity of the atmosphere, that serenity of the sky so important on account of the influence which it exercises not only on the development of organic tissues in vegetables and the ripening of fruits, but also on the ensemble of moral sensations which mankind experience in the different zones. There are two general causes on which the climate peculiar to any country principally depends: First, its distance from the equator; second, its altitude above the level of the sea; but their effect is generally modified by many circumstances exerting a partial influence. Among these may be enumerated the configuration and extent of the country; its inclination and local exposure; the direction of the chains of mountains by which it is intersected, or which are in its vicinity; the nature of the soil as it is more or less favorable to radiation, absorption, and evaporation; the proximity to, or distance from seas; the action of winds blending the temperatures of different latitudes; and even the changes produced by cultivation. The appreciation of all these causes, which modify the results deduced from the consideration of latitude and elevation alone, and the effect produced by their combined operation, constitutes the science of Climatology.

Climax (a ladder or stairs), a rhetorical figure in which a series of propositions or objects are presented in such a way that the least impressive comes first, and there is a regular gradation from this to the most impressive or final.

Climbing Perch (*Anabas scandens*), an Indian species of perch which quits the water and makes its way for considerable distances over the land. It is even said to climb trees, whence its specific name.

Climbing Plants, plants which climb by tendrils or any similar appliances terminating at the stem. There are also leaf-climbers which do so by means of their sensitive leaves.

Clinch, to bend the point of a nail after it is driven home. The word is sometimes written *clench*, from the French *clenche*, the lift of a latch. (Dutch, *klinken*, to rivet.) The phrase, "That was a clencher," means that argument was not to be gained; that remark drove the matter home, and fixed it "as a nail in a sure place." A lie is called a clencher or clincher from the tale about two swaggerers, one of whom said, "I drove a nail right through the moon." "Yes," said the other; "I remember it well, for I went the other side and clenched it." The French say, *Je lui ai bien rivé son clou* (I have clinched his nail for him).

Clinch, Charles Powell, an American poet and play-writer; born in New York city, Oct. 20, 1797. For many years he was editorial writer, and literary and dramatic critic, for the press; also writer of many poems, theatrical addresses, and dramas. Among the latter are: "The Spy," "The Expelled Collegiates," and "The First of May." He died in New York, Dec. 16, 1880.

Clinical Medicine (from the Greek *klinē*, a bed), a branch of medical practice that teaches us to investigate at the bedside of the sick the true nature of diseases in the phenomena presented; to note their course and termination; and to study the effects of the various modes of treatment to which they are subjected. From this mode of study we learn the character of individual cases; theoretical study being competent to make us acquainted with species only. Clinical medicine demands, therefore, careful observation. It is, in fact, synonymous with experience. We are unacquainted with the method of clinical instruction in medicine which was followed by the Asclepiadæ, but we cannot help admiring the results of it as exhibited to us in the writings of Hippocrates, who augmented the stores of experience inherited from them by following in their steps. After his time medicine ceased to be the property of particular families, and the path of experience, by which it had been rendered so valuable, was soon deserted. The slow progress of anatomy and physiology, the constant study of the philosophy of Aristotle, and endless disputes respecting the nature of man, of diseases, and of remedies, occupied all the attention of physicians; and the wise method of observing and describing the diseases themselves fell into disuse. Hospitals at their origin served rather as means of displaying the benevolence of the early Christians than of perfecting the study of medicine. The school of Alexandria was so celebrated, according to Ammianus Marcellinus, that a careful attendance upon its lessons entitled the student to pursue the practice of medi-

cine. Another old and very thriving, although less known institution, was in Nishapur, Persia; and hospitals, even before the flourishing period of the Arabians, to whom the happy idea is commonly ascribed, were united with these medical institutions. The last school, founded by the Emperor Aurelian, and superintended by Greek physicians, spread the doctrines of Hippocrates through all the East. It was supported for several centuries, and in it, without doubt, Rhazes, Ali-Abbas, Avicenna, and the other celebrated Arabian physicians, were instructed. At the same time the celebrated John Mesue, of Damascus, was at the head of the hospital of Bagdad. Of the mode of instruction pursued there we knew nothing; but we are inclined to form no very elevated opinion of the systems of an age which was devoted to all the dreams of Arabian polypharmacy. In truth, medicine shared the fate of all the other natural sciences in those barbarous ages. Men were little disposed to acquire slowly and cautiously the knowledge of disease at the bedside of the sick, in the manner of the Greek physicians. It appears probable that the foundation of universities led to a renewed attention to the study of medical science; and we find accordingly, that in Spain, even under the dominion of the Arabians, there were schools and hospitals for the instruction of young physicians in Seville, Toledo, and Cordova. But even then clinical studies were almost wholly neglected. Instead of studying the history of diseases, the pupils occupied their time with the most unprofitable pursuits. Not much more advantageous were the journeys which were made for the same objects to Italy and France in the 11th and 12th centuries. The schools of Paris and Montpellier were those principally resorted to; but in these the instruction consisted simply in lectures and endless commentaries upon the most obscure subjects; and even at the close of the 15th century when the works of the Greek physicians began to be printed, men were still busied with verbal explanations and disputes. Two centuries elapsed before physicians returned to clinical studies and instructions. Among the renovators of this mode of studying medicine may be named, in Holland, William von Straten, Otho Heurnius, and the celebrated Sylvius, about the middle of the 17th century; and it is said that clinical instruction was given at the same period in the schools of Hamburg, Vienna, and Strassburg. Even Boerhaave, who succeeded Sylvius as clinical instructor at Leyden in 1714, has left us no journals of daily observation of disease, but only academic discourses on the general principles of medicine. The influence of this celebrated school was first perceived in Edinburgh, and afterward in Vienna—two schools which, in celebrity for clinical

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instruction, soon eclipsed their common mother, the school of Leyden. Cullen, one of the most celebrated teachers of practical medicine in Edinburgh, was too fond of fine-spun theories on the condition of the diseased structures of the body, and the proximate causes of disease, ever to follow a uniform method in his lectures, and to adopt the entire history of disease, as observed at the bedside, as the basis of his system. From the account of what was effected in clinical medicine in Italy, Germany, and France, in the course of the 18th century, we may discover both the constantly increasing attention to this department of knowledge, and the difficulties with which such institutions are obliged to contend. The Vienna school, by means of the labors of Van Swieten, De Haen, and, still more, of Stoll and of Franck, became a model of clinical study, since public lectures were given in the hospitals, and the simplicity of Grecian medicine successfully inculcated. The practice and study of medicine in the hospitals in France was only a mode of gaining confidence, till the revival of science, and the erection of the French *École de Santé*. In that for the first time clinical instruction was expressly commanded. At the present day every good school has its establishment for clinical medicine connected with it. In Germany the experimental mode of studying medicine was early given up for the more scientific form of lectures; while in Great Britain and France students were carried to the bedside of the sick before they had been properly grounded in elementary studies.

Clinkstone, or **Phonolite**, a greenish gray or brownish compact or very finely crystalline igneous rock, remarkable for its tendency to split into slabs, which are now and then thin enough to be used for roofing purposes. This structure is due to the parallel arrangement of plate-like or tubular crystals of sanidine felspar. The slabs give a metallic ring or "clink" when struck with a hammer, whence its name. Its essential mineral components are sanidine and nepheline, but other minerals, such as augite or hornblende, leucite and magnetite, are usually present. The rock has often a porphyritic structure.

Clinometer, an instrument for the purpose of taking the amount of dip or angle of inclination of a stratum. There are various kinds in use, but the simplest consists of a strip of wood upon which is mounted a graduated arc with a pendulum. When this instrument is held horizontally, the pendulum points to zero; when it is held in a slanting position, the pendulum shows the number of degrees that the upper edge or the base of the strip deviates from horizontally. The most useful form of clinometer is that which is combined with

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a compass — both these instruments being required in geological observations.

Clinton, a city and county-seat of Clinton Co., Ia. It is on the Mississippi river, and the Chicago and Northwestern, the Chicago, Milwaukee and St. Paul, and the Burlington, Cedar Rapids and Northern railroads; 60 miles S. E. of Dubuque. It is the trade center for a region of 50 miles radius, and has large manufacturing interests. The Mississippi is crossed at this point by a wagon and a railroad bridge. The city has public schools, several churches, daily and weekly newspapers, electric lights, and railways, 3 National banks, and an assessed property valuation of \$2,000,000. Pop. (1890) 13,619; (1900) 22,698; (1910) 25,577.

Clinton, a town in Worcester county, Mass.; on the Nashua river, and the Boston and Maine and the New York, New Haven and Hartford railroads; 40 miles W. of Boston. It has important cotton and carpet manufactories, furnished with excellent power from the river; is connected with neighboring towns by electric street railroads; and has numerous churches, daily newspapers, electric lights, public library, high and graded public schools, a National bank, and an assessed property valuation of \$8,000,000. Pop. (1890), 10,424; (1900), 13,667; (1910) 13,075.

Clinton, De Witt, an American lawyer and statesman; born in Little Britain, N. Y., March 2, 1769. He was United States Senator from New York (1802); mayor of New York city (1803-1807, 1809-1810, 1811-1815); lieutenant-governor (1811-1813); candidate for President (1812); governor (1817-1823, 1825-1828). He was the chief originator of the Erie Canal (1817-1825). Besides purely political works, addresses, etc., he wrote: "Antiquities of Western New York," "Natural History and Internal Revenues of New York," etc. He died in Albany, N. Y., Feb. 11, 1828.

Clinton, George, Vice-President of the United States; born in Little Britain, Ulster co., N. Y., July 26, 1739. He served as lieutenant under his brother James at the capture of Frontenac, but afterward studied law. He was a member of Congress in 1776, and voted for the Declaration of Independence, but was summoned to the army as brigadier-general before it was prepared for signature. In 1777 he was elected governor and at the same time lieutenant-governor of the State of New York, which latter office was, on his acceptance of the other, conferred upon Mr. Van Courtlandt. He held the office of governor during the next 18 years, for which eventful period the history of his life is that of the State. He was again chosen governor

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after spending five years in private life, in 1801, and in 1804 became Vice-President of the United States. He died in Washington, D. C., April 20, 1812.

Clinton, Sir Henry, a British general, born about 1738; served in the Hanoverian war, and was sent in 1775 with the rank of Major-General, to America, where he distinguished himself in the battle of Bunker Hill. He defeated the Americans at Long Island, but had to evacuate Philadelphia to Washington. In 1782 he returned to England. He died in Gibraltar, Dec. 23, 1795.

Clinton, James, an American military officer; born in Little Britain, Ulster co., N. Y., Aug. 9, 1736. With his father he served at Frontenac, in 1758, as captain, and commanded in 1763 the forces raised to protect Ulster and Orange counties against the Indians. He accompanied Montgomery to Quebec in 1775, and was appointed Brigadier-General the following year. While his brother George was governor of New York, he was overpowered at Fort Clinton by the superior force under Sir Henry Clinton, and being severely wounded narrowly escaped with his life. He afterward served against the Indians under Sullivan, in 1779, and was present at the surrender of Cornwallis. After the peace he occupied many distinguished civil stations. He died Dec. 22, 1812.

Clinton's Big Ditch, a phrase applied in derision to the Erie Canal, connecting the Hudson river with the great lakes, because it was planned and carried to completion by DeWitt Clinton.

Clio, glory, renown, the muse of history and epic poetry, represented as bearing a half-opened roll of a book. Daughter of Jupiter and Mnemosyne, she was the mother of Hyacinthus and Hymenæus. There was also a sea nymph, Clio, daughter of Oceanus and sister of Beroe, who figures in Greek mythology.

Clio, the typical genus of the family *Clidæ*, formerly called *Clionidæ*. Named after the sea nymph and not the Muse. Four recent species are known in the Arctic and Antarctic seas, in Norway and in India. *C. borealis* is found in immense abundance in the Arctic, and *C. australis* in the Antarctic seas. They constitute a large part of the food of the whales. Eschricht estimated the microscopic pedunculated discs in its head at 360,000. Pallas called the genus *clione*. Clio, in astronomy, is an asteroid, the 84th found. It was discovered by the astronomer Luther on Aug. 25, 1865.

Clipper, a name familiarly given to a ship built expressly for speed. A clipper, as compared with an ordinary sailing ship, is longer and narrower (though of late the tendency has been to increase the beam);

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very sharp at the bows, which are generally hollowed more or less below the water-line; gracefully fined away toward the stern, which is usually elliptical; and altogether presenting the contrast of the race-horse to the beast of burden. Clipper ships are usually employed in the California and China trade.

Clive, Robert, Lord Clive and Baron of Plassey, an English soldier and statesman; born in Shropshire, Sept. 29, 1725. He was sent to several schools but to little purpose, and was said by all his masters to be the most unlucky boy in their schools. His father obtained for him the place of a writer in the East India Company's service, and in his 19th year he went in that capacity to Madras. Two years after his arrival Madras surrendered to the French, but Clive succeeded in making his escape to the English post of Fort St. David, where he entered the military service. He took part in the unsuccessful attempt to capture Pondicherry in 1748. The peace of Aix-la-Chapelle enabled him to return for a short time to civil employment, but when the British thought proper to engage as auxiliaries in favor of a competitor to the reigning Rajah of Tanjore, Clive greatly distinguished himself in the attack on one of his forts named Devikota, and was soon after appointed commissary to the British troops. About this time M. Dupleix, taking part with a candidate for the subahdarship of the Deccan, succeeded in placing him on the throne on condition of raising Chunda Sahib to the nabobship of the Carnatic. The British espoused the cause of Mahomed Ali, second son of the nabob who had fallen in the battle of Ambur in 1749, and as their candidate was besieged in Trichinopoly by Chunda Sahib, they resolved on Clive's proposal to create a diversion by attacking Arcot, the capital of the Carnatic. In 1751 Clive led a small force against the fort, which he captured without encountering opposition. Very shortly afterward a detachment of Chunda Sahib's troops appeared and laid siege to the fort, but the brilliant defense of Clive's force compelled them to retire. He relieved Trichinopoly, and afterward reduced the forts of Covelong and Chingleput. Returning to Madras he married, and in 1753 sailed to England for the recovery of his health. A diamond hilted sword was voted to him by the East India Company. When he returned to India in 1753, the government of Fort St. David (South Arcot, Madras) was conferred upon him, with the right of succession to that of Madras, and a lieutenant-colonel's commission in the king's service. After a successful attack on the pirate Angria, in conjunction with Admiral Watson, he repaired to Fort St. David, but was soon called to Madras to command the

succors sent to Bengal, where the nabob Suraj-ud-Dowlah had attacked the British, destroyed their factories, taken Calcutta, and suffocated over 120 of his prisoners in the Black Hole. Colonel Clive proceeded to Calcutta and driving out the enemy took possession of the city, and with a very inferior number of men entered the nabob's camp and seized his cannon, which alarmed him so much that he offered terms which were adjusted much to the advantage of the company. The state of things rendering it impossible for this peace to last long, Colonel Clive formed the project of dethroning the nabob; and one of the nabob's officers named Meer Jaffier joined in this, on condition of succeeding to his master's dignity. A Hindu merchant named Omichund was engaged to carry on the correspondence between Jaffier and the British; but, after gaining the confidence of the English, he demanded a high sum for his services, or rather for his silence. On this two treaties (one written on red and the other on white paper) were drawn up, in one of which his demand was inserted, and both were signed; but the first only was shown to Omichund. The nabob suspecting what was going forward commanded Meer Jaffier to swear fidelity and join his army; and the famous battle of Plassey ensued (June 21, 1757), in which Clive's force of 3,000 put to flight the nabob and his army of more than 50,000. On the affair being decided Omichund was informed that "the red paper was a trick, and he was to have nothing." The disappointment, it is said, drove him mad, but this seems doubtful. It should also be noticed that the signature of Admiral Watson, who was too honest to sign the paper, was a forgery (to which we are told he was a party). The new nabob, Meer Jaffier, who had come over at the close of the battle and had presented Clive with £234,000, now wished to govern without the interference of the British; but three rebellions rising against him, he was obliged to solicit the aid of Clive, who was appointed governor of Bengal. Soon after a Dutch force arrived at Chinsura, on pretence of being sent to reinforce the garrisons belonging to the Dutch company. Suspecting that they were invited by the nabob to destroy the British power, Clive attacked them both by sea and land, captured all their ships, and drew up a treaty signed by the Dutch, who agreed to pay all expenses on the restitution of their property. He then again returned to England (1760), where his success was highly applauded; and in 1762 he was raised to the Irish peerage by the title of Baron Clive of Plassey. Two years later he was made a Knight of the Bath. He was also elected M. P. for Shrewsbury. He had not, however, been long in England before a disagreement took place between Meer Jaffier and Mr. Hol-

well, who then officiated as governor, which ended in transferring the nabobship from the former to his son-in-law, Meer Kasim, but in consequence of the shameful monopolies and usurpations of the British traders the new nabob declared the trade of the country free for all. It was in consequence resolved to depose him and restore Meer Jaffier, and after a temporary success he was obliged to take refuge with the Nabob of Oude. On the news of these commotions reaching Great Britain, the company appointed Lord Clive president of Bengal, with the command of the troops there; and in July, 1764, he returned to India. Before his arrival Major Adams had defeated the Nabob of Oude, Suraj-ud-Dowlah, and obliged him to sue for peace, so that Lord Clive had only to settle terms of agreement. He also reformed the civil service in Bengal, and restored discipline in the army. In 1767 he finally returned to England, being the chief contributor to the immense possessions of the East India Company. After his return severe attacks were made on him for his conduct in India, and a parliamentary inquiry followed, which led to resolutions of censure in 1773. But when a motion was made in the House of Commons, "that Lord Clive had abused the powers with which he was intrusted," it was rejected, and a resolution passed "that Lord Clive had rendered great and meritorious services to his country." From that time his broken health and the mental worry caused by the attacks on him rendered him a prey to depression of spirits, under the morbid influence of which he put an end to his life, Nov. 22, 1774.

Cloaca, a sewer, an underground drain or conduit. The Roman Cloaca Maxima (the greatest or main sewer) is said to have been constructed, or at least begun under the auspices of King Tarquinius Priscus, about 588 B. C. It is still used in the drainage of Rome.

A cloaca in anatomy is a part of the intestine in which the intestinal, ovarian, and urinary outlets terminate. This structure exists in birds, in reptiles, in the amphibia, and in the mammalian order *Monotremata*. In the *Rotifera* also the perivisceral cavity terminates in a dilatation or cloaca, which forms the common outlet for the digestive, generative and water vascular systems. There is a cloaca also in insects, and one also in tunicated mollusks. The latter is sometimes called the atrial chamber. In the embryonic development of man there is a period during which a cloaca, like that of the inferior animals, exists.

Clock, an instrument for measuring and indicating the time of day. From the earliest periods of human history man has sought to measure time. To pastoral or

agricultural nations where the duties of each day were monotonous and bounded by the four great divisions of sunrise, mid-day, sunset, and midnight, extreme accuracy was not important. The first measure of time was the sun-dial, but this being of no service at night or on cloudy days, the hour-glass was invented, next the clepsydra, subsequently improved by the addition of a toothed wheel and index or sort of dial driven by the water which flowed from the bottom of the jar. These have been in use 2,000 years. The next improvement was the substitution of a weight for the water to turn the wheel. This has been attributed to Archimedes. Some contrivance was necessary to regulate the weight so as to make the index pass over equal spaces in equal times. This must be accomplished by a pendulum or escapement of some kind, and a rude escapement is attributed to Gerbert, about A. D. 1000. A better one was that of De Vick in 1379.

Accuracy in marking time was not attained, however, by this, though it was a great improvement. For 270 years there was no advance, but between 1641 and 1658 the idea of attaching the pallets of the escapement to the pendulum-rod and making the escapement horizontal occurred both to Harris, an English clockmaker, and Huyghens, a Dutch philosopher. The anchor escapement of Dr. Hooke, invented in 1666-1680, and the dead-beat escapement of Graham in 1700, gave a new impulse to clockmaking. There has been no material change in the principles on which clocks are made, except in the substitution of steel springs for weights and in the finer movements, and in the addition of the hair-spring to regulate still further the action of the escapement or pendulum, since 1700. There have been a great variety of escapements invented and much more attention paid to accuracy in the details and perfection of finish, but the principles are the same. The tall, old-fashioned clock, with its long pendulum and heavy weights, seems a very different thing from the little "nutmeg lever" which stands on the shelf, but both depend on the same principle.

Considered as scientific instruments for the precise measurement of time, they may be divided into two classes according to the character of the compensation of their pendulums, whether of the gridiron type or the mercurial pendulum. The first keeps a constant length of the pendulum-rod by the difference of expansion of different metals with change of temperature, and the other makes up for the lengthening of the rod with rise of temperature by the greater expansion of a jar of mercury carried on the bed-plate of the pendulum, the rise in the center of gravity of this counterbalancing the lengthening of the sustaining rod.

Clocks differ in another important particular, that of the escapement, whose function it is to be unlocked at each oscillation of the pendulum and thus allow the train of wheels to move forward a step, and also to transmit an impulse to the pendulum just sufficient to counterbalance the friction caused by the unlocking of the escapement. In fine astronomical clocks either the Graham dead-beat or some form of gravity escapement is the one most generally used. In any of them the object to be attained is to make the work of unlocking and the impulse given to the pendulum to make up for it as nearly absolutely constant as possible. If this is not done the arc of vibration of the pendulum will vary, and with it the steady rate of the clock.

Most of the difficulties today in the case of the best astronomical clocks come from the necessity of attaching to them some device for making or breaking an electric circuit each second or every other second. This ought to be done without interfering in the least degree with the motion of the pendulum, the work of unlocking, or with the impulse given to it. The only form of escapement with which this can be done is some kind of gravity escapement where the impulse given to the pendulum is not directly connected with the motion of the train itself, but with great care and fine workmanship it can be done by the train of a dead-beat escapement without very seriously interfering with the impulse given to the pendulum. When these matters have all been looked after there is still one source of error which interferes with the steady rate of a clock, if it is desired over intervals of days at a time, and this is due to the changes in the pressure of the atmosphere. The difference of pressure at the bottom and top of the cistern or bob of the pendulum acts as a buoyant effect, slightly diminishing the pull of gravity on the pendulum. The greater the barometric pressure the greater this difference and its consequent effect on the rate of vibration. The best way to overcome this is to put the clock in an air-tight case, winding it either through a tight packing-box for the key or by a magnet, though various other ways have been tried with varying degrees of success.

Clodius Pulcher, Publius, a notorious public character of ancient Rome, son of Appius Claudius Pulcher, who was consul about 79 B. C. He served in the third Mithridatic War under Lucullus, and filled different high posts in the provinces of the East, where his turbulence was the cause of serious disturbances. Returning to Rome, he became a popular demagogue; was elected tribune in 59 B. C.; was the means of procuring Cicero's banishment, and continued to be a ringleader in all the sedi-

tions of the time till killed in an encounter between his followers and those of Titus Annius Milo. One of Cicero's orations was written in defense of Milo.

Clœlia, a girl of Rome, who, the legends say, having been given up to Porsena as a hostage, escaped to Rome by swimming the Tiber.

Clog-almanac, an almanac or calendar made by cutting notches or characters on a clog or block, generally of wood. The block had generally four sides, three months for each edge. The number of days is marked by notches, while various symbols are used to denote saints' days, the golden number, etc.

Cloister, the square space attached to a regular monastery or large church, with a peristyle or ambulatory round, and usually with a range of buildings over it. The cloister is perhaps *ex vi termini*, the central square shut in or closed by the surrounding buildings. Cloisters are usually square on the plan, having a plain wall on one side, a series of windows between the piers or columns on the opposite side, and arched over with a vaulted or ribbed ceiling. It mostly forms part of the passage of communication from the church to the chapter-house, refectory, and other parts of the establishment.

Cloutz, Jean Baptiste de, a Prussian baron, better known as ANACHARSIS CLOUTZ, one of the wildest and most violent actors in the early scenes of the French Revolution. He was born in Cleves in 1755, and very early dissipated the greater portion of his fortune. In 1790, being at Paris, he presented himself at the bar of the National Assembly, attended by a number of men dressed to represent various foreign nations; and, describing himself as the "orator of the human race," he demanded the right of confederation. After making himself conspicuous by a variety of foolish projects set forth in no less foolish speeches, he was in 1792 sent to the National Convention as deputy from the department of the Oise. As might be expected from his previous conduct, he was among those who voted for the death of Louis XVI. His course, however, was now well-nigh run, for, becoming an object of suspicion to Robespierre, he was arrested, and guillotined in 1794.

Clotaire I., son and successor of CLOVIS (*q. v.*), first King of the Franks in Gaul, reigned as sole king from 558 to 561. **CLOTAIRE II.**, a king of the same Merovingian dynasty, reigned over the Franks 30 years later.

Closure, a rule in British parliamentary procedure adopted in 1887 by which, at any time after a question has been pro-

posed, a motion may be made with the speaker's or chairman's consent "That the question be now put," when the motion is immediately put and decided without debate or amendment. So also if a clause of a bill is under debate a motion that it stand or be added may be put and carried in the same way. The motion must be supported by more than 100 members and opposed by less than 40, or have the support of 200 members. The introduction of the closure was intended to prevent debates from being too much spun out.

In the Congress of the United States the practice has been to allow unlimited debate, and it is for this reason that there are so many instances of obstructionary tactics being resorted to by a minority to delay the passage of a measure. These tactics have been given the general name of "filibustering," and include almost every expedient known to parliamentary tacticians, not even omitting serious breaches of decorum. A call for "the previous question," if sustained, will usually terminate discussion immediately.

Cloth, a manufactured substance consisting of wool, hair, cotton, flax, and hemp, or other vegetable filaments. It is formed by weaving or interlacing threads, and is used for making garments or other coverings. The term cloth, when used alone, is generally employed to distinguish woolen cloth from fabrics made of any other textile material.

Clothing, the clothes or dress, that is, the artificial coverings collectively, which people wear. Nothing is more necessary to comfort than that the body should be kept in nearly a uniform temperature, thus preventing the disturbance of the important excretory functions of the skin by the influence of heat or cold. Hence in a changeable climate the question of clothing becomes of special importance. The chief end proposed by clothing ought to be protection from the cold. A degree of cold amounting to shivering cannot be felt without injury to the health, and the strongest constitution cannot resist the benumbing influence of a sensation of cold constantly present, even though it be so moderate as not to occasion immediate complaint, or to induce the sufferer to seek protection from it. This degree of cold often lays the foundation of the whole host of chronic diseases, foremost among which are found scrofula and consumption.

The only kind of dress that can afford the protection required by the changes of temperature to which the cooler or temperate climates are liable, is woolen. Those who would receive the advantage which the wearing of woolen is capable of affording, must wear it next the skin; for it is in this

Clotho

situation only that its health-preserving power can be felt. The great advantages of woolen cloth are briefly these:—the readiness with which it allows the escape of sweat through its texture; its power of preserving the sensation of warmth to the skin under all circumstances; the slowness with which it conducts heat; the softness, lightness, and pliancy of its texture. Cotton cloth, though it differs but little from linen, approaches nearer to the nature of woolen, and on that account must be esteemed as the next best substance of which clothing may be made. Silk is the next in point of excellence, but it is very inferior to cotton in every respect. Linen possesses the contrary of most of the properties enumerated as excellencies in woolen. It retains the matter of perspiration in its texture, and speedily becomes imbued with it; it gives an unpleasant sensation of cold to the skin; it is very readily saturated with moisture, and it conducts heat too rapidly.

Clothes should be so made as to allow the body the full exercise of all its motions. The neglect of this precaution is productive of more mischief than is generally believed, and the misery and suffering arising from it often begin while we are yet in the cradle.

Clotho, one of the three Fates or Destinies who are represented by the ancient classical writers as spinning the thread of life. Clotho held the distaff, Lachesis spun the thread of life, Atropos cut the thread when the man was to die. In zoölogy, Clotho is a genus of snakes, tribe *viperina*, family *Viperidæ*. *C. arietans* is the puff-adder of the Cape of Good Hope. Clotho, in astronomy, is the name of an asteroid, the 97th found. It was discovered by Tempel on Feb. 17, 1868.

Cloth of Gold, Field of the. See FIELD OF THE CLOTH OF GOLD.

Clotilda, St., the daughter of Chilperic, King of Burgundy; born in 475., and in 493 became wife of Clovis, King of the Franks. She was the chief means of securing the conversion of her husband to Christianity, and largely influenced his life. After his death she lived a life of austerity at Tours, where she died in 545. She was canonized a few years after. Her remains were buried in the church of St. Geneviève at Paris, and burnt at the Revolution to prevent their desecration; the ashes are still in the church of St. Leu.

Cloudberry, or Mountain Bramble (*Rubus chamæmorus*), a fruit found plentifully in the N. of Europe, Asia and America, and common in some of the more elevated moors of Great Britain, of the same genus with the bramble or blackberry. The plant is from 4 to 8 or 10 inches high, with

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a rather large handsome leaf, indented and serrated at the edges. The flowers are large and white, and the berries, which have a very fine flavor, are orange-yellow in color; and about the size of a bramble berry.

Cloud Burst, a sudden and violent rainfall, covering a limited territory and of brief duration. It occurs in the hottest season and most frequently on the slopes of mountains and in arid regions, and is generally accompanied by severe and continuous lightning. The cloud burst is caused by the contact of a warm current of air, surcharged with moisture, with a cold current, the result being swift condensation and immediate precipitation of the water formed.

Clouds, formations owing their origin to aqueous vapor diffused in the atmosphere. The vapor is supplied from the evaporation of the sea and other water surfaces, under the influence of solar heat, and is diffused through the agency of winds. Air—under a given pressure and temperature—can absorb, or hold, only a certain amount of invisible vapor; when charged with this maximum amount it is said to be saturated. Should the temperature, under this condition, be lowered, as, for instance, when a current is ascending into colder regions, or expanding, condensation takes place, and clouds are formed, appearing suspended at a certain level above the surface. Should the cooling continue, these globules unite and are finally precipitated in the form of rain, and, with sufficiently reduced temperature, as snow, or perhaps hail or sleet. Mists and fogs are simply incipient states of clouds, and when in contact with cold bodies produce, by deposition of moisture, dew, and hoar frost. The whole subject is comprised under the name hygrometry. The forms of clouds have been observed to depend greatly on altitude, and have been classified accordingly.

The nomenclature proposed by Howard, at the beginning of the 19th century is still generally adhered to, owing to its simplicity and appropriateness. He divides clouds into three primary modifications, named *cumulus*, *stratus*, and *cirrus* with the intermediate composite forms—*cumulo-stratus*, *cirro-stratus*, *cirro-cumulus*, and, lastly, *nimbus*, or rain-cloud. These varieties, and the conditions accompanying them, may be briefly described as follows: *Cumulus*—Convex or conical masses, generally resting on a horizontal base of apparently dense structure, and of globular shape or rolls (so-called cotton bale); they form in the lower atmosphere under the influence of ascending heated air, and are most developed during the hottest part of the day; a fair-weather cloud. *Stratus*—Consists of continuous horizontal sheets, a

Cloud, St.

fine-weather sign, appearing mostly during the night and at no great elevation. It forms dense clouds when mixed with smoke or dust. *Cirrus*—A lofty cloud of loose or fibrous structure, feathery in appearance and of great variety—said to have been seen at an altitude of 10 miles. Its particles are supposed to be frozen and crystallized, which give rise to halos, coronæ, and other optical appearances. *Cirrus* is said to be often the precursor of windy weather or changes. Their movement is generally different from that of the lower clouds. *Cumulo-stratus*—A modification of cumulus; flat-topped, mushroom-shaped masses; have a tendency to spread and overcast the sky, and indicate coming rainy weather. *Cirro-stratus*—A fibrous cirrus cloud in close horizontal arrangement. Sky mottled with these clouds is known as mackerel sky. Often precedes wind and rain. *Cirro-cumulus*—Small, round masses, disposed with more or less regularity; usually a high level cloud, though below that of cirrus. They appear most frequently in dry and warm weather. *Nimbus*—A low cloud, from which rain is falling, the masses so blended together as to form no definite outline. *Scud*—A term referring to low, detached clouds, drifting rapidly before the wind.

Precipitation, or rain, is one of the most irregular of all meteorological phenomena, there being places of habitual dryness throughout the year with but occasional sprinklings. Tropical countries generally have a dry and a wet season, and there are other localities where rain may fall irregularly at all seasons. There are places where the annual rain-fall amounts to several hundred inches. Fifty inches per annum may be regarded as a moderate rain-fall, and below 20 inches a very light one, and generally insufficient for agricultural purposes unless it should fall in the right season.

Cloud, St., or Clodoald (san'klö), son of Clodomir and grandson of Clovis, King of France. After the death of his father, and the murder of his two brothers, he became a monk, and found refuge in a monastery near Paris, which took from him the name of St. Cloud. He died there in 560.

Cloud, St., a town of France, in the department of Seine-et-Oise, on the limit of Paris. The historical associations of this place are intimately connected with the royalty of France. Its palace, which is very beautiful, was originally the property of the Dukes of Orleans, and, for a long period, was a summer residence of the kings of France. Its fountains are extremely elegant, and its park extensive. Here, in 1799, Napoleon I. dismissed the Assembly of Five

Clovis I.

Hundred, and caused himself to be proclaimed first consul; and here, in 1830, Charles X. put his signature to the ordinances which cost him his throne.

Clough, Arthur Hugh (klöf), an English poet; born in Liverpool, Jan. 1, 1819. He studied under Dr. Arnold at Rugby, and then at Oxford, where he highly distinguished himself. On his return from a tour in the United States (1852) he was appointed an examiner attached to the educational branch of the privy-council office. He died in Florence, Nov. 13, 1861, while returning from a journey to Greece. His poems, of which the best known are "Bothie of Tober-na-Vuolich," "Amours de Voyage," and the "Tragedy of Dipsychus," were published, with a memoir, by F. T. Palgrave, in 1862.

Clove Bark, a name vaguely used for various aromatic drugs; some belonging to the clove, others to the cinnamon alliance. To the former class belongs the bark of *Eugenia caryophyllata* of Ceylon, etc.; to the latter, the *culilawan* bark (*Cinnamomum culilawan*) of the Moluccas.

Clover, or Trefoil, a genus of plants of the natural order *Leguminosæ*, sub-order *papilionaceæ*, containing a great number of species, natives chiefly of temperate climates, and some of them very important in agriculture as affording pasture and fodder for cattle. The amount of nutritive substances in red clover at beginning of flower is 11.26 per cent.; red clover in full flower, 13.04 per cent. Red clover hay, cut at beginning of flower, contained 55.43 per cent. nutritive matter, while the same cut in full flower contained 46.07 per cent.

Clover Weevil, a kind of weevil, genus *Apion*, different species of which, or their larvæ, feed on the leaves and seeds of the clover, as also on tares and other leguminous plants. *A. apricans*, of a bluish-black color, and little more than a line in length, is especially destructive.

Cloves, a very pungent aromatic spice, the dried flower-buds of *Caryophyllus aromaticus*, a native of the Molucca Islands, belonging to the myrtle tribe, now cultivated in Sumatra, Mauritius, Malacca, Jamaica, etc. The tree is a handsome evergreen from 15 to 30 feet high, with large elliptic smooth leaves and numerous purplish flowers on jointed stalks. Every part of the plant abounds in the volatile oil for which the flower-buds are prized. The spice yields a very fragrant odor, and has a bitterish, pungent, and warm taste. It is sometimes employed as a hot and stimulating medicine, but is more frequently used in culinary preparations.

Clovis I., King of the Franks, usually called the founder of the French monarchy;

Clovis II.

born in 467. He was the son of Childeric I., and succeeded him in 481. During his reign he recovered from the Romans all their possessions in Gaul. He defeated Siagrius, near Soissons, in 486, compelled Alaric, King of the Visigoths, to surrender himself, and had him put to death. Clovis I. married Clotilda, niece of Gundebald, King of the Burgundians, and through her influence was gradually led to renounce paganism, and profess Christianity. His final decision was made after his great victory over the Alemanni, at Tolbiac, in 496; and he was baptized by St. Remi, with 3,000 of his subjects. In the following year the Armoricans united themselves with the Franks. Clovis I. pursued a crafty policy with the King of the Burgundians and his brother, on the principle "divide and con-



CLOVES.

quer." In 507 he made war on Alaric II., King of the Visigoths, and totally defeated him at the battle of Vouglé, killing him with his own hand. Clovis I. thus added the whole S. W. part of Gaul to his dominions. At Tours he soon afterward received ambassadors from Anastasius, Emperor of the East, who gave him the titles of patrician and consul. Clovis I., about that time, settled at Paris, and made it the capital city. He disgraced himself by the unjust and cruel measures he took to get rid of several of his kindred, possible competitors for the crown. He died in Paris, in 511, after dividing his kingdom between his four sons.

Clovis II., second son of Dagobert, King of Neustria and Burgundy, whom he succeeded in 638. He died in 655.

Clubbing

Clovis III., son of Thierry III., King of France, whom he succeeded in 691, at the age of nine, and reigned five years, under the guardianship of Pepin d'Heristal, mayor of the palace. He died in 695.

Clowes, William Laird, an English naval critic and miscellaneous writer; born in London Feb. 1, 1856. He was educated at King's College, London; and from 1876 to 1895 was correspondent for various newspapers. He has written much on naval development and on art and sociology. His works include "The Naval Pocket Book," "Black America," "The Great Peril," and some novels, including "Captain of the Mary Rose."

Clown, the buffoon or practical jester in pantomime and circus performances. On the old English stage the clown was the privileged laughter-provoker, who, without taking any part in the dramatic development of the piece represented, carried on his improvised jokes and tricks with the actors, often indeed addressing himself directly to the audience instead of confining himself to what was going on on the stage. In Shakespeare's dramas, a distinct part is assigned to the clown, who no longer appears as an extempore jester, although the part he plays is to a certain extent in keeping with his traditional functions.

Club, an association or number of persons combined for the promotion of some common object, whether political, social or otherwise. The earliest London club of any celebrity was established about the beginning of the 17th century, at the Mermaid Tavern, Friday street. Among its members were Shakespeare, Sir Walter Raleigh, Beaumont, Fletcher, and Selden. Ben Jonson figured at another club, which met at the Devil Tavern, near Temple Bar. Of other clubs, the literary one, established in the year 1764, had among its members Johnson, Boswell, Burke, and Goldsmith. Toward the close of the 18th century the French political clubs gained world-wide notoriety from the active part which they took in the first French Revolution. The most celebrated was the Jacobin club, founded at Versailles in 1789, and called originally the Breton club. This and other political French clubs were abolished on Sept. 4, 1797. They were revived in 1848, but were suppressed again in 1849 and 1850.

Well-established clubs in the English style have been organized in all the leading cities of the United States, and within recent years clubs exclusively for women have become numerous and popular, one of the most notable pioneers in this line being the Sorosis of New York city.

Clubbing, a diseased condition of plants of the cabbage family produced by the

Club Foot

larvæ of insects, consisting in the lower part of the stem becoming swollen and misshapen. Plants on ground exhausted by over-cultivation suffer chiefly.

Club Foot, a short, deformed foot; some form of *Talipes*. In 1831 Dr. Stromeyer cured a man of this defect by dividing the tendons of the contracted muscles with a very thin knife. There are three principal forms of distortion to which the foot is congenitally subject: (1) When the foot is turned inward. (2) When it is turned outward. (3) When the patient can only put the toes on the ground. Almost all the varieties of club-foot may be referred to one of these species.

Club Moss (so called because it is mossy-looking. It is not, however, a genuine moss), the ordinary English name for the genus *Lycopodium*, and especially for *L. clavatum*. *Lycopodium* is sometimes called also snake-moss.

Cluny, or **Clugny** (ancient *Cluniacum*), a town of France in the department of Saône-et-Loire, on the Grône, 46 miles N. of Lyons. There are seen the ruins of a celebrated abbey. The monks of the order of Cluny were the first branch of the order of Benedictines, and took their name from the above town, where they were first established. The Benedictines having become very lax in their discipline, St. Odo, Abbot of Cluny, in 927, not only insisted on a rigorous observance of the rules by the monks under him, but likewise introduced new ceremonies of a severer nature. These new rules soon came to be observed in the principal monasteries in France, Spain, Italy, Germany, and Britain; and by the 12th century the order numbered 2,000 cloisters in different parts of Europe. The order was abolished in 1790.

Clupeidæ, the herring tribe, a family of fishes belonging to Cuvier's order *Malacopterygii abdominales*. Now they are placed under the order *Teleostei*, and the sub-order *malacopteri*. The dorsal fin is single; there is no adipose fin; the upper jaw is composed of the intermaxillary bones in the middle and the maxillaries at the sides, and the body is covered with scales. The following genera are represented in the North Atlantic—*Clupea*, *alosa*, and *engraulis*. The family appears to have had representatives as early as the chalk period.

Cluricaune, in Irish mythology, an elf of evil disposition who usually appears as a wrinkled old man, and has knowledge of hidden treasures.

Cluseret, Gustave Paul (klö-ze-rā'), a French officer and Communist; born in Paris, June 13, 1823; he came to the United States soon after the breaking out of the Civil War, and after serving on General

Clyde

McClellan's staff became a Brigadier-General. In 1864 he edited the "New Nation," in New York. Subsequently he returned to Paris, and was War Minister of the Commune in April, 1871. From Paris he fled to England and Mexico, and was condemned to death by a military tribunal in 1872. He was, however, pardoned and allowed to return to Paris in 1880. He died in Toulon, Aug. 23, 1900.

Clusia, a genus of plants, the typical one of the order *Clusiaceæ* (guttifers), and the tribe *clusiæ*. The flowers are usually polygamous, calyx consisting of four imbricate permanent sepals, colored, the outer pair smallest, often bracteate at the base. Petals 4-6, deciduous; stamens in the male flowers many and free, in the female ones few, sterile, and connected, all glutinous; stigmas 5-12, radiately peltate, glutinous; ovary surrounded by a staminiferous ring; capsule fleshy, 5-12 celled. The species are trees or shrubs, often parasitic. *Clusia rosea* is a beautiful tree growing on rocks; its fruit divides into eight portions, with scarlet seeds like those of the pomegranate. *C. alba* is an elegant tree of great thickness of trunk, yet, strange to say, parasitic upon other trees. *C. flava* resembles the former one. These plants found their way from the gardens of the United States to the greenhouses of England. Endlicher thinks that hog-gum is produced by *C. flava*. A resin "wept" by the disk and stamens of *C. insignis* is rubbed down with the butter of the chocolate-nut and used by Brazilian women to alleviate the pain of sore breasts.

Clusius (Charles de la Cluse), a French botanist; born in Antwerp, Feb. 18, 1526. He traveled extensively in Europe in pursuit of his favorite science, and by over-exertion and numerous grave accidents, he ruined his health and became a cripple. He was made keeper of the Botanical Gardens at Vienna, and in 1593 accepted the chair of Botany at Leyden. His principal works are, "History of Rare Plants," and "History of Plants," a translation from Doedens. He died in Leyden, April 4, 1609.

Clustered Column, in architecture, a pier which appears to consist of several columns or shafts clustered together; they are sometimes attached to each other throughout their whole height, and sometimes only at the capital and base.

Clutha, the largest river in New Zealand, in the S. part of the South Island. It receives the waters of Lakes Hawea, Wanaka, and Wakatipu, and flows in a S. E. direction, having a length of 150 miles. It is called also Molyneaux.

Clyde (klid), a river of Scotland, which has its sources amid the hills that separate

Clyde

Lanarkshire from the counties of Peebles and Dumfries, passes by Lanark, Hamilton, Glasgow, Renfrew, Dumbarton, Greenock, etc., and forms finally an extensive estuary or firth before it enters the Irish Sea at the southern extremity of the island of Bute. From its source to Glasgow, where navigation begins, its length is 70 or 80 miles. Its principal tributaries are the Douglas Water, the Mouse, the Nethan, the Avon, the Calder, the North Calder, the Kelvin, the White and Black Cart; and the Leven. Near Lanark it has three celebrated falls—the uppermost, Bonniton Linn, about 30 feet high; the next, Corra Linn, where the water takes three distinct leaps, each about as high; and the lowest, Stonebyres, also three distinct falls, altogether about 80 feet. The Clyde, by artificial deepening, has been made navigable for large vessels up to Glasgow, and is the most valuable river in Scotland for commerce.

Clyde, Lord. See CAMPBELL, SIR COLIN.

Clymene, the daughter of Oceanus, and mother of Atlas and Prometheus.

Clymer, Ella Dietz, an American poet; born in New York. She began her career as an actress in 1872; in 1881 she abandoned the stage. She has contributed to literature three volumes of poems: "The Triumph of Love" (1878), "The Triumph of Time" (1884), and "The Triumph of Life" (1885). She was one of the founders of the "Sorosis" Society, and its president in 1889.

Clymer, George, an American patriot; born in Philadelphia in 1739. He entered mercantile life when a lad and acquired a competence. He was prominent in public affairs prior to the Revolution, and in 1775 became one of the first Continental treasurers. He was chosen in 1776 to succeed a member of the Continental Congress who had refused to sign the Declaration of Independence, to which he promptly affixed his signature, although not on the 4th of July. He was active in the patriot cause during the Revolution, and in 1787 was a member of the convention that framed the Constitution of the United States. He was a member of the First Congress of the United States. He died in Moinsville, Pa., Jan. 23, 1813.

Clyster, an enema, such as tepid water or gruel, introduced into the rectum to produce evacuation of its contents during obstinate constipation or other injections designed to make the bowels retain their contents in diarrhœa, for supplying nourishment when the teeth are closed in tetanus, or for various other purposes. Too frequently employed clysters weaken the system in place of giving it aid.

Coagulation

Clytemnestra, in Greek mythology, daughter of King Tyndareus and Leda, and half-sister of Helen. During the absence of Agamemnon in the war against Troy she bestowed her favors on Ægisthus, and, in connection with him, murdered Agamemnon on his return from Troy, and, together with her paramour, governed Mycenæ for seven years. Her son Orestes killed them both.

Clytie, the daughter of Oceanus and Thetis, who pined away through love for Apollo, and was changed by him into a sunflower.

Cneph, the name under which the Egyptians adore the Creator of the world.

Cnidus, or **Gnidus**, an ancient Greek town in Caria, a province of Asia Minor, a great seat of the worship of Aphrodite (Venus), who had three temples here, in one of which was a famous statue of the goddess by Praxiteles.

Coach, a large, close, four-wheeled vehicle, generally constructed to carry passengers inside and outside; used for purposes of State, for pleasure, or for traveling. Italy, France, Spain, and Germany all claim the honor of having invented coaches. About 1282 the Queen of Charles of Anjou entered Naples in a caretta, which seems, in some respects, to have resembled a modern coach. It is generally believed that the first one used in England was introduced by the Earl of Arundel in 1580. They did not become common till about 1605. In the first half of the 19th century, the greater part of the passenger traffic of the more settled portions of the United States was conveyed by coaches, and the coaching system had been carried to a very high state of perfection when it was superseded by railways.

Coach Dog, a short-haired dog of moderate size and rather handsome shape, white with numerous black spots, kept as an attendant upon carriages, and of no use otherwise; called also Dalmatian dog.

Coadjutor, a Latin term, nearly synonymous in its original meaning with assistant. The term is especially applied to an assistant bishop appointed to act for and succeed one who is too old or infirm for duty.

Coagulation, the act or process of being coagulated, or of changing from a liquid to a curd-like semi-solid state, produced without evaporation and without crystallization. It differs from congestion in not being attended by a fall of temperature in the substance coagulated.

When blood is drawn and allowed to stand it emits a "halitus" or exhalation, which has a faint smell. In three or four minutes a film overspreads the liquid, commencing at the circumference and gradually

spreading to the center. Two or three minutes later the lower part of the blood, in contact with the vessel, becomes solidified, and then the whole mass, only about eight or nine minutes being needful for the whole process from first to last. In about 15 or 20 minutes a thin serum begins to exude from it, and goes on to do so for two or three days.

Coahuila (kō-ä-whī'lä), a State of Mexico, separated from Texas by the Rio Grande, has an area of 59,280 square miles, partly mountainous, and forming in the W. a part of the wilderness of the Bolson de Mapimi. The climate is healthy, though extremes of heat and cold are usual. The state is rich in minerals, especially silver, and coal has been found. It has valuable pasturage, and in many parts a most fertile soil; but no district of Mexico is so little known, or has been less developed. The construction of the National railway has, however, prepared the way for a change, and already several cotton-factories and a large number of flour-mills are in operation. Pop. (1900) 280,899; capital, Saltillo.

Coaita, the French name for the quata, a South American monkey, *Ateles paniscus*, very common in the woods of Surinam and Brazil.

Coal, a solid mineralized vegetable matter that can be used for fuel. In the sense of a piece of glowing fuel, thence a piece of fuel, whether dead or alive, the word is common to all languages of the Gothic stock, and seems allied to the Latin *calere*, to be hot and is allied to glow and kiln. The different sorts of fuel are distinguished by prefixes, as char-coal, pit-coal, sea-coal, but, owing to the eminent importance of mineral or pit-coal, the word coal alone has come to be used in this special signification. Coal is one of the most important of all minerals; it consists chiefly of carbon, and is universally regarded as of vegetable origin. It occurs generally in strata or beds; it is always of black or blackish-brown color; some of the varieties have considerable vitreous or resinous luster; some are destitute of luster; some have a shell-like fracture, and some have a sort of slaty structure, and are readily broken into cubical or rhomboidal fragments. In a general way we may define coal as a fossil fuel of a black color and stony consistency, which, when heated in close vessels, is converted into coke with the escape of volatile liquids and gases. The variety known in Great Britain as blind coal, and in the United States as anthracite, no doubt gives off scarcely any volatile matter; but this is because it has undergone a natural distillation through metamorphism or other cause.

Divisions.—We may, therefore, divide coal into two primary divisions, viz., anthracite, which does not, and bituminous, or soft coal, which does, flame when kindled. Anthracite averages in analysis 85 to 87 per cent. of fixed carbon. The term "anthracite" is applied to all coals containing more than 80 per cent. of fixed carbon. Various synonyms, such as stone coal, glance coal, culm, and Welsh coal, also are used to designate this substance, which in Great Britain is used chiefly for smelting purposes and for raising steam, but in the United States is used also almost entirely for domestic fuel and manufacturing purposes. It is difficult to kindle, but gives out a high heat in burning, and holds fire for a long time. Bituminous coal includes an almost endless number of varieties, one of the best marked being cannel or parrot coal. Cannel coal is so called from burning with a bright flame like a candle, and the name "parrot coal" is given to it in Scotland from the crackling or chattering noise which some kinds of it make when burned. That of different localities varies much in appearance, but it is commonly dull and earthy, or with only a slight luster; some kinds are, however, bright and shining. In texture it is nearly always compact, and certain beds of it admit of being polished in slabs of considerable size, which approach black marble in appearance. Of this material vases, inkstands, boxes, etc., are made. Cannel coal, from its comparative scarcity and high price, is not suitable for house fires, and is for the most part consumed in making gas, of which it yields from 8,000 to 15,000 cubic feet per ton. When distilled at a low red-heat it yields paraffine oil. The other varieties of bituminous coal are so numerous that there are as many as 70 kinds of it imported into London alone. Still, among these there are three leading kinds: (1) Caking coal, which cakes or fuses into one mass in the fire. It breaks into small uneven fragments, and is found largely at Newcastle and some other localities. (2) Splint, or hard coal, occurring plentifully in Scotland, which is hard and has a kind of slaty fracture. It is not very easily kindled, but when lighted makes a clear, lasting fire. (3) Cherry, or soft coal, which breaks easily into small, irregular cubes, has a beautiful, shining luster, is readily kindled, and gives out a cheerful flame and heat. It is common in Staffordshire. Brown coal, or lignite, though inferior to true coal, is, nevertheless, an important fuel in some countries, in default of a better kind.

Origin.—Several theories as to the origin of coal have been put forth from time to time. The one now generally received is that the rank and luxuriant vegetation

Coal

which prevailed during the Carboniferous period grew and decayed upon land raised but slightly above the sea; that by slow subsidence this thick layer of vegetable matter sank below the water and became gradually covered with sand, mud, and other mineral sediment; that then, by some slight upheaval of the sea bottom or other process, a land surface was once more formed and covered with a dense mass of plants, which in course of time decayed, sank, and became overlaid with silt and sand as before. At length thick masses of stratified matter would accumulate, producing great pressure, and this, acting with chemical changes, would gradually mineralize the vegetable layers into coal. Some experiments made by Dr. Lindley a few years ago showed that of a large number of plants kept immersed in water for two years, the ferns, lycopodiums, and pines were those which had the greatest powers of resisting decay, and coal appears to be mainly composed of the substance of the ancient gigantic representatives of these three orders of plants. The interesting fact has also been lately proved by Huxley, Morris, Carruthers, and others, that in many instances the bituminous matter in coal is formed almost wholly of the spore cases and spores of plants allied to our club-mosses and ferns.

Sources of Supply.—Since the prosperity of great national industries, as well as much of our domestic comfort, depends on the continuance of an abundant and cheap supply of fuel, much anxiety has arisen in Great Britain of late years regarding the future supply and price of coal. Of the probable duration of the coal supply very various estimates have been made, ranging from 100 to 1,000 years. Since 1872 a great rise has taken place there in the price of coal. This is due partly to the unusually high rate of miners' wages, and partly to the fact that some of the richest and easily worked English coal mines are becoming exhausted. All the coal now existing was formed untold ages ago, when the conditions of temperature and moisture on the earth's surface were different from those now prevailing. Coal is not a growth annually renewable, but an accumulation which is gradually being spent. This is a truth which scientific men have recognized for some time past; but manufacturers, mine-owners, and merchants have given singularly little attention to the subject under the supposition that the present stock will last for so great a period that there need be no anxiety on the matter. On the continent of Europe productive coal fields occur in Belgium, France, various parts of Northern Germany, Austria-Hungary, Spain, and Russia. By far the largest in area are those of Russia, and

Coal

they are known to contain many valuable beds of coal, though, as yet, comparatively little has been worked. Coal is also found in India, China (where the coal fields are estimated to cover 400,000 square miles), Japan and the Malayan Archipelago, in Australia and New Zealand, and in Africa. Turning to the New World, there is evidence of promising coal deposits in several countries of South America, but owing to the great supply of wood in their forests there is little temptation to work them. In British Columbia, Vancouver's Island, Manitoba, Nova Scotia, New Brunswick, and Newfoundland there are small though valuable coal fields, and in the United States enormous fields of fossil fuel are found.

Coal in the United States.—The entire area of these is about 200,000 square miles, being 38 times greater than the area of the coal fields of Great Britain. But though the coal measures of the States are of vast extent and contain many valuable coal seams—a few of them 40 and even 50 feet thick at certain places—there has been doubt whether the amount of workable coal is as great as has been stated. In proportion to the extent of the seams, the quantity of coal annually mined in the United States is small, compared with the product of Great Britain. The coal areas of the United States are seven in number. They are (1) The Massachusetts and Rhode Island area, approximately 500 square miles; (2) the Allegheny area, about 59,000 square miles; (3) the Michigan area, about 6,700 square miles; (4) the Illinois, Indiana, and Western Kentucky area, about 47,000 square miles; (5) the Iowa, Missouri, Kansas, Arkansas, and Texas area, about 98,000 square miles; (6) and (7) those of the Rocky mountains and of the Pacific Coast, extent not yet well determined. Excluding these last from the calculation, we have a total area of 191,200 square miles underlaid by coal-bearing strata. Of course, however, not more than 120,000 square miles contain workable beds. Of the two generally recognized classes of coal, anthracite and bituminous, the former composes the whole of the coal of the Massachusetts and Rhode Island area, and of a part of the Pennsylvania and Colorado. With slight exceptions, bituminous coal occupies the rest of the districts named. The coal areas are distributed very unequally over the United States. The greatest development of workable coal strata is in the Allegheny mountains and to the W. of them, extending continuously from Pennsylvania and Ohio to Alabama.

Anthracite Areas.—Commercially speaking, the anthracite division may be said to consist of Pennsylvania alone, although a small amount of anthracite coal is mined in Colorado. The original coal beds of New

England have been metamorphosed into graphite and graphitic coal. This area is confined to Eastern Rhode Island, and the counties of Bristol and Plymouth, Mass. The product mined from the beds, which may be more properly called graphite than coal, requires a considerable degree of heat for combustion, and can be used only with other combustible material or under an intense draft or blast. Its principal use is in the direct manufacture of steel; the entire annual output is but a few thousand tons. There are five recognized principal divisions of the Pennsylvania anthracite region: (1) The Southern or Pottsville field, extending from the Lehigh river, at Mauch Chunk, S. E. to within a few miles of the Susquehanna river, directly W. of Harrisburg. (2) The Western Middle or Mahanoy and Shamokin field, extending from the extreme E. headwaters of the Little Schuylkill river to the Susquehanna. These are sometimes grouped together and given the common name of the Schuylkill region. (3) The Eastern Middle or Upper Lehigh field, lying between the Lehigh river and Catawissa creek, and mostly situated in Luzerne county. (4) The Northern or Wyoming and Lackawanna, mostly in Luzerne and Lackawanna counties. (5) The Loyalsock and Mehoopany field is within the area drained by the headwaters of two creeks of that name, 20 or 25 miles N. W. of the W. end of the field last mentioned. The anthracite region of Pennsylvania as a whole, has a maximum length of about 115 miles, a maximum breadth of about 40 miles; area about 1,700 square miles; but the area underlain by workable coal beds is only about 470 square miles.

Bituminous Areas.—The bituminous coal areas of the United States may for convenience be grouped into seven divisions: the Triassic, the Appalachian, the Northern, the Central, the Western, the Rocky Mountain, and the Pacific Ocean areas. The E. Triassic area is composed chiefly of the Richmond basin, in Virginia and the Deep River and the Dan River fields, in North Carolina. No extensive mining operations are now carried on in this area. The Appalachian field is immediately W. of the E. border of the Appalachian range, and extends from New York on the N. to Alabama on the S., its direction being N. E. and S. W.; length, about 900 miles; width, from 30 to 180 miles. There are in this region many varieties of bituminous coal, the best and most productive beds on the whole being those of the Pittsburgh district and of West Virginia. The thickness of the coal measures in different sections varies from 100 to over 3,000 feet. The N. bituminous area is all in Central Michigan. The coal here found is not of superior quality, and is used mostly for local supply.

Of the central area three-fourths are in Illinois, less than one-sixth in Indiana, and about one-twelfth in Western Kentucky. In the W. field the most extensive mining operations have been carried on in Iowa and Missouri; its area is seen from the figures already given to be greater than that of any other one coal field in the United States. The coals are of great variety; the best which has so far been mined is that of the Indian Territory. The Rocky Mountain coal beds have been found in the geological formations from the Carboniferous up to and including the Cretaceous, differing in this respect from those hitherto enumerated, which, with the exception of that in Virginia and North Carolina, are all confined to the Carboniferous. Coal has been mined in California, Oregon, and Washington.

Coal Mining.—The cutting of a path through the harder rocks, as carried on by the ancient miners, was particularly laborious and unhealthy. Miners became subject to disorders of the lungs at an early age. Previous to the introduction of blasting, the implements used were wedges and hammers. Bit by bit pieces of rock were broken away, the operation being assisted by natural fissures in the rock and by the brittleness of the hard material. In this way the ancient miners cut coffin-shaped galleries 5 feet in height. At the present time the galleries or levels are usually 7½ feet high and 5 feet wide, thus affording facilities for traveling and for ventilation. Gunpowder was not applied to mining purposes until the beginning of the 17th century, and it made its way so slowly that it was not largely employed until the 18th century. Of late years rock-drills driven by steam or by compressed air have come largely into use. The bore-hole, when finished, is then charged. The gunpowder is enclosed in a little bag of cloth dipped in pitch and provided with a fuse. The fullest benefit of modern explosives, such as dynamite, gun-cotton and yonite, can be obtained only by the use of strong detonators fired by electricity, by which it is impossible to place a number of bore-holes in such a manner that when fired simultaneously they shall help one another. Blasting powder is still used for removing coal and millions of tons are obtained by its aid. In order to obviate the danger of explosions in fiery collieries, many ingenious substitutes for blasting have been proposed. For example, a hole is bored and wedges inserted to force down the coal which has previously been under-cut with the pick. Another plan of great promise is that devised by Smith and Moore, in which cartridges of caustic lime are employed, water being forced into them by a pump. The pressure of steam generated by the usual

charge of seven cartridges is 2,850 pounds, the cartridges themselves expanding to about five times their original size. The efficiency of these cartridges varies with the nature of the coal, the best results having been obtained in the Derbyshire collieries.

Various machines have been invented with a view of lessening the labor and expense of under cutting coal seams. They work with compressed air or electricity, and have the cutters arranged on the periphery of a rotating disc, or on a traveling pitch chain. The coal, when broken down, is placed in cars and drawn to the bottom of the shaft and raised to the surface. The actual mode of working the coal varies greatly in every district. By the post-and-stall, or board-and-pillar, or (in Scotland) stoop-and-room, method, the first stage of excavation is accomplished with the roof sustained by coal; in the long-wall method the whole of the coal is allowed to settle behind the miners, no sustaining pillars of coal being left. This, when well planned, is the safer, both as regards facility of ventilation and less liability to accidents from falls. At a Durham colliery, working the Harvey seam, $3\frac{1}{2}$ feet in thickness, 5,185 tons of coal were obtained when working by the long-wall system and 5,052 tons when working by the post-and-stall system. In thick and highly inclined beds it is usual to remove the coal by horizontal slices and to fill the excavation with waste material. In some instances blast furnace slag is used for the purpose.

The great depth and size of modern collieries necessitate the raising of vast quantities of coal through a single shaft and the winding engines of modern erection are of extraordinary power. At Harris' Navigation colliery the engines have cylinders with a diameter of 54 inches and are capable of raising six tons of coal, or, with ropes and the cages containing the coal-trucks, a total load of $15\frac{1}{2}$ tons at a speed of 32 feet per second. From 900 to 1,400 tons are often raised from one pit in a day. In collieries both coal and men are raised in the cages, but in the metal mines the man engine is largely used. This consists of a reciprocating rod or pair of rods fitted with steps, by which the miner is raised 8 to 14 feet at a stroke. Though this method obviates the tax on the energies of the men entailed by the climbing of ladders, it is not free from danger. Prussian statistics show that where man engines are employed there are four times as many accidents as where cages and ropes or ladders are used. At the Epinac collieries in France a costly pneumatic system of raising coal and men is employed. An air tight wrought iron tube 5 feet 3 inches in diameter is placed in the shaft and fitted

with a piston cage carrying nine coal cars. The air being exhausted above the piston, a load of three tons of coal is raised at a rate of 95 feet a minute.

Production.—Despite the widespread business depression, the production of coal in the United States in the calendar year 1908 reached the great total of 415,842,698 short tons; spot value, \$532,314,117. Pennsylvania anthracite yielded 83,268,754 short tons; spot value, \$158,178,849; and bituminous and lignite, 332,573,944 short tons; spot value, \$374,135,268. The total output showed a decrease from that of 1907 (480,363,424 short tons; value, \$614,798,898), which was the largest on record. In 1908 coal was mined in 30 States and Territories, Pennsylvania, producing all of the anthracite, and leading in bituminous, with Illinois and West Virginia following. Total production in 1910, about 480,000,000 short tons.

World's Resources.—In view of the enormous consumption of coal in the past 40 years the question as to how long the supply will last has been much discussed. England has not been particularly alarmed by the prediction that the end of her coal resources was almost within sight. The majority of the people have adopted the view that the economists who affirmed that two generations more would practically see the end of her coal beds were unnecessarily pessimistic. England therefore continues with much serenity to sell more coal to the countries which import it than all the rest of the world together. It supplies far more coaling stations than any other country. It is the only land that does an enormous business in the exportation of coal.

The business of selling coal abroad is usually very profitable and one reason why England surpasses all competitors in this business is because she has special facilities for it. Her coal is so near the sea that England is able to ship it less expensively than any other exporting nation. Owing to our more extensive use of coal mining machinery, a great deal of our coal at the pit mouth does not cost so much as British coal when raised to the surface, but by the time we ship our coal on the ocean it usually costs more than British coal.

Another reason why usually, when the price of European coal is not abnormally high, we cannot compete with British exports is because our sea carriage to the continent of Europe, which is by far the greatest importer, is very much longer than that of England.

The most interesting contribution that has been made for a long time to the question of the world's future coal supply is that which Dr. Ferdinand Fischer of Göttingen published. Dr. Fischer collected with much care all the best attainable data as to the coal resources of the entire world.

Coal

Such work as this can be regarded only as a striving to reach conclusions that are worthy of consideration for the time being and as satisfactory as the present condition of our knowledge will permit. They are likely to be very much modified when we have more light on the question, just as the prognostications 30 years ago with regard to the world's coal resources needed amending when we came to understand China's ability to contribute to the supplies.

Briefly summing up the estimates which Dr. Fischer based on his studies, he concludes that the attainable coal supply of Germany amounts, in round numbers, to 160,000,000,000 tons; that of Great Britain to 81,500,000,000 tons; that of Austria-Hungary, Belgium, and France together to 17,000,000,000 tons. The coal deposits of Russia are still so little known that Dr. Fischer does not attempt to estimate the attainable output, though he says that the resources are undoubtedly enormous, particularly in the S. regions from the government of Poltava E. into the land of the Don Cossacks.

He estimates that the coal resources of the whole of America are at least 684,000,000,000 tons. All our later information with regard to China has tended to confirm the conclusions reached by Von Richthofen as to the enormous wealth in coal of that empire. There is as yet no reason to believe that this very careful scientific traveler overshot the mark when he estimated (his figures are reproduced by Dr. Fischer) the coal provision of the 18 provinces at 630,000,000,000 tons of anthracite and an equal quantity of bituminous coal.

It is a curious commentary on that really civilized land which, as far as we know, is richer in coal than any other country in the world, that almost none of it is yet available for steam power. It is largely used by the Chinese, but mainly in the regions where it is mined. The land routes are so miserably poor that it does not pay to haul coal more than 25 miles. Unless a mine is within this distance of water carriage the area of the distribution of the output is confined to the immediate neighborhood. steamships at Shanghai are today filling their bunkers with coal brought from Europe, because it is cheaper than coal brought from Chinese mines in the interior.

The United States now far surpasses all other nations in the employment of machinery in coal mining. The cheaper and more rapid methods of machine mining have undoubtedly been a factor in the influences that have made us the first among the coal producing States. The quantity of our machine mined coal increased from 6,200,000 tons in 1891 to 43,963,000 tons in 1899. Dr. Fischer advises the Germans to give more attention to mining of coal by machinery.

Coal Gas

In his opinion, Germany has a coal supply that will meet the needs of the country for about 1,000 years to come. Dr. Fischer also reaches the conclusion, based on the latest and most accurate information, that probably within the next 50 years Great Britain will exhaust her coal resources, at the present rate of consumption; that is to say, she cannot go on supplying the larger part of the world's export coal without reaching the end of her tether as far as home coal is concerned long before her industrial competitors have exhausted their home supplies. Dr. Fischer entertains the view that when England becomes a coal-importing nation she will lose much of her importance as an industrial State and will cease to be the leading world power.

Japan has large coal resources, particularly in the S. province of Kiushiu. Borneo is rich in coal formations, as also is New South Wales—a fact that is enabling Sydney to forge ahead of the other Australian cities in industrial development. Africa and South America are poorer in coal than any of the other continents, but the development of coal mines in South Africa bids fair to supply the industrial needs of the country.

History.—The use of coal does not seem to have been known to the ancients, nor is it known at what time it began to be used for fuel. Some say that it was used by the ancient Britons, and at all events it was to some extent an article of household consumption during the Anglo-Saxon period as early as A. D. 852. There is reason for thinking that England was the first European country in which coal was used to a considerable extent. About the end of the 13th century it began to be used in London, but was first only in the arts and manufactures, and the innovation was complained of as injurious to health. In 1316 Parliament petitioned the king, Edward II., to prohibit the use of coal and a proclamation was accordingly issued against it; but owing to a high price of wood its use soon became general in London. It was for a long time known there as sea-coal, because imported by sea.

Coal Gas, a mixture of gases produced by the destructive distillation of coal at regulated temperatures. It is used in lighting streets, houses, etc., and for cooking and heating purposes. Coal gas is colorless and has a disagreeable smell. It is purified from H_2S by ferric hydrate, which is moistened with $FeSO_4$ and H_2SO_4 to remove ammonia. The carbon disulphide can be removed by passing it through an iron tube filled with iron turnings and heated to redness. Coal gas consists of a mixture of hydrogen, 40 to 50 per cent., carbon-monoxide about 5 per cent., marsh gas (CH_4) about 40 per cent., which contribute nothing to the illuminating power of the

Coaling Stations

gas; it depends upon the presence of heavy hydro-carbons, principally C_2H_4 ethene, ordinary gas containing about 4 per cent., and cannel gas about 8 per cent. Coal gas also contains small quantities of acetylene, butylene, etc., and aromatic hydro-carbons, as benzine, etc. The percentage of nitrogen is very variable. When gas is burnt a large quantity of water is formed, hence, if a gas stove is used to dry a room there must be sufficient ventilation to carry off the aqueous vapor. The sulphur in coal gas is converted into sulphuric acid when burnt, which greatly damages books, furniture, etc. The escape of coal gas from pipes into the soil is very injurious to the roots of trees and shrubs. The admixture of a very small quantity of air greatly impairs the illuminating power of coal gas. Three causes are capable of decreasing the luminosity of flames, viz.: (1) withdrawal of heat; (2) dilution; and (3) oxidation of luminous material.

Poisoning by coal gas is known only as an accident. Occasionally sudden fatal consequences ensue among workmen from exposure to a sudden rush of undiluted gas from gasometers and mains. More commonly, slowly fatal cases result from the gas-tap in a bedroom being left open carelessly, from accidental extinction of the light, from blowing the gas out, or from leakage of the pipes in a house, or at a distance, the gas gaining entrance to the house in the latter case through cellars, walls, and more especially by means of drains and sewer-pipes. Symptoms: In small proportions it acts deleteriously if it is long breathed, and gives rise to headache and general depression of health. In severe cases headache, nausea, and vomiting, vertigo, loss of consciousness, passing into deep coma and muscular prostration, resembling apoplexy. Death usually occurs quietly. Treatment: Instant removal from the vitiated atmosphere, artificial respiration, and inhalation of pure oxygen, and, lastly, transfusion of blood may be tried.

Coaling Stations, depots established by maritime governments at various important points throughout the world, where the ships of the navy may obtain supplies of coal. The utility of such stations, when properly fortified, as points of refuge, defense, and repair for warships in the event of war can hardly be over-estimated. The more important of British stations are Aden, at Trincomalee (Ceylon), Singapore, Hong Kong, Sierra Leone, St. Helena, Mauritius, Jamaica, and Simon's Town (Cape Colony). During 1898-1900 the United States established coaling stations for its navy at San Juan, Porto Rico; Pearl Harbor, Hawaii, Pago Pago, Samoa; Cavite, near Manila; at the chief port of Guam, Ladrone Islands;

Coal Plants

and at convenient points in Cuba; and coal "piles" at La Paz, Mexico, and at several points in Alaska. Some of the British coaling stations supply both naval and mercantile vessels.

Coalition, in British politics, the name applied to the union of two parties, or, as generally happens, portions of parties who agree to sink their differences and act in common. Pitt the elder, when he took office in 1757, coalesced with the Whig aristocracy represented by the Duke of Newcastle. The ministry always spoken of, however, as the Great Coalition was formed in 1782, when Fox, the leader of the reformers, took office along with Lord North, the leader of the opposite party. When Lord Derby's ministry resigned in 1853, there was a short coalition between the Whig party under Lord John Russell, and the more moderate of the Conservative party under Lord Aberdeen. The arrangement made between Conservatives and Liberal Unionists in 1886 can scarcely be called a coalition, inasmuch as the main responsibility of government rested on the former, while the latter gave them a general support. In the United States the word "fusion" came to be applied in the same sense in the Presidential election of 1896. The term is also used of alliances between separate States.

Coal Oil, a name sometimes given to PETROLEUM (*q. v.*).

Coal Plants, plants, the remains of which are found in the strata of the coal-formation, and from the stems, leaves, roots, etc., of which coal itself has been produced. Brongniart has figured upward of 300 species. They are often in a state of high preservation, exhibiting the most delicate nervures of the leaves, and cortical markings of the stems. Of the most common coal plant remains, *stigmara* was conjectured by Professor Brongniart and Sir William Logan to have a relation to *sigillaria*, and Mr. Binney proved it to be the roots of that plant by finding the two in actual continuity. Richard Brown, of Nova Scotia, also saw a probable *sigillaria* with *stigmara* roots. What *sigillaria* itself is has been a matter of dispute. Brongniart, Göppert, and Unger consider it as probably a cycad. Principal Dawson, of Montreal, thinks that this may be its affinity, or that it may be a connecting link between the *gymnosperms* and the higher *acrogens*. William Carruthers, F. R. S., of the British Museum, on the contrary, considers it one of the *lycopodiaceæ*, and consequently an *acrogen*. He places *calamites* under the *equisetaceæ*, and thinks that *asterophyllites*, *annularia*, and *sphenophyllum* are the leaves of three species. Akin to it is the genus *volkmannia*. It is generally agreed

that *lepidodendron* should be placed under the *lycopodiaceæ*. Among the plants of undisputed affinity are ferns of various genera: *Sphenopteris*, *pecopteris*, *neuropteris*, *cyclopteris*, etc., but with the fructification as a rule destroyed. There are also genuine *conifers* in the coal measures, which probably grew upon the hills, while the plants previously described had their habitat on the plains.

Coal Tar, tar produced in the destructive distillation of bituminous coal. It is a thick, sticky, dark-colored substance, and is used in the manufacture of printer's ink, for asphalt pavements, coating ships, etc. The composition of coal tar varies according to the temperature at which the coal is distilled, the higher the temperature the larger being the yield of solid bodies. Coal tar when distilled first gives off gas, then water containing ammoniacal salts, then a brown light oil which, when purified, is called coal-naphtha; at higher temperatures a yellow, heavy, fœtid oil called dead-oil, or creasote oil, then naphthalene; afterward the black residue in the retort solidifies on cooling and forms pitch, which is used to form asphalt, and a black varnish to protect iron from rust. If the distillation is continued the pitch yields a yellow substance like butter, containing anthracene, phenanthrene, fluorene; afterward, at red heat, a bright orange powder, consisting chiefly of pyrene $C_{16}H_{10}$ and chrysene $C_{18}H_{12}$; the residue forms a hard, porous coke. Coal tar colors are dyes prepared from aniline, naphthalene, phenol, and other compounds contained in coal tar.

Coanza, a river of West Africa, in the Portuguese colony of Angola, flows generally N. W., and enters the Atlantic about 30 miles S. of St. Paul de Loando, by a mouth over a mile broad. It is navigable for light vessels as far as the Cambambe cataracts, over 120 miles, and is regularly traversed as far as Dindo, a few miles below, by the trading vessels of a steamship company established by the Portuguese, who have many settlements on the banks.

Coan, Titus (kō'an), an American missionary; born in Killingworth, Conn., Feb. 1, 1801. After spending several months (1833-1834) on a dangerous exploring expedition in Patagonia, he went to the Sandwich Islands (1835), occupying the Hilo station 47 years, and in that time converting 14,000 natives. He wrote: "Adventures in Patagonia" (1880); "Life in Hawaii" (1881). He died at Hilo, Hawaii, Dec. 1, 1882.

Coan, Titus Munson, an American physician and critic; son of Titus Coan; born in Hilo, Hawaii, Sept. 27, 1836. He now resides in New York. He has written

"An Ounce of Prevention"; "Topics of the Time" (edited).

Coast and Geodetic Survey, United States, a branch of the Treasury Department charged with the survey of the Atlantic, Gulf, and Pacific coasts of the United States, including the coast of Alaska; the survey of rivers to the head of tide-water or ship navigation; deep-sea soundings, temperature and current observations along the said coasts and throughout the Gulf Stream and Japan Stream flowing off from them; magnetic observations and gravity research; determinations of heights by geodetic leveling, and of geographical positions by lines of transcontinental triangulation, which with other connecting triangulations and observations for latitude, longitude, and azimuth, furnish points of reference for State surveys and connect the work on the Atlantic coast with that on the Pacific. Results of the survey are published in the form of annual reports, which include professional papers of value; bulletins which give information deemed important for immediate publication; notices to mariners, issued monthly; tide tables, issued annually; charts upon various scales, including harbor charts, general charts of the coast, and sailing charts; chart catalogues and "Coast Pilots."

Coast Defense, primarily a system of fortifications, with auxiliary mines and torpedoes, to protect a country from hostile attack or occupation on its coast lines. The work of providing a proper armament for the exposed harbors of the United States has been progressing as rapidly as the Congressional appropriations would permit. Since the outbreak of the war with Spain, Congress has been more liberal with its provisions for pushing this work. According to the annual report of the United States Board of Ordnance and Fortification for 1895, at the rate of progress then being made it would require 50 years of work to place the great stretch of sea-coast in proper condition for defense. The Board recommended an appropriation of \$2,000,000 for engineer work in the construction of implements, fortifications, and necessary work, and one of \$5,000,000 for the construction of guns, mortars, gun-carriages, sea-coast armament, and ammunition. Concerning future advancement, the Board recommended that it be along the following lines: the development of smokeless powders; the development of a high explosive that can be safely discharged in a shell at a high velocity with certainty of detonation; the selection of armor-plate for sea forts; the development of rapid-fire field and sea-coast guns; and the development of an efficient system of fire control for harbor defenses. Recent reports show that satisfactory progress has been made in all these lines except

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that the use of armor-plates in forts has been abandoned for the more satisfactory earth and concrete emplacements. The bill making appropriations for the construction of fortifications and coast defenses in the year ending June 30, 1900, carried a total of \$4,744,798. The Department submitted estimates for works to cost \$12,151,898. In the 11 years from 1889 to 1899, inclusive, Congress appropriated for these purposes \$48,761,747. The bill for the year 1898-1899 carried \$9,377,494, and the further sum of \$8,674,898 was provided in deficiency acts. In addition, \$12,865,841 was allotted for the same object out of the \$50,000,000 appropriation for the National defense, making a total of \$30,988,233 made available for fortifications and the armament thereof at that critical period.

The total appropriations made for fortifications and other works of defense since 1888, in accordance with the recommendations of the "Endicott Board" of 1885, amounted in 1899 to \$70,302,462. The scheme of sea-coast fortifications contemplated by the Endicott Board, it was then estimated, would cost \$112,197,267, of which sum there had been already provided \$42,982,212. The appropriation for fortifications in 1902-1903 was \$7,298,955; in 1903-1904, \$7,188,416.22; in 1904-1905, \$7,518,192. In April, 1900, the Secretary of War issued a general order to the army announcing the names of 56 new batteries that had been recently constructed and the sites for works yet to be constructed along the sea-coast. The report of the Board of Ordnance and Fortification for 1903-1904 recommended that attention be directed chiefly toward increase in the effectiveness of the present armament rather than the installation of new. See also FORTIFICATION.

E. L. ZALINSKI.

Coates, Florence Earle (Mrs. Edward H.), an American poet; born in Philadelphia, Pa. She has made many contributions to various magazines. Among her uncollected poems are: "Conscience"; "Song"; "To France—1894"; "Combatants"; "Survival."

Coati or Coati-Mondi, a Central and South American plantigrade carnivorous mammal, of the genus *Nasua*, belonging to the *Ursidae* or bears, but recalling rather the raccoon or civet, and having a long proboscis or snout. It feeds on worms, insects, and the smaller quadrupeds, but chiefly on eggs and young birds. *Nasua narica* is found in Mexico and Central America, and *N. rufa* generally throughout South America.

Coat of Arms. See HERALDRY.

Coat of Mail, a piece of armor in the form of a shirt, consisting of a net-work of iron or steel rings, or of small laminæ or

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plates, usually of tempered iron, laid over each other like the scales of a fish, and fastened to a strong linen or leather jacket.

Coatzacoalco (kwäts-ä-kwäl'kō), a river of the isthmus of Tehuantepec in Mexico, rises in the Sierra Madre, and falls into the Gulf of Mexico, 130 miles S. E. of Vera Cruz. It is navigable for large vessels for 30 miles, and is interesting as part of a route which has been surveyed for an inter-oceanic canal.

Cobalt, a metallic element, at. wt. 59, symbol Co. The metal was first obtained in an impure state by Brandt in 1733. It occurs as speiss cobalt, or tin-white cobalt CoAs_2 , and cobalt-glance, CoAsS . Cobalt occurs in meteoric iron. The ore is first roasted to expel the arsenic, then dissolved in aqua regia, the excess of acid evaporated off; H_2S is then passed through the solution to precipitate copper, bismuth, and the remainder of the arsenic; the filtered liquid is boiled to expel the excess of H_2S , boiled with HNO_3 to convert the iron into a ferric salt; it is then supersaturated with ammonia, which precipitates the iron as $\text{Fe}_2(\text{HO})_6$, and the cobalt and nickel remain in solution. Cobalt can be separated from nickel by Rose's process. The solution of the mixed oxides is dissolved in HCl ; the solution is diluted with much water, and supersaturated with chlorine gas, which converts the cobaltous chloride CoCl_2 into cobaltic chloride Co_2Cl_6 , while the nickel is unaltered; excess of barium carbonate BaCO_3 is then added, and left to stand for 18 hours, when the cobaltic oxide is precipitated; the nickel remains in solution. The precipitate is dissolved in boiling HCl , and Na_2SO_4 is added to precipitate the barium as BaSO_4 , and the cobalt is then precipitated as $\text{Co}(\text{HO})_2$ by caustic soda. The metal is obtained by heating cobaltous oxalate in a covered crucible.

Metallic cobalt is a hard, magnetic, ductile, reddish-gray metal, with a high melting point. Its sp. gr. is 8.9. It is not easily oxidized by the air, when pure. It is dissolved by dilute HCl or H_2SO_4 with evolution of hydrogen. Cobalt forms two oxides: Cobaltous oxide CoO and Cobaltic oxide Co_2O_3 (*q. v.*). The alloys of cobalt are unimportant. Zaffre is an impure oxide of cobalt prepared by roasting cobalt ores with twice their weight of sand. Smalt is prepared by fusing partially roasted cobalt ores with a mixture of powdered quartz and potassium carbonate; while hot it is poured into water and then ground to a fine powder; it is used as a pigment; this color was known to the ancients. The cobaltous salts are the most stable in which cobalt acts as a dyad element. Cobalt compounds give a blue color to a borax bead.

Cobalt

There is no native cobalt known, but many ores of the metal. Arsenate or Arseniate of Cobalt = Erythrite; Arsenical Cobalt = Smaltite; Black Cobalt = Asbolite; Bright-white Cobalt = Cobalt-glance; Carbonate of Cobalt = Remingtonite; Earthy Cobalt = Asbolite; Gray Cobalt = Smaltite; Red Cobalt = Erythrite; Sulphate of Cobalt = Bieberite; Sulphuret of Cobalt = Syepoorite, Linnæite; White Cobalt = Smaltite; Cobalt and Lead Selenite = Tilkerodite.

Ammonia cobaltous salts are formed by the union of cobaltous salts with ammonia in excess, the air being excluded, as, $\text{CoCl}_2 \cdot 6\text{NH}_3$, rose-colored crystals. They are formed when an ammoniacal solution of cobalt is exposed to the air, as — Tetrammonio-cobaltic salts, as $\text{Co}_2\text{Cl}_6 \cdot 4\text{NH}_3$. Hexammonio-cobaltic salts, as $\text{Co}_2\text{Cl}_6 \cdot 6\text{NH}_3$. Oxyoctammonio-cobaltic (fusco-cobaltic) salts, as $\text{Co}_2\text{OCl}_4 \cdot 8\text{NH}_3$. Decammonio-cobaltic (roseo- and purpureo-cobaltic) salts, as $\text{Co}_2\text{Cl}_6 \cdot 10\text{NH}_3$. Dinitrodecammonio-cobaltic (xantho-cobaltic) salts, $\text{Co}_2(\text{NO}_2)_3\text{Cl}_4 \cdot 10\text{NH}_3$. Dodecammonio-cobaltic (luteo-cobaltic) salts, $\text{Co}_2\text{Cl}_6 \cdot 12\text{NH}_3$.

Cobalt, a town of Ontario, Canada; situated in the township of Coleman, Nipissing District, 330 miles by rail N. of Toronto, on Cobalt Lake and on the Temiscaming and Northern Ontario railway, a line built, owned, and operated by the Ontario government. In 1907 the Canadian Pacific railway was projecting a branch line between Cobalt and Sudbury, the center of a famous copper and nickel mining district. The Grand Trunk railway in 1907 was also projecting an extension from North Bay to Cobalt. North Bay is the junction for Cobalt on the Grand Trunk system, and through it direct connection is made with Buffalo, Detroit, and Chicago. The town is of very recent origin, having first been settled in 1904, and the houses are mostly of wood. Cobalt square is the chief business quarter, and there are also Prospect avenue, Silver street, Government road, and Nickel street. The Imperial Bank and Canadian Bank of Commerce have branches here. Cobalt has an opera house, three churches, a hospital under the supervision of the Grey Nuns, a newspaper, the "Cobalt Mining Journal," and a mining exchange. Saloons are prohibited. The surrounding district is rich in silver, cobalt, arsenic, and rickel. The silver-bearing area, so far as known in 1907, is comprised in a portion of Coleman township about 6 miles from N. to S. and 3 from E. to W. A similar assemblage of rocks extends for 75 miles N. to S., but as the strata outside the immediate vicinity of the town are more disturbed, scientific authorities do not predict the discovery of equally valuable ores throughout their whole extent. The mineral deposits at Cobalt contain not only silver, which is by far the most valuable

Cobb

portion, but also cobalt, nickel, and arsenic, valuable in the order named. Shipments of ore have been made averaging \$780 to the ton, but some have been as high as from \$1,000 to \$2,000 to the ton. The production increased very rapidly. In 1904, according to the Dominion government returns, the total output was 158 tons; in 1905, 2,144 tons; in 1906, 5,129 tons; and during the first four months of 1907, 4,120 tons. There were in 1907 nineteen shipping mines. Immediately S. of Cobalt a large timber limit, in which similar very rich deposits have been found, has been retained for development by the Ontario government. Pop., local est. (1907) 3,000 resident and 1,000 transient.

Cobb, Howell, an American statesman; born in Cherry Hill, Ga., Sept. 7, 1815. He was graduated at Franklin College in 1834, became a lawyer in 1836, and in 1843 was elected to Congress as a Democrat. He served eight years and was Speaker of the House one term; was elected governor of Georgia in 1851, returned to Congress in 1855, and was made secretary of the treasury by President Buchanan in 1857, resigning in 1860 to urge secession. He held a Confederate military commission in the Civil War, but saw little service. He died in New York city, Oct. 9, 1868.

Cobb, Joseph Beckham, an American author; born in Oglethorpe county, Ga., April 11, 1819. He studied at the University of Georgia, and in 1838 removed to Noxubee county, Miss., and engaged in literary pursuits, also taking some active part in political affairs. He published: "The Creole, or the Siege of New Orleans" (1850); "Mississippi Scenes" (1850); and "Leisure Labors" (1858). He died in Columbus, Ga., Sept. 15, 1858.

Cobb, Sylvanus, an American novelist; born in Waterville, Me., June 5, 1823; was editor and publisher of a periodical called the "Rehabite." Besides contributing to other publications, he was a most prolific story-writer. His most popular novels are: "The King's Talisman" (1851); "The Patriot Cruiser" (1859); and "Ben Hamed" (1864). He died in Hyde Park, Mass., July 20, 1887.

Cobb, Thomas Reed Root, an American lawyer, soldier, and author; born in Cherry Hill, Ga., April 10, 1823. He was graduated at the University of Georgia in 1841, was admitted to the bar, and was reporter of the Supreme Court of the State from 1849 to 1857, when he resigned to resume the practice of his profession. In 1860 he was a member of the State secession convention, and in the following year he was elected to the Confederate Congress, where for a time he served as chairman of the Committee on Military Affairs. Enter-

ing the Confederate army in August, 1861, as colonel, and promoted brigadier-general in the following November, he commanded Cobb's Georgia Legion at the battle of Fredericksburg. From 1858 to 1862 he was a trustee of the University of Georgia. The Lucy Cobb Institute, at Athens, Ga., named for his daughter, was founded by him. He published: "Digest of the Laws of Georgia" (1851); "Inquiry into the Law of Negro Slavery in the United States" (1858); and "Historical Sketch of Slavery, from the Earliest Periods" (1859). He was killed at Fredericksburg, Va., Dec. 13, 1862.

Cobbe, Frances Power, an English author and philanthropist; born in Dublin, Dec. 4, 1822. Her early religious training was conducted under evangelical influences, but she possessed the capacities of original thought and study, and through a wide acquaintance with ethnic faiths, as well as with Christian history, she reached the ground of what may be called humanitarian theism. She assisted Mary Carpenter (*q. v.*) in her educational and reformatory work for girls, advocated the civil and political rights of women, and strongly opposed vivisection. Some of her writings are descriptions of her travels in various countries, the others treating mainly of theological and religious, ethical, and humanitarian questions. She also edited the works of Theodore Parker (*q. v.*), of whose teachings she was a faithful interpreter. Her own published works include: "Intuitive Morals" (1855); "Pursuits of Women" (1863); "Broken Lights" (1864); "Darwinism in Morals" (1872); "Hopes of the Human Race" (1874); "Duties of Women" (1880); "The Peak in Darien" (1882); "The Scientific Spirit of the Age" (1888); "The Modern Rack: Papers on Vivisection" (1889); and an "Autobiography" (1894). She died in London, April 5, 1904.

Cobbett, William, an English essayist and political writer; born in Farnham, March 9, 1762. The son of a farmer, he made his way, in 1783, to London, where he became a copying clerk. Finding this irksome work, he enlisted in the army, served in Nova Scotia, and was discharged, at his own request, in 1791. After a brief stay in France he came to the United States (1792) and occupied himself with teaching and writing. Powerful, though coarse and bitter, articles under his pen-name, "Peter Porcupine," brought about actions for libel, which compelled him in 1800 to leave this country. Returning to England, he established, in 1802, his famous "Weekly Political Register," issued up to the time of his death. Because of his unbridled criticism of government and individuals, he was forced to leave England in 1817, and again sought American shores. After two years,

during which he farmed on Long Island, Cobbett returned to his native land, bearing with him the body of Thomas Paine, which had been exhumed under his direction. Besides the "Works of Peter Porcupine" (1794-1800), and innumerable pamphlets, his most important books include: "Parliamentary History" (compiled 1806-20); "Grammar of the English Language" (1819); "Cottage Economy" (1822); "Advice to Young Men and Women" (1829); and "Rural Rides" (1830). He died near Farnham, June 18, 1835.

Cobden, Richard, an English politician, the "Apostle of Free Trade," born in Sussex, June 3, 1804. After receiving a meager education he was taken as an apprentice into a warehouse in London belonging to his uncle, and in this situation he rapidly made up for the defects of his education by his own diligence. In 1830, being left by the failure of his uncle to his own resources, along with some relatives he started a cotton manufactory in Manchester, which in a few years was very successful. His first political writing was a pamphlet on England, Ireland, and America, which was followed by another on Russia. In both of these he gave clear utterance to the political views to which he continued through his life rigidly to adhere, advocating non-intervention in the disputes of other nations, and maintaining it to be the only proper object of the foreign policy of England to increase and strengthen her connections with foreign countries in the way of trade and peaceful intercourse. Having joined the Anti-Corn-Law League, formed in 1838, it was chiefly the extraordinary activity of Cobden, together with Bright and other zealous fellow-workers, which won victory for the movement.

In 1841 Cobden entered Parliament as member for Stockport, and after several years of unwearied efforts at last induced Sir Robert Peel, then prime minister, to bring in a bill for the repeal of the corn laws, a measure which became law in 1846. Next year he was chosen member for the West Riding of York, a constituency which he represented for 10 years. His business, once highly prosperous, had suffered while he devoted himself to the agitation, and as a compensation for the loss he had thus sustained a national subscription was made, and a sum of about \$350,000 presented to him. Cobden continued his labors as an advocate of parliamentary reform, economy and retrenchment, and a policy of non-intervention, in all of which he found a firm and ready ally in Bright, both being strong opponents of the Crimean War. In 1859 he was chosen member for Rochdale, and was offered, for the second time, a place in the government, but again preferred to keep his independent position. He refused also a

baronetcy and several other dignities. His last great work was the commercial treaty which he was the means of bringing about between Great Britain and France in 1860. During his later years he lived a good deal in retirement. He died in London, April 2, 1865.

Cobden Club, an association formed about a year after the death of Mr. Cobden, mainly by the influence of John Bright and Thomas B. Potter, for the purpose of encouraging the growth and diffusion of those economical and political principles with which Mr. Cobden's name is associated. The Cobden Club has distributed a vast number of books and pamphlets.

Cobham, Lord. See OLDCASTLE.

Cobijai (kō-bē'), or **Puerto La Mar**, a seaport formerly belonging to Bolivia, now in the territory of Antofagasta, Chile.

Coble, or **Cobble**, a low flat-floored boat with a square stern, used in salmon-fishery.

Coblentz (anciently *Confluentes*, from its situation at the confluence of the Rhine and Moselle), a fortified town of Germany, capital of Rhenish Prussia, finely situated on the left bank of the Rhine in the angle between it and the Moselle, and connected by a pontoon-bridge over the Rhine with the fortress of Ehrenbreitstein, this, along with its other fortifications, rendering it one of the strongest places in Germany, and capable of accommodating 100,000 men. The new part of the town is well built, with broad streets and fine squares. The palace of the Elector of Treves is now a Prussian royal residence. Its industries embrace cigars, machinery, champagne wines, pianos, and it has an important trade in Rhine and Moselle wines. Pop. (1905) 53,897.

Cobourg, a town, port of entry, and county-seat of Northumberland Co., Ontario, Canada; on Lake Ontario, and the Grand Trunk railroad; 69 miles N. E. of Toronto. It is the seat of a Wesleyan university, and has several woolen mills, car factory, foundries, newspapers, banks, and schools. Pop. (1901) 4,239.

Cobra de Capello, that is, "serpent with a hood"; the Portuguese name of an East Indian serpent, the *Naja tripudians*, and of an African serpent of same genus, the *Naja haje*, or asp, both reptiles of the most venomous nature. The former inhabits India and Southeastern Asia, Java, etc. The species of the viper kind are all remarkable for the manner in which they spread out or distend the sides of the neck and head when disturbed or irritated. In the cobra de capello the conformation necessary to this action is found in the most perfect condition, as the animal is provided with a set of ribs or bony processes, moved by appro-

priate muscles on the sides of the neck, which when expanded give the anterior part of the body the appearance of an overhanging arch or hood, on the middle of which, posterior to the eyes, is a greenish-yellow mark, resembling the rim of a pair of spectacles. From this mark we have the name "spectacled snake." When disturbed by the approach of an individual or otherwise, the cobra raises the anterior part of its body, so as to appear to stand erect, expands its hood, and is prepared to inflict a deadly wound. So exceedingly poisonous is its bite that in numerous instances which are well authenticated death has followed within a few minutes; under ordinary circumstances, a few hours is the longest term that intervenes from the infliction of the bite till the death of the sufferer, where prompt measures for his relief have not been resorted to. In case a bite is received, the first thing to be done is to make a firm and well-sustained pressure above the wound on the side nearest the heart. The effects of pressure, combined with the withdrawal of the poison, will be obtained by applying a well-exhausted cupping glass over the wound. It is also said that volatile alkali or spirits of hartshorn repeatedly applied to the wound, and taken internally in doses of 30 or 40 drops, repeated according to circumstances, may avert the injurious consequences of the poison. To minister to the curiosity of the multitude, the jugglers of India select these venomous reptiles for their exhibitions, and having extracted their fangs keep them in cages or baskets to exhibit as dancing snakes. When the cage is opened, the juggler begins playing upon a pipe or other instrument; whereupon the cobra assumes the erect attitude, distends its hood, and remains balancing itself in this position until the music is suspended. It is, however, most probable that this snake in common with lizards and other animals, is peculiarly affected by musical sounds. With the exception of the spectacle mark on the back of the neck and its distensible hood, the cobra is not especially distinguished as regards coloration or forms. See Pl. II. at REPTILIA, fig. 18.

Coburg, a thin fabric of worsted and cotton, or worsted and silk, twilled on one side, for ladies' dresses, intended as a substitute for merino.

Coburg, the name of a family in Germany, dating from the 5th century, noted for intermarriages with royal houses, especially during the 19th century. A sister of Duke Ernest I. became Duchess of Kent and mother of Queen Victoria; the duke's brother Leopold became King of the Belgians, and married in suc-

cession daughters of George IV. of England and of Louis Philippe; one of his nephews, Ferdinand, married the Queen of Portugal, and was regent of that kingdom, 1853; another, August, married a daughter of Louis Philippe; one of his sons, Duke Ernest II., declined the crown of Greece, 1863, and another, Prince Albert, was the husband of his cousin, Queen Victoria of England.

Coburg, or Koburg, a town of Germany, capital of the duchy of Saxe-Coburg-Gotha; on the left bank of the Itz; 106 miles E. by N. of Frankfort-on-the-Main. Among the principal buildings is the Ehrenburg Palace, one of the town residences of the Duke of Saxe-Coburg-Gotha, formerly a monastery of the Recollets, but converted into a ducal residence in 1549. It contains some interesting pictures, tapestry, etc. Some of the old doors exhibit beautiful specimens of marquetry or inlaid work. There are one or two other palaces, and various monuments, including a statue of Prince Albert, consort of Queen Victoria. The chief church is the Moritzkirche, a spacious building in the late Gothic style, with a tower 334 feet high. The government house is a handsome structure in the Italian style; and there are a town hall, arsenal, containing a public library, theater, etc. The educational institutions comprise a gymnasium (founded in 1605), real school, normal school, etc. On an eminence overhanging the town is the ancient castle or fortress, from which extensive views are obtained. It is now converted into a museum, with extensive collections of various kinds, including relics and writings of Luther, who resided here for three months in 1530 and wrote some of his works. This castle was occupied by the Swedes in 1632, and was unsuccessfully besieged by Wallenstein during the Thirty Years' War. Coburg has manufactures of porcelain and ceramic wares, carriages, furniture, etc.; it has also malt works, breweries, etc. Pop. (1905) 22,488.

Coca, the dried leaf of *Erythroxylon Coca*, a shrub, 4-8 feet high, growing wild in Peru, and cultivated there on the Andes, between 2,000 and 5,000 feet high. It constitutes a stimulant which tends to enslave those who use it to a greater extent, it is said, than opium in China or strong liquor here. It is used chiefly by the Peruvian miners, who chew its leaves mixed with the ashes of *Chenopodium quinoa*. It is said to give them great power of enduring fatigue on a scanty supply of food; 30,000,000 pounds of the dried leaves are consumed annually. The leaves contain an alkaloid cocaine, a variety of tannic acid, and a waxy substance called cocawax $C_{33}H_{66}O_2$, which melts at 70° . The official preparations in the United States are fluid extract coca, and wine of *Coca mariani*.

Cocaine, an alkaloid obtained from the leaves of coca. A new and most important discovery to the medical profession was made in 1884, through pure accident, by a German student who had occasion to experiment with hydrochlorate of Cocaine. Getting some by accident in his eye, he was amazed to find that it caused the surface to become insensible to all feeling. The new anæsthetic was at once tried by a prominent oculist, who had occasion to perform an operation for the removal of cataract from a woman's eye, and with the greatest success. Her eyelids were held wide open, and four drops of the liquid were cautiously dropped upon the surface of the eye. It produced a slight anæsthetic effect upon the external coating. After an interval of five minutes four drops more were applied, which caused the insensible condition to extend deeper, and after waiting another five minutes five drops more were used. After the last application had done its work the sensation of the eyes was tested, and they were found to be so entirely anæsthetized that the very severe and otherwise painful operation was performed without the slightest pain to the patient.

The alkaloid occurs in the form of colorless, transparent prisms, without odor, and bitter. The peculiar virtues of coca in certain contingencies have long been known, not only to the medical profession, but to the Peruvian natives, who are enabled to support prolonged fatigue by simply chewing the leaves. The remedy has already been widely employed by ophthalmic surgeons, with brilliant results. Nor has its use been confined to the eye. When applied locally to the interior of the larynx, to the ear (in severe neuralgia), and to other delicate membranes, its effect is the same; pain and irritability are relieved, and the surgeon is enabled to accomplish his purpose without causing any suffering in cases where general anæsthesia is not desirable.

Four or five drops of a four per cent. solution are instilled into the eye at short intervals 20 minutes before operation. The effect is experienced within five minutes after its introduction, and lasts for half an hour. The principal drawbacks to its frequent use are its expense and the difficulty of obtaining pure preparations. An anæsthetic that will render a particular part of the human body without sensation, and avoid the necessity of using chloroform or ether, had long been sought, and this new discovery was hailed by the medical fraternity everywhere as one of the greatest medical events of modern times.

Cocco, Coco Root, or Eddoes, plants of the genus *Colocasia*, and of the nearly allied genus *Caladium*, of the order *Araceæ*, widely cultivated in tropical and subtropical countries for their edible starchy root-

Coccolith

stocks, of which the food value broadly corresponds to the potato. These are deprived by roasting or boiling of the characteristic acidity of the order, which, indeed, some of them possess in a comparatively small degree. They are sometimes included under the name *Yam*, but are totally different from the true yam. The names more strictly belong to *Colocasia antiquorum*, a stemless plant with ovate leaves, and flowers inclosed in a cylindrical erect spathe. This is a native of India, but was early introduced to Egypt and the Mediterranean countries, whence it has now passed even to America. *C. esculenta*, *C. macrorhiza*, or *tara*, and *C. Himalensis* are also of economic importance in different parts of the world, and many species of these and allied genera are to be seen in European hot-houses, where their handsome foliage has gained them an important place.

Coccolith, the name given in 1858, by Professor Huxley, to one of certain minute oval or globular calcareous bodies found in countless numbers in the ooze of the Atlantic, either detached or adherent to small pieces of protoplasm. They have since been dredged up from other places, and found in chalk, and, according to Guembel, in limestone of all ages. Carter thinks they belong to *melobesia*, a genus of algæ.

Coccoloba, a genus of plants, order *Polygonaceæ*. The calyx is 5-parted and ultimately becomes succulent; the corolla is wanting; the stamens are five, united by thin filaments into a ring; the styles three; the stigma simple; the one-seeded nut being enveloped in the succulent enlarged calyx. *C. uvifera* is the seaside grape, which grows on the shores of the West Indian Islands, Bermuda, and on the American continent. It has large glossy green leaves with red veins. The berries are eatable. It is an evergreen. It helps to bind together the sandy sea-coast, and protect it against the destructive effects of wind and sea. The wood is used for cabinet work. A red coloring matter in it is employed as a dye. The wood, leaves, and bark are astringent, and a decoction of them evaporated forms *Jamaica Kino*.

Coccomilia, a kind of plum growing in Calabria, the bark of which — especially of the root — is highly esteemed by the Neapolitan faculty for its virtues in intermittent fever.

Coccosteus, a genus of fossil placogonoid fishes, pertaining chiefly to the Devonian and Old Red Sandstone system, but met with also in Silurian strata. The head was protected by a great shield covered with tubercles. Besides this bony cuirass there was also a ventral shield, but the rest of

Coccus

the body was naked. The mouth was furnished with small teeth.

Cocculus, a genus of plants, order *Menispermaceæ*. Sepals 6 in 2 whorls, petals 6, stamens 3 or 6, ovaries 3, 6 or more; drupes one-celled, one-seeded. The genus consists of climbing plants with small, generally white or green, diœcious flowers and heart-shaped leaves. In general the species are bitter febrifuges. *C. crispus*, a twining species with tubercles or warts on the stem, found in Sumatra and the Molucca Islands, is used by the Malays in intermittent fevers. The root of what was formerly called *C. palmatus*, but is now designated *Jateorhiza palmata*, found in Mozambique and Oibo, is the calumba-root of commerce, from which a bitter is obtained. A decoction of the fresh roots of *C. villosus*, with a few heads of long pepper in goat's milk, is administered by the Hindus in rheumatism and old venereal complaints, as is a green jelly for heat of urine. An ink is made from its fruit. In Arabia a spirit is distilled from the acrid berries of *C. Cebatha*.

Cocculus Indicus, a popular name given to a species of *Menispermaceæ*, which furnishes certain dried berries constituting an article of commerce. They are imported from the East Indies. There is no botanical species with this exact name. The plant which furnishes the berries, the *Menispermum C.* of Linnæus, was called by De Candolle *C. suberosus*, but Wight and Arnott have since removed it from the *cocculus* genus, and term it *Anamirta C.* The drupe resembles a round berry, the size of a pea or larger, wrinkled externally, and with a brittle husk. The kernel is intensely bitter. It contains about one-fiftieth of its weight of a powerful bitter narcotic poison called picrotoxin, also bases called menispermine $C_{18}H_{24}N_2O_2$, a crystalline base, paramenispermine, and several organic acids. *C. indicus* is a deadly poison, is used to give a bitter taste to beer, and is thrown into rivers to kill the fish. It has been used in form of ointment in certain skin diseases, and in decoction for killing vermin in the hair of children and animals. They are commonly known in the United States as fish-berries.

Coccus, the typical genus of the family *Coccidæ*. Many species are hurtful to plants in greenhouses and elsewhere. Gardeners call them bugs. *C. adonidum* (the mealy bug) does damage in hothouses, as does *C. testudo*. *C. vitis* (the vine-scale) injures vines, and *C. hesperidum* oranges. They may be destroyed by painting the branch on which they congregate with spirits of turpentine, or fumigating them with turpentine, tobacco, or sulphur. Others, however, are of value as dyes. *C. Cacti*,

Coccyx

found on the cactuses, is the cochineal insect. *C. Ilıcis*, found on *quercus coccifera*, an evergreen oak in the S. of France, furnishes a crimson dye which has long been known to mankind. *C. polonicus* is used by the Turks as a red dye. *C. lacca* yields lac.

Coccyx, the lowermost portion of the vertebral column, consisting of four, or more rarely five or three, divided terminal vertebræ, which become more or less united into one with the advance of age. They have been called united vertebræ.

Cochabamba, a central department of Bolivia, with offshoots of the Eastern Cordilleras, and extensive plateaus. The climate is equable and healthy, and though the department is comparatively poor in metals, its fertile valleys render it the richest as well as the most picturesque district of the republic. Agriculture and cattle-raising are the chief occupations; but here, as elsewhere in Bolivia, trade is sadly hampered by the want of roads. Area, 29,346 square miles; pop. (1906) est. 426,611. The capital, Cochabamba (8,396 feet above the sea), on a tributary of the Guapay, was founded in 1565, as Ciudad de Oropesa. It has some 15 churches, a university and high school, and a population estimated (1906) at 28,451, with a trade in corn and Peruvian bark.

Cochin, a seaport of Hindustan, in the Malabar district of the Madras Presidency; on a small island; a picturesque place with many quaint old Dutch buildings. Its harbor, though sometimes inaccessible during the S. W. monsoon, is the best on this coast. Cochin was one of the first places in India visited by Europeans. In 1502 Vasco da Gama established a factory, and soon after Albuquerque built a fort; he also died here in 1524. In 1663 the Dutch took the place, in 1795 the British. Pop. 17,600.

Cochin, a small native State of India, on the S. W. or Malabar coast, connected with the Presidency of Madras, intersected by numerous rapid streams descending from the Western Ghauts, and having several shallow lakes or backwaters along the coast. Chief products: Timber, rice. Area, 1,361 square miles; pop. (1901) 815,200, of whom 136,361 were Christians, partly belonging to the Jacobite and Nestorian Churches established here in early times. The capital is Ernakolam.

Cochin China, a country forming part of the peninsula of Southeastern Asia, and generally regarded as comprising the whole of ANAM (*q. v.*) and Lower or French Cochin China. The latter belonged to Anam till, in 1863, a portion of it was ceded to France after a war occasioned by the persecution of French missionaries; another portion being declared French territory in

Cochineal

1867. The territory thus acquired covers 23,082 square miles, and in 1901 had an estimated pop. of 2,968,529. It is now organized into four provinces and 21 arrondissements. The N. and E. parts are hilly, but the rest of the territory consists almost entirely of well-watered low alluvial land. In the low and wet grounds much rice is grown. In the more elevated districts are grown tobacco, sugar-cane, maize, indigo, and betel. Among the other products are tea, gums, cocoanut oil, silk, spices. The climate is hot and unsuited for Europeans.

Industrial arts are as yet limited among the natives. But they excel in the use of wood, of which their temples, pagodas, and tombs are built, being ornamented with elaborate carving. They live in villages adjacent to the rivers, which form almost the only means of communication. The only roads at present existing are those connecting Saigon, the capital, with the principal towns; a railway of 51 miles connects Saigon and Mytho. The principal export is rice, mainly to China; cotton and silk are also exported. The export and import trade is mostly carried on by British vessels, while the local trade is chiefly in the hands of the Chinese. The French number (1901) 4,323. The majority of the inhabitants are Anamese. In their monosyllabic language, their religious tendencies toward Buddhism or the system of Confucius, and in their social customs they much resemble the Chinese. There are 232 schools, with 115 European and 1,183 native teachers and 28,000 pupils. Upper Cochin China is the name sometimes given to the narrow strip of land on the E. coast of Anam between the mountains and the sea extending from Tonquin on the N. to Champa on the S., or from about 18° to 11° N.

Cochin China, a term applied to a variety of the domestic fowl, imported from Cochin China. It is a large, ungainly bird, valuable chiefly owing to its fecundity, eggs being laid even during the winter.

Cochineal, a dye-stuff employed in dyeing scarlet and crimson; consists of the bodies of the females of a species of *Coccus*,



COCHINEAL INSECTS FEEDING ON CACTUS.

called *C. cacti*, because it feeds upon plants of the *Cactus* family, particularly on one, therefore designated the cochineal plant.

Cochineal Fig

The cochineal insect is a small creature, a pound of cochineal being calculated to contain 70,000 in a dried state. The male is of a deep red color, and has white wings. The female, which is wingless, is of a deep brownish color. When a plantation of the cochineal plant has been formed — by cuttings which are ready to receive the insect in 18 months — the cultivator (*nopalero*) procures branches laden with cochineal insects; and, keeping the branches, of which their succulency admits, till the mother-insects have laid their eggs he places their bodies with the eggs which they cover, in little nests formed of some cottony sub-



COCHINEAL INSECT.

Female and male, the latter with wings.

stance, upon the cochineal plants, and the young insects, when hatched, soon spread over them. The gathering of the cochineal is very tedious, and is accomplished by brushing the branches with the tail of a squirrel or other animal. The insects are killed by boiling water, by heating them in ovens, or by exposure to the heat of the sun. They must be speedily killed to prevent them from laying their eggs, which diminishes their value. When killed and dried they may be kept for any length of time without injury.

Cochineal Fig, a name given to *Opuntia cochinillifera* and two other species of cacti, natives of Mexico and the West Indies, the plants on which the cochineal insect lives.

Cochlea (kok'lē-a), an important part of the internal ear, so called from its shape, which resembles that of a snail-shell.

Cochlearia, a genus of cruciferous plants, including the horse-radish and common scurvy-grass.

Cochrane, Thomas, 10th Earl of Dundonald; a British naval officer; born in Annsfield, Scotland, Dec. 14, 1775. He entered Parliament in 1806. In 1814 he was accused of conspiring to circulate a false report of Napoleon's death for speculative ends, and though he protested his innocence he was imprisoned for a year, fined, and was expelled from the navy and the House

Cock

of Commons. In 1818 he accepted an invitation to organize the navy of Chile and he performed many brave exploits in the contest with Spain. He left the service of the Chileans and was commander of the Brazilian navy from 1823 to 1825, when he resigned, because accused of insubordination. In 1827 and 1828 he commanded the Greek navy. In 1832 he was cleared of the charges brought against him in 1814, and was restored to the Order of the Bath and to the English navy. He was appointed vice-admiral, Nov. 23, 1841; admiral, March 21, 1851, and rear-admiral of the United Kingdom, Oct. 23, 1854. He died in Kensington, England, Oct. 31, 1860.

Cock (*Phasianus gallus*, L.), the well-known chieftain of the poultry yard, and rural announcer of the passage of time; whose shrill clarion, heard in the still watches of the night, inspires the invalid with cheering hopes of the coming dawn, and informs the wayworn traveler of his approach to the habitations of his kind; the appropriate emblem of vigilance, virility, warlike daring, and gallantry; domesticated but not subdued he marches at the head of his train of wives and offspring, with a port of proud defiance, not less ready to punish aggression against his dependents than to assert his superiority upon the challenge of any rival.

In what country and at what time this valuable species of pheasant was brought under the immediate control of man it is now impossible to determine; but, as the forests of many parts of India still abound with several varieties of the cock in the wild or natural condition, it is quite reasonable to conclude that the race was first domesticated in the Eastern countries, and gradually extended to the rest of the world. It is stated that the cock was first introduced into Europe from Persia; and Aristophanes speaks of it as the "Persian bird." Nevertheless, it has been so long established throughout the Western regions as to render it impossible to trace its progress from its native wilds.

The cock has his head surmounted by a notched, crimson, fleshy substance called comb; two pendulous fleshy bodies of the same color, termed wattles, hang under his throat. The hen has also a similar, but not so large nor so vividly colored excrescence on her head. The cock is provided with a sharp horn or spur on the outside of his tarsus with which he inflicts severe wounds; the hen instead of a spur has a mere knot or tubercle. There is in both sexes below the ear an oblong spot, the anterior edge of which is reddish, and the remainder white. The feathers arise in pairs from each sheath, touching by their points within the skin, but diverging in their course outward. On the neck they

Cock

are long, narrow, and floating; on the rump they are of the same form, but drooping laterally over the extremity of the wings which are quite short, and terminate at the origin of the tail, the plumes of which are vertical. In the center of the cock's tail are two long feathers, which fall backward in a graceful arch, and add great beauty to the whole aspect of the fowl. It is in vain to offer any description of the color of the plumage, as it is infinitely varied, being in some breeds of the greatest richness and elegance, and in others of the simplest and plainest hue. Except in the pure white breeds, the plumage of the cock is always more splendid than that of the hen. We cannot contemplate the cock, when in good health and full plumage, without being struck with his apparent consciousness of personal beauty and courage. His movements and gestures seem all to be influenced by such feelings, and his stately march and frequent triumphant crowing express confidence in his strength and bravery. The cock is strongly attached to what may be called his harem, and one is often seen strutting at the head of 10 or 15 hens. His sexual powers are matured when he is about six months old, and his full vigor lasts for about three years, varying in earliness of maturity and duration with his size and the climate.

The hen is ready to commence laying after she has moulted or changed her plumage, and is not at the trouble of making a regular nest. A simple hole scratched in the ground in some retired place serves her purpose, and she generally lays from 12 to 15 eggs before she begins to sit on them for the purpose of hatching. Having thus taken possession of her nest, she becomes a model of enduring patience, remaining fixed in her place until the urgency of hunger forces her to go in search of food. A short time suffices; she runs eagerly about in quest of sustenance, and soon resumes her charge. Her eggs are diligently turned and shifted from the center to the edge of the nest, so that each may receive a due degree of genial warmth, and it is not until about 21 days have elapsed that the incubation is completed. The strongest of the progeny then begin to chip the shell with the bill, and are successively enabled to burst their brittle prisons. She continues on the nest till the whole are hatched and dry, and then leads them forth in search of food. The hen, except when accompanied by a young brood, is always timid, and ready to fly from disturbance; but when she is engaged in discharging the duties of maternity her whole nature is changed. She fiercely and vigorously attacks all aggressors, watches over the safety of her young with the utmost jealousy, neglects the demands of her own appetite to divide the food she may obtain among her nurslings, and labors with

Cockburn

untiring diligence to provide them sufficient sustenance. The present limits forbid the attempt to give a complete history of this valuable species which is in every point of view, interesting. To detail all that would be necessary to illustrate it, as an object of natural history and domestic economy—the modes of breeding, rearing, preparing for the table, etc.—would require a volume. Fortunately, almost every one who will employ his own observation may readily arrive at such knowledge. Very full histories of the species are given by Buffon and other standard authors. Temminck has perhaps offered the most complete, in his “*Histoire des Gallinacés*.” See FOWL: INCUBATION.

Cockade, a plume of cock's feathers, with which the Croats in the service of the French in the 17th century adorned their caps. A bow of colored ribbon was adopted for the cockade in France, and during the French revolution the tricolored cockade—red, white, and blue—became the National distinction. National cockades are now to be found over all Europe.

Cockade City, a popular name of Petersburg, Va.

Cockatoo (*Ptyctolophus*), a genus of birds of the parrot family, but distinguished from true parrots by the greater height of the bill, and its being curved from the base, and by the lengthened, broad, and rounded tail. The head is also large, and in the true cockatoos is surmounted by a crest of long and pointed feathers, with their tips directed forward, which can be erected and expanded like a fan, or depressed, at the pleasure of the bird. The true cockatoos are also all of generally whitish plumage, but often finely tinged with red, orange, and other colors, or mixed with these colors in more brilliant displays.

Cockatrice, a fabulous monster anciently believed to be hatched from a cock's egg. It is often simply another name for the BASILISK (*q. v.*)

Cockburn, Sir Alexander, an English jurist; born Dec. 24, 1802; studied at Cambridge; was called to the bar in 1829, and soon became distinguished as a pleader before Parliamentary committees. In 1847 he became member of Parliament for Southampton in the Liberal interest; became Solicitor-General and was knighted in 1850; was made Chief-Justice of the Common Pleas in 1856; and Lord Chief-Justice in 1859. He was prosecutor in the Palmer case, and among the many famous trials over which he presided were the Wainwright case and Tichborne case. He represented Great Britain at the Geneva arbitration in the “Alabama” case. He died Nov. 20, 1880.

Cockburn

Cockburn, Alison, a Scotch poetess; born Oct. 8, 1713, the daughter of Robert Rutherford, laird of Fairnilee, Selkirkshire. In 1731 she married Patrick Cockburn, advocate, and in 1753 was left a widow, with an only son, who predeceased her in 1780. She died Jan. 23, 1795, having for 60 years and more been a queen of Edinburgh society. In person she was not unlike Queen Elizabeth. Of her lyrics the best known is the exquisite version of "The Flowers of the Forest" ("I've seen the smiling of Fortune beguiling"), commemorating a wave of calamity that swept over Ettrick Forest, and first printed in 1765. Mrs. Cockburn in 1777 discerned in Walter Scott "the most extraordinary genius of a boy"; in 1786 she made Burns's acquaintance. See "Songstresses of Scotland" (vol. i, 1871).

Cockburn, Sir George, a British naval officer; born about 1772. He entered the navy in early youth, and about 1812 obtained the rank of rear-admiral. He took part in the capture of Washington City in 1814 and conveyed Napoleon to Saint Helena in 1815. He was a lord of the admiralty from 1818 to 1828, and sat in Parliament for many years. He died in 1853.

Cockburn, Henry Dundas, Lord, a Scotch jurist, son of Archibald Cockburn, one of the barons of the Court of Exchequer; born in 1779. He studied for the Scotch bar, and was admitted a member of the Faculty of Advocates in 1800. He attached himself to the Liberal party, rose to eminence in his profession, and became, under Earl Grey, Solicitor-General for Scotland. He was a good example of the blending of wit, law, and learning common enough at the old Scots bar. His "Memorials of His Time" (published in 1856) is an invaluable record of the social history of Scotland. Not less interesting is his life of his friend, Lord Jeffrey, published in 1854. He died in 1854.

Cock Chafer, the popular name of a lamellicorn beetle, *Melolontha vulgaris*, found in England. It crawls awkwardly on the ground, and when it flies does so heavily and with a whirring hum. The larvæ are found in dung or in decaying vegetable matter or buried in the ground.

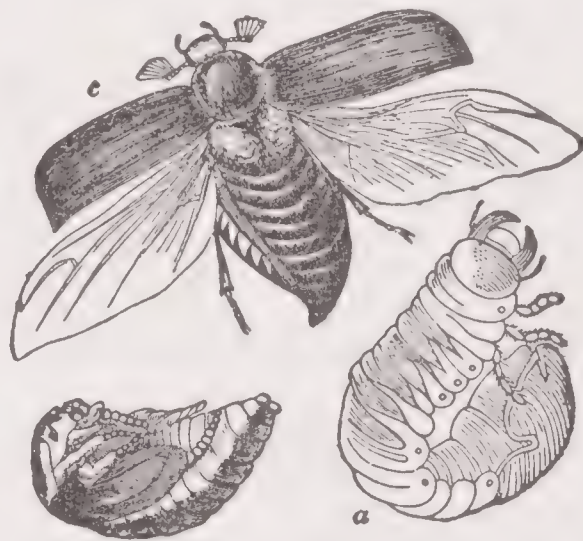
Cocker, a dog of the spaniel kind, allied to the Blenheim dog, used for raising woodcocks and snipes from their haunts in woods and marshes.

Cocker, Edward, an English engraver and teacher of writing and arithmetic in the 17th century; born about 1631. His work, "Cocker's Arithmetic," upon which many succeeding treatises were framed, was published in 1677.

Cockle

Cockerell, Charles Robert, a British architect; born in 1788. His excavation of the Temple of Zeus at Ægina, in 1811, contributed largely to the British Museum. He wrote monographs on the mausoleum of Halicarnassus and other archæological subjects. Advancing to the front rank of his profession, he became an associate of the Royal Academy in 1829, a member in 1836, and Professor of Architecture in 1839, delivering lectures which were highly esteemed and largely attended. He was happier in following classic models than in the Gothic style. He wrote on the "Iconography of Wells Cathedral"; "Sculptures of Lincoln and Exeter Cathedrals"; "Tribute to the Memory of Sir Christopher Wren," etc. He died in 1863.

Cock Fighting, an amusement practiced in various countries, first perhaps among the Greeks and Romans. At Athens there were annual cock-fights, and among the Romans quails and partridges were also used for this purpose. It was long a favor-



COCK CHAFER.

a, larva; b, pupa; c, perfect insect.

ite sport with the British, and the training, dieting, and breeding of cocks for fighting was the subject of many treatises. It is a favorite sport in the island of Cuba, in the Philippines, and in some of the United States, though in the latter it is now generally prohibited by local laws.

Cockle, a plant, *Lychnis Githago*, formerly called *agrostemma githago*. Its fuller English name is corn-cockle. It is an erect-branched plant, between one and two feet high, with linear-lanceolate leaves and large purple flowers, the segments of the ribbed calyx being much longer than the corolla.

It is also the popular name of the shells classed by naturalists under the genus *Cardium*, or the family *Cardiadae*. Their appearance is familiar. The most common one is *C. edule*; it is the one to which the name cockle is most frequently applied. It is found in sandy bays near low water.

Cockney

The Order of the Cockle is that of St. Michael, the knights of which wore the scallop as their badge. This order was instituted by Louis XI. of France, who began to reign A. D. 1461. The dress is thus described from a MS. inventory of the robes at Windsor Castle in the reign of Henry VIII.: "A mantell of cloth of silver, lyned withe white satten, with scallope shelles. Item, a hoode of crymsin velvet, embraudeard with scallope shelles, lyned with crymsin satten."

Cockney, a nickname for a London citizen, as to the origin of which there has been much dispute. The word is often, but not always, employed slightlying as implying a peculiar limitation of taste or judgment. The epithet is as old at least as the time of Henry II.

Cock of the Plains (*Centrocerus urophasianus*), a large North American species of grouse, inhabiting desolate plains in the W. States.

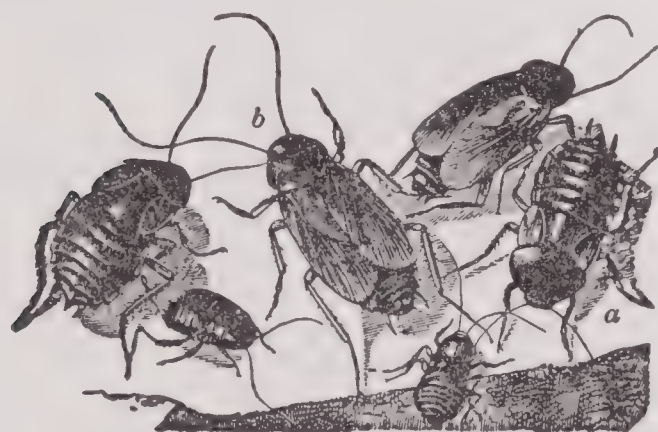
Cock of the Rock (*Rupicola aurantia*), a South American bird of a rich orange color with a beautiful crest, belonging to the manakin family.

Cock of the Walk, a phrase applied to a dominant bully or master spirit. The place where barn-door fowls are fed is called the walk, and if there is more than one cock they will fight for the supremacy of this domain.

Cock of the Woods. See CAPERCAILLIE.

Cockpit, in a ship of war, the name still given to the compartment in the lower part of the ship where the wounded are attended to during action. The surgery and dispensary which contains the medicine chests for the ship's company adjoin the cockpit.

Cockroach, generally, any insect of the family *Blattidæ*, or at least, of the genus *Blatta*; and specially, the *B. orientales*, so



COCKROACH.

a, female; b, male.

common in houses, particularly in seaport towns. The cockroach is said to have come originally from India, through the Levant.

Cocoanut

It is often called the black beetle, an erroneous name, for it is not a beetle at all, but an orthopterous insect. When the male is mature it has wings half the length of the body, while those of the female are but rudimentary. It is nocturnal in its habits. Its appetite is omnivorous. It leaves an unpleasant smell on provisions which it has been unable to devour. The eggs are deposited in horny cases, in which they are arranged with much regularity, in two rows, with a central partition, and smaller ones isolating each egg from the other.

Cockscomb, the comb of a cock, being a sort of ensign or token which the fool was accustomed to wear. Also a name sometimes given to *Celosia cristata*. The flowers are astringent and are prescribed in Asia in cases of diarrhœa, blennorrhœa, excessive menstrual discharges, hæmatesis, and similar disorders.

Cock's-foot Grass (*Dactylis*), a genus of grasses, closely allied to fescue, but differing in habit. The common or rough cock's-foot grass (*D. glomerata*) is a native of both palæarctic and nearctic regions, and is very abundant in Great Britain. It furnishes an important part of both natural and artificial pastures. In the United States this grass is called orchard grass, and is extensively cultivated. To this genus belongs also the tussac grass.

Cockton, Henry, an English comic novelist; born in London in 1807. Unless for their illustrations, all of his 10 works are almost forgotten but one, "Valentine Vox, the Ventriloquist" (1840). He died June 26, 1853.

Cocles, Horatius, a hero of ancient Rome, who alone, in 506 B. C., opposed the whole army of Porsenna at the head of a bridge, while his companions were destroying it behind him. When this was effected, Cocles, though wounded by the darts of the enemy, and impeded by his arms and armor, leaped into the Tiber and swam safely across.

Cocoa. See CACAO.

Cocoanut, a woody fruit of an oval shape, from 3 or 4 to 6 or 8 inches in length, covered with a fibrous husk, and lined internally with a white, firm, and fleshy kernel. The tree (*Cocos nucifera*) which produces the cocoanut is a palm, from 40 to 60 feet high. The trunk is straight and naked, and surmounted by a crown of feather-like leaves. The nuts hang from the summit of the tree in clusters of a dozen or more together. The external rind of the nuts has a smooth surface. This incloses an extremely fibrous substance, of considerable thickness, which immediately surrounds the nut. The latter has a thick and hard shell, with three black scars at one end, through

Cocoanut Beetle

one of which the embryo of the future tree pushes its way. This scar may be pierced with a pin; the others are as hard as the rest of the shell. The kernel incloses a considerable quantity of sweet and watery liquid, of a whitish color, which has the name of milk.

This palm is a native of Africa, the East and West Indies, and South America, and is now grown almost everywhere in tropical countries. Food, clothing, and the means of shelter and protection are all afforded by the cocoanut tree. The kernels are used as food in various modes of dressing, and yield on pressure an oil which is largely imported into various countries. When dried before the oil is expressed they are known as *copra*. The fibrous coat of the nut is made into the well-known cocoanut matting; the coarse yarn obtained from it is called *coir*, which is also used for cordage. The hard shell of the nut is polished and made into a cup or other domestic utensils. The fronds are wrought into baskets, mats, sacks, and many other useful articles; the trunks are made into boats or furnish timber for the construction of houses. By boring the tree a white sweetish liquor called *toddy* exudes from the wound, and yields by distillation one of the varieties of the spirit called *arack*. A kind of sugar called *jaggery* is also obtained from the juice by inspissation.

Cocoanut Beetle (*Batocera rubus*), a large longicorn beetle, the larvæ of which are very destructive in cocoanut plantations, eating their way in all directions in the stems of the younger trees. They are destitute of feet, large and pulpy, and of repulsive aspect; but are esteemed a luxury by the coolies of the East. They resemble the grugru worms of South America.

Coco de Mer (also called Sea or Maldive Double Cocoanut), the fruit of the *Lodoicea Seychellarum* palm. Its double kernel has long had an extraordinary value over a large area in the East. As a sovereign antidote to poison, and long known only from specimens thrown up on the Maldive coasts, it was supposed to grow on a submarine tree, and had other fables attached to it. The tree on which it grows is peculiar to some of the Seychelles Islands, reaches a height of 100 feet, and has very large fern-like leaves.

Cocoon, the silken sheath spun by the larvæ of many insects in passing into the pupa or resting stage. The cocoon proper is due to the secretion of special spinning glands, situated anteriorly or posteriorly, but larval hairs and foreign objects of many kinds may also be utilized. The amount of secretion, the arrangement of the threads, and the completeness of the covering vary very widely; nor is the presence of any cocoon whatever essential to the pupa stage.

Cod

The most typical and perfect cocoons are those of many moths, a familiar example being that of the silkworm. The delicacy, neatness, and labor exhibited by these last silken robes make them as marvelous as they are useful.

Cod (*Gadus*), a genus of fishes belonging to the order *Jugulares* (soft-finned, subbrachial, of Cuvier), distinguished by the following characters: A smooth, oblong or fusiform body, covered with small, soft, deciduous scales, ventrals attached beneath the throat, covered by thick skin, and drawn out to a point; head scaleless; eyes, lateral; operculum not dentated; jaws and anterior part of the vomer furnished with several ranges of moderate-sized, unequal, pointed teeth, forming a card or rasp-like surface; the gills are large, seven-rayed, and opening laterally; a small beard at the tip of the lower jaw; almost all the species have two or three dorsal fins, one or two anal and one distinct caudal fin; the stomach is sacciform and powerful, the cæca very numerous, and the intestines of considerable length; they have a large, strong swimming bladder, frequently dentated or lobed at its borders. (Pl. III. at FISH, fig. 6.)

The most interesting of all the species is the common or Bank cod (*Gadus morrhua*). Regarded as a supply of food, or as a wonder of nature in its continuance and multiplication, this fish may justly challenge the admiration of every intelligent observer. Though plentiful in the seas washing the coasts of the British Isles, Scandinavia, Iceland, and other N. regions, an extent of about 450 miles of ocean, laving the chill and rugged shores of Newfoundland, is the favorite annual resort of countless multitudes of cod, which visit the submarine mountains known as the Grand Banks to feed on the crustaceous and molluscos animals abundant in such situations. Hither also fleets of fishermen regularly adventure, sure of winning a rich freight in return for their toils and exposure, and of conveying plenty and profit to their homes and employers. Myriads of cod are thus yearly destroyed by human diligence; myriads of millions, in the egg state, are prevented from coming into existence not only by the fishermen, who take the parents before they have spawned, but by hosts of ravenous fishes and an immense concourse of other animals, which attend on their migrations to feed upon their spawn; yet in despite of the unceasing activity of all these destructive causes, year after year finds the abundance still undiminished, inexhaustible by human skill and avidity, irrepressible by the combined voracity of all the tribes of ocean. This however is by no means the sum of destruction to which the species is liable. After the spawn are hatched, while

the fry are too young and feeble to save themselves by flight or resistance, they are pursued and devoured in shoals by numerous greedy tyrants of the deep, and still worse, by their own gluttonous progenitors, clearly showing that without some extraordinary exertion of creative energy the existence of the species could not have been protracted beyond a few years. Such however is the fecundity with which the Almighty has endowed this race, that if but one female annually escaped and her eggs were safely hatched, the species would be effectually preserved. This is not so surprising when we recollect that the ovaries of each female contain not fewer than 9,344,000 eggs, as has been ascertained by careful and repeated observation.

Few members of the animal creation contribute a greater mass of subsistence to the human race; still fewer are more universally serviceable than the codfish, of which every part is applied to some useful purpose. When fresh its beautifully white, firm, and flaky muscles furnish our table with one of the most delicious dainties; salted, dried, or otherwise conserved for future use, it affords a substantial and wholesome article of diet, for which a substitute could not readily be found. The tongue, which is always separated from the head when the fish is first caught, even epicures consider a delicacy; and tongues, salted or pickled along with the swimming bladders which are highly nutritious, being almost entirely pure gelatine, are held in much estimation by housekeepers under the title of tongues and sounds. The sound or swimming bladder of codfish, if rightly prepared, supplies an isinglass equal to the best Russian, and applicable to all the uses for which the imported is employed. The liver of the cod, when fresh, is eaten by many with satisfaction, but it is more generally reserved by fishermen for the sake of the large quantity of fine limpid oil which it contains. This is extracted and forms the well-known and highly valued cod liver oil. Sometimes the heads, after the tongues are cut out and the gills are saved for bait, are thrown overboard on account of want of room, and because salting would not preserve them to any advantage. Yet the head, being almost entirely composed of gelatine is when fresh the richest and perhaps the most nutritive part of the fish. The fishermen it is true make use of it for their own nourishment, but the great mass is thrown into the sea—a circumstance we scarce reflect upon without regret, when we remember how many poor in various charitable institutions and through the country generally, might be luxuriously fed with the waste. If vessels were provided with the requisite implements and fuel, these heads would furnish a large amount of strong and valuable fish glue or

isinglass that would well repay the trouble and expense of its preparation. The intestines of the codfish also yield a tribute to the table; the French fishermen especially prepare from them a dish somewhat similar, and not far inferior to the sounds. Finally the ovaries or roes of the females are separated from their membranes, and the eggs, nicely pickled, afford an agreeable and tasteful relish far more delicate and inviting to the palate than the celebrated Russian caviare. In addition to these usual modes of employing the different parts of the fish, the Norwegians, Icelanders, and Kamschadales, pound up the backbones and other refuse parts, for the purpose of feeding their dogs and other domestic animals during the winter. It is stated as a fact that cows fed on these pounded bones with a small quantity of vegetable matter, yield a larger supply and a better quality of milk than those supported on ordinary provender.

The usual mode of preserving for commercial purposes is by salting them immediately after they are caught, having first removed the head, intestines, etc. Those which are carefully selected and salted with greater attention to their whiteness are usually called dun-fish, and bring a better price than such as are salted in bulk, with little regard to the discoloration caused by imperfect washing and draining before being packed. Where facilities are afforded for drying by an adjacent shore or by the construction of the vessel, cod are cured by drying alone, or with a very small quantity of salt. This process requires several days' exposure to sun and air, and when skilfully conducted keeps the fish for an indefinite period in a very desirable condition of whiteness and freshness, both peculiarly advantageous to the appearance of the fish at respectable tables. Cod thus cured are called stock fish, and before being cooked require to be softened, by soaking in water or pounding with a wooden mallet.

The common or Bank cod (in French *Cabeliau* or *morue*) varies in size and weight according to its age and the season of the year. The average length is about 2½ or 3 feet, and the weight between 30 and 50 pounds. Single cod have been caught weighing three times as much, measuring 5½ feet in length; but such specimens are uncommon, the greater number approaching the average above given. The color is a yellowish gray on the back, spotted with yellowish and brown; the belly white or reddish, with golden spots in young individuals. The fins are yellowish, with the exception of the anal, which are grayish; the head is large and flattened, with an enormous gape to the mouth; the upper jaw projects beyond the lower, which has a cirrhous or beard about the length of a finger; the eyes are very large, and veiled by

a transparent membrane; the scales are of large size; first ray of the first anal fin not articulated and spinous. Among the fishes of the cod genus which are found round the British coasts are *Gadus æglefinus*, the common haddock; *G. merlangus*, the whiting; *G. luscus*, the whiting pout; *G. minutus*, the power cod; *G. pollachius*, the pollack; *G. virens*, the coal fish; *G. pou-tassou*, Couch's whiting. Among American species there have been enumerated 10 that are taken to the New York market, and are caught on the coasts adjacent. They are named as follows: *Gadus morrhua*, Bank cod; *G. callarius*, dorse cod; *G. tomcodus*, tomcod; *G. æglefinus*, haddock; *G. blennoides*, blennoid cod; *G. purpureus*, New York pollock; *G. merluccius*, hake; *G. tenuis*, slender cod; *G. longipes*, codling; *G. punctatus*, spotted cod. The importance of this fishery and the great national interests which it involves, has made it a fruitful source of diplomatic discussion, and led to the establishment of various regulations, to which all are obliged to conform who participate in its advantages. See COD-LIVER OIL.

Coda, in music, an adjunct to the close of a composition, for the purpose of enforcing the final character of the movement.

Coddington, William, the founder of the colony of Rhode Island; born in England, in 1601, and arrived in Massachusetts in 1630. He remained in Boston for several years, but not being able to agree with the authorities of the colony, he removed in 1638 to Aquidneck, or Rhode Island, where he founded a colony to be governed "by the laws of the Lord Jesus Christ." It was soon found necessary to abandon this vague scheme, and in 1640 he himself was chosen governor, and in 1647 aided in the formation of a regular body of laws. He was unable to secure the reception of Rhode Island into the colonial confederacy. In 1674 and 1675 he was again elected governor. He died in 1678.

Code, a systematic collection or digest of laws, classified and simplified.

In the United States.—The acts of Congress have been codified and are spoken of as the United States Code, and in each State the acts of the different legislatures are usually annually printed and periodically codified. Both the State and Federal authorities have court and legislative reporters for aiding in the codification of the laws.

Code, Cipher, a system of arbitrary words to designate prearranged or predetermined words, figures or sentences. See CIPHER-WRITING: CODEX.

Code Civil, or Code Napoleon. One of the first labors of Bonaparte, when consul, was to give France a code. By a consular decree, dated 24th of Thermidor, year VIII.

(July 13, 1800), a committee was instituted "to compare the order which had been followed in the preparation of the *projets* for a civil code hitherto published, to determine the plan which the committee shall think best to adopt, and to discuss the chief principles of civil legislation." Portalis, Tronchet, Bigot-Préameneu, Maleville, and the minister of justice formed this committee. In the following year, 1801, these commissioners reported a draft of a civil code, which was in the first instance submitted to the Court of Cassation (see CASSATION, COURT OF), and the various courts of appeal. With the reports of the judges of these courts the draft was submitted to the Council of State, over which the consul Bonaparte presided, and in which every part was thoroughly discussed. In the work entitled "Conférence du Code Civil, avec la Discussion particulière du Conseil d'Etat et du Tribunat, etc." (8 vols. Paris, 1805), a detailed and very carefully prepared report of these discussions is contained. Each article after having been discussed in this body was presented to the tribunate, where it underwent another discussion, and was returned to the Council of State as adopted, rejected, or amended.

Of the five codes prepared in this way, namely, the "Code Civil," published in 1804; the "Code de procédure civile," published in 1806; the "Code de commerce," published in 1807; the "Code d'instruction criminelle," published in 1808; and the "Code pénal," published in 1810; the first was called by way of eminence, by a law of Sept. 3, 1807, "Code Napoleon." At the restoration its name was changed back to "Code Civil," and during the time of the second empire it was again called "Code Napoleon." It is divided into 2,281 paragraphs, which are numbered, and consist of a few lines each. The work is divided into three books (*livres*); each book into a certain number of titles; each title is comprised in one or more chapters. A preliminary title, "On the Publication, Effects, and Application of the Law in General," precedes the whole. The first book is entitled "Of Persons," and in 11 titles treats, 1, of the enjoyment and privation of civil rights; 2, of civil acts, such as the registry of births, marriages, and deaths; 3, of domicile; 4, of absentees; 5, of marriages; 6, of divorce; 7, of the relations of father and son; 8, of adoption and official guardianship; 9, of the paternal power; 10, of minority, guardianship, and emancipation; 11, of majority, of guardianship of persons of age (interdiction), and judicial counsel. The second book is entitled "Of Property and the Different Modifications of Ownership," and in four titles treats, 1, of the distinction of property into real and personal (*immeubles et meubles*); 2, of ownership; 3, of usufruct, of use and habitation;

4, of servitudes (easements, *des servitudes ou services fonciers*). The third book is entitled "Of the Different Modes of acquiring Property," and in 20 titles treats, 1, of successions; 2, of donations *inter vivos* and testaments; 3, of contracts, or conventional obligations in general; 4, of engagements formed without a convention; 5, of the contract of marriage, and the rights of the parties respectively; 6, of sale; 7, of exchange; 8, of the contract of letting to hire; 9, of partnership; 10, of loan; 11, of deposit and sequestration; 12, of contracts connected with chance (*aléatoires*, such as wagers and life-rents); 13, of powers of attorney; 14, of becoming security; 15, of transactions; 16, of bodily duress in civil cases; 17, of furnishing security; 18, of mortgages; 19, of taking and setting off by execution; 20, of prescriptions.

It would be necessary to give the heads of the chapters also, in order to present a clear view of the code, but our limits do not permit it. The work already quoted, "Conférence du Code Civil," is indispensable to a complete understanding of the code, because it gives the history of each law. It first presents each article in the code as finally adopted. Next follow the different forms and drafts of each article discussed in the council of state, with the report of the discussions. To this succeed the observations made in the section of legislation of the tribunate. We learn from this work how active a part Napoleon took in the formation of the code, as his remarks are given as well as those of the others, and he was present during almost the whole of the debates. Under the first empire the adoption of the "Code Napoleon" was made obligatory on all the countries subject to the French. After the battle of Leipsic, in 1813, which freed Germany from the power of France, it ceased to be obligatory in the German States, but it continued to influence considerably their legislation. At present this code is recognized in the kingdom of Belgium (with some modifications), in the grand-duchy of Baden, in the kingdom of Italy, and elsewhere in Europe. In the United States it was a model for the code of Louisiana.

Codeia, Codeina, or Codeine ($C_{18}H_{21}NO_3$ or $C_{17}H_{18}(CH_3)NO_3$, methyl morphine), an alkaloid obtained by digesting opium with warm water, precipitating the meconic acid with calcium chloride, and concentrating the filtrate; the hydrochlorates of morphine and codeine crystallize out first, and may be separated by treating their aqueous solution with ammonia, which precipitates the morphine; the liquid is then evaporated, and the codeine is precipitated by caustic potash and recrystallized from ether; it forms colorless prisms when crystallized from water, which lose their water of crystallization at

120° ; the anhydrous alkaloid melts at 150° . Codeine is a tertiary monamine; heated with soda lime it gives off methylamine, NH_3 , CH_3 , and trimethylamine, $N(CH_3)_3$. Codeine dissolves in concentrated sulphuric acid without color, if the solution is warmed to $150^\circ C.$; a trace of molybdic acid turns it a dirty green color, becoming blue; and a drop of nitric acid turns it a violet-red color. Codeine is used as a narcotic and hypnotic, as is morphine, but more rarely. It is given usually in cases where morphine is intolerable to the constitution, and is said to be less likely to nauseate.

Codex, a roll or volume, specially used in compound terms, as *Codex Justinianus*, Code of Justinian, *Codex Theodosianus*, Code of Theodosius. In Biblical criticism, a manuscript of any portion of the New or Old Testament, especially of the former. The original manuscripts of the two Testaments have been lost, and there is little hope of their recovery. In our inability to obtain them for purposes of consultation, it is needful to fall back on other copies as few removes as possible from the original. When in copying the Scriptures the ancient transcribers detected an error committed by some one of their predecessors, they did not simply erase it, but placed it as an erratum on the margin of their copy. As further transcriptions were made fresh errata were similarly noted, till at length the margin became greatly crowded. In attempting to restore the original text great value is attached to the acquisition of any manuscripts made in one of the earliest centuries, from the power it gives one of eliminating errata belonging to subsequent periods. Manuscripts are divided into two classes: *uncials*, written in capitals and with no spaces between the words, and *cursives*, written more in conformity with modern practice. The line between them should be drawn about the 10th century. In this respect the modern Biblical critic has the advantage of his predecessors. When the New Testament was rendered into English for the authorized version of the Scriptures, the Greek text used, that of Erasmus and Robert Stephens, was based on MSS. more modern than the 10th century. Now, some of much earlier date are available, prominent among which are the five noted below:

Codex A (called also *Codex Alexandrinus*).—The Alexandrian, or Alexandrine, MS. of the New Testament; a MS. sent by the Patriarch of Constantinople as a present to the English King Charles I., and believed to belong to the middle of the 5th century. A correct edition of it was printed in 1860.

Codex B (called also *Codex Vaticanus*).—The Vatican codex, or MS.; so named because preserved in the Vatican; a very val-

uable MS., belonging, it is thought, to the middle of the 4th century, if not even older. It was discovered in the latter part of the 14th century, but was a long time withheld from the examination of scholars. It was only in 1868 that it became practically accessible by the publication of a facsimile.

Codex C.—The Ephraem manuscript, so called because some of the compositions of Ephraem the Syrian had been written over it. It is supposed to be dated at least as early in the 5th century as Codex A.

Codex D.—The manuscript of Beza, called after this eminent reformer, who presented it to the University of Cambridge in 1581. It is supposed to belong to the 6th century.

Codex Aleph or Codex Sinaiticus: The Sinaitic codex, or manuscript; so-called because Tischendorf, its discoverer, obtained it from the monastery of St. Katherine on Mount Sinai; the year of the great acquisition was 1859; a most valuable New Testament MS., dating, it is supposed, from the middle of the 4th century. It is believed that it may have been one of the 50 copies of the Bible executed under the superintendence of Eusebius, Bishop of Cæsarea, by order of the Emperor Constantine, in A. D. 331. The monastery of Sinai was founded by the Emperor Justinian, by whom it is supposed that the invaluable "codex" was given as a present to the monks, with whom it remained during the numerous intervening centuries till the visit of Tischendorf in 1859. An edition of it was published in 1865.

Codicil, a supplement to a will, whereby anything omitted is added, or any change demanded by the altered circumstances of the testator or the beneficiaries is effected. A codicil is authenticated in the same manner as a will, and possesses the same privileges when holograph, or written by the hand of the testator himself.

Codilla, the coarsest part of hemp and also of flax, sorted out and separated from the rest.

Codlin Moth (*Carpocapsa pomella*), a small moth which infests apple trees. In the Northern States it flies in May, laying its eggs in the calyx after the blossoms fall; in a few days the larva hatches, in three weeks it becomes fully grown.

Cod-liver Oil, an oil obtained from the liver of the common cod. There are three kinds known in commerce, viz., pale, pale-brown, and dark-brown, the last possessing a very disagreeable taste and smell. Cod-liver oil was first recommended as a remedy for the debility induced by diseases of the lungs about the year 1833. Previous to that time it had been used with much success in cases of chronic rheumatism. Its efficacy is ascribed by some to the presence of iodine and bromine, while others assert that it is

due to the presence of a minute quantity of free phosphorus. Cod-liver oil is frequently adulterated with other fish-oils, especially shark-liver oil, but the latter can be easily recognized by its low specific gravity.

Codman, John, an American sea-captain and miscellaneous writer; born in Dorchester, Mass., 1814. He was author of "Sailors' Life and Sailors' Yarns" (1847); "The Mormon Country" (1876); "Round Trip by Way of Panama, etc." (1879); "Winter Sketches from the Saddle" (1888); etc., besides many newspaper and magazine articles on current topics. He died in Boston, Mass., April 6, 1900.

Codrington, Sir Edward, an English naval officer; born in Gloucestershire in 1770. He entered the navy in 1783; obtained a gold medal for his services at the battle of Trafalgar, and was afterward actively employed both in the Peninsular and second American wars. In 1827 he commanded the united squadron that overthrew the Turkish fleet in the battle of Navarino. From 1832 to 1837 he was member of Parliament. He died in London in 1851.

Codrus, according to Greek legend the last King of Athens. Having learned that the enemies of his country would be victorious, according to the declaration of an oracle, if they did not kill the Athenian king, he voluntarily entered their camp, provoked a quarrel, and was slain. The grateful Athenians abolished the royal dignity, substituting that of archon, esteeming no one worthy to be the successor of Codrus.

Cody, William Frederick, a former United States government scout; born in Scott county, Ia., Feb. 26, 1845; better known as "Buffalo Bill," a name earned while employed by the Kansas Pacific railway to furnish meat for its laborers, when he slaughtered 4,280 buffaloes in 18 months. He is an unerring shot, a fearless rider and has had some thrilling adventures among the savages. In 1872 he was elected to the Nebraska Legislature, and in 1883 organized the "Wild West Show," which has been seen in many foreign countries as well as all over the United States. He has been employed frequently by the United States Government as a guide and scout in the Indian country.

Coe College, a co-educational institution in Cedar Rapids, Ia.; organized in 1881. under the auspices of the Presbyterian Church; has grounds and buildings valued at over \$255,000; endowment funds, \$400,000; scientific apparatus, \$30,000; volumes in the library, 6,000; ordinary income, about \$40,000; scholarships, 60; average number of faculty, 25; average student attendance, 395.

Coefficient, a number or known quantity, prefixed as a multiplier before a known or unknown quantity of letters, into which such

Coehorn

quantity or letters are supposed to be multiplied. Thus in the expressions, $4a$, $3ab$, cx , 4 is the coefficient of a , 3 of ab , and c of x .

Coehorn, Menno, Baron Van, a Dutch military engineer; born in 1641. Having entered the Dutch military service he distinguished himself by his invention of small mortars, called after him *coehorns*, but more by his eminence as a master of the art of fortification, whence he has been called the Dutch Vauban. He fortified almost all the strong places in Holland. He died in 1704.

Cœlenterata, the name given by Frey, Leuckart, and others, to a sub-kingdom of the animal kingdom, the species of which are distinguished from those of humbler organization by possessing a hollow digestive cavity with which the hollow interior of the body freely communicates. The prehensile organs are hollow tentacles disposed in a circle round the mouth. All, or nearly all, are moreover provided with organs of offense and defense, called thread-cells or nematocysts. Professor Huxley places the Cœlenterata between the molluscoida and the protozoa. The sub-kingdom is divided into two classes, actinozoa and hydrozoa. Examples, the corals, the sea anemones, the fresh-water hydra, etc.

Cœle-Syria (that is, "Hollow-Syria"), the large valley lying between the Lebanon and Anti-Lebanon mountain ranges in Syria. Near its center are the ruins of Baalbec.

Cœliac Artery, an artery issuing from the aorta just below the diaphragm. It is called also the Cœliac axis.

Cœliac Passion, a diarrhœa, or flux, that arises from the indigestion or putrefaction of food in the stomach and bowels, whereby the aliment comes away little altered from what it was when eaten, or changed like corrupted stinking flesh.

Cœnobites, the name given to those monks who live together, in contradistinction to anchorites or hermits, who withdraw from all society, and live in a solitary fashion.

Cœur de Lion (ker de lē-ôn'), a title given to several historical personages, as Richard I. of England; so-called from the prodigies of personal valor performed by him in the Holy Land; Louis VIII. of France, frequently called *Le Lion*; and Bolaslas I. of Poland, also called "The Intrepid."

Coffee, the seed of an evergreen shrub which is cultivated in hot climates, and is a native of Abyssinia and of Arabia. This shrub (*Coffea arabica*) is from 15 to 20 feet in height, and belongs to the Rubiaceæ. The leaves are green, glossy on the upper surface, and the flowers are white and sweet-scented. The fruit is of an oval shape, about the size of a cherry, and of a dark-red color when ripe. Each of these contains two

Coffee

cells, and each cell a single seed, which is the coffee as we see it before it undergoes the process of roasting. Great attention is paid to the culture of coffee in Arabia. The trees are raised from seed sown in nurseries and afterward planted out in moist and shady situations, on sloping ground or at the foot of mountains. Care is taken to conduct little rills of water to their roots, which at certain seasons require to be constantly surrounded with moisture. When the fruit has attained its maturity cloths are placed under the trees, and upon these the laborers shake it down. They afterward spread the berries on mats, and expose them to the sun to dry. The husk is then broken off by large and heavy rollers of wood or iron. When



COFFEE PLANT AND KERNEL.

the coffee has been thus cleared of its husk it is again dried in the sun, and, lastly, winnowed with a large fan, for the purpose of clearing it from the pieces of husks with which it is intermingled. A pound of coffee is generally more than the produce of one tree; but a tree in great vigor will produce 3 or 4 pounds.

The best coffee is imported from Mocha, on the Red Sea. It is packed in large bales, each containing a number of smaller bales, and when good appears fresh and of a greenish-olive color. Next in quality to the Mocha coffee may perhaps be ranked that of Southern India and that of Ceylon,

Coffee

which is strong and well-flavored and is brought to Great Britain in large quantities. Java and Central America also produce large quantities of excellent coffee. Brazilian coffee, though produced more abundantly than any other, stands at the bottom of the list as regards quality. Liberian coffee may also be mentioned. Of the best Mocha coffee grown in the province of Yemen little or none is said to reach the Western markets. Arabia itself, Syria, and Egypt consume fully two-thirds, and the remainder is exclusively absorbed by Turkish or Armenian buyers. The only other coffee which holds a first rank in Eastern opinion is that of Abyssinia. Then comes the produce of India, which those accustomed to the Yemenite variety are said to consider hardly drinkable. American coffee holds in the judgment of all Orientals the very last rank. The Dutch were the first to extend the cultivation of coffee beyond the countries to which it is native. About 1690 some coffee seeds were brought to Java, where they were planted and produced fruit. By 1718 the Dutch planters of Surinam had entered on the cultivation of coffee with success, and ten years after it was introduced from that colony by the English into Jamaica, and by the French into Martinique.

It was not till 1774 that the planters of Brazil, now the greatest producers of coffee in the world, began its cultivation. Coffee as an article of diet is of but comparatively recent introduction. To the Greeks and Romans it was wholly unknown. From Arabia it passed to Egypt and Turkey, whence it was introduced into England by a Turkey merchant named Edwards in 1652, whose Greek servant, named Pasqua, first opened a coffee-house in London. In 1671 an Armenian named Pascal set up a coffee-house in Paris. In Great Britain much less is drunk than on the Continent of Europe or in the United States and Canada, tea being the British national beverage. The excellence of coffee depends in a great measure on the skill and attention exercised in roasting it. If it be too little roasted it is devoid of flavor, and if too much it becomes acrid, and has a disagreeable, burned taste. Coffee is used in the form either of an infusion or decoction, of which the former is decidedly preferable, both as regards flavor and strength. The fine aromatic oil which produces the flavor and strength of coffee is lost by boiling. The best mode is to pour boiling water through the coffee in a biggin or strainer, which is found to extract nearly all the strength; or to pour boiling water upon it and set it upon the fire, not to exceed ten minutes. Prepared in either way it is fine and strong. In the Asiatic mode of preparing coffee the beans are pounded, not ground; and though the Turks and Arabs boil the coffee, they boil each cup by itself and only for a mo-

Coffee House

ment, so that the effect is much the same as that of infusion. In Arabia some additional spicing, generally of saffron or some aromatic seeds, is considered indispensable; but neither Turks nor Arabians use sugar or cream with coffee.

Since the middle of the 18th century both the culture and consumption of coffee have continually increased. The principal supply of the United States is derived from Brazil, which furnishes 75 per cent. of the whole import. It is known in commerce as "Rio." Coffee acts as a nervous stimulant, a property which it owes mainly to the alkaloid caffeine. It thus promotes cheerfulness and removes languor, and also aids digestion; but in some constitutions it induces sleeplessness and nervous tremblings.

Statistics for the years 1895-1900 show a steady increase in the world's consumption of coffee. According to them, the universal production during that period was as follows. The year is the fiscal one:

Year.	Production. Sacks.
1895-1896	10,355,000
1896-1897	13,605,000
1897-1898	16,178,000
1898-1899	13,723,000
1899-1900	14,437,000
1900-1901	13,975,000

The two last quantities are approximate only, but carefully made. These figures show that the consumption increased in the last four years quoted almost at the rate of 1,000,000 bags per annum. The world's visible stock (Dec. 31, 1899), was thus distributed:

Description.	1899. Sacks.
Europe.	
Importations for the year.....	9,165,700
Delivered for consumption.....	8,867,400
In stock on December 31.....	4,114,800

United States.

Importations for the year.....	6,433,900
Delivered for consumption.....	6,271,900
In stock on December 31.....	1,080,000

United States and Europe.

Importations for the year.....	15,599,600
Delivered for consumption.....	15,139,300
In stock on December 31.....	5,194,800

The world's crop in 1908-1909 aggregated 2,331,165,000 pounds, the United States (Porto Rico and Hawaii only) having 36,698,000 pounds.

Coffee House, a house of entertainment where persons are supplied with coffee and other refreshments. Formerly the chief resort of every class for purposes of conversation and information. It was the central meeting-place of politicians, literary men, etc. Constantinople is believed to have been the first European capital in which coffee-houses were instituted, the year of their es-

tablishment there being A. D. 1554. In 1650 the first one in England was opened in Oxford. They were suppressed by Charles II. in 1675, but were soon again allowed to be reopened.

Cofferdam, a water-tight inclosure formed by piles driven into the bottom of a river and packed with clay, planks, or other stop-gaps. It is used as a dam while laying bare the bottom of the river, in order to establish the foundation for a pier, abutment, or quay.

Coffer Fish (*Ostracion*), a peculiar genus of bony fishes in the small order *Plectognathi*, and in the family *Sclerodermi*, which also includes the file-fishes. The body is inclosed in a firm box formed of hexagonal bony scales fitted into one another like a mosaic. The snout, the bases of the fins, and the end of the tail are the only soft-skinned parts. Over a score of species are known from tropical and sub-tropical seas. The best known form is *O. quadricornis* from the tropical Atlantic.

Coffin, the box or chest in which corpses are inclosed before being committed to the ground. Coffins were in use in Egypt at a remote period of antiquity. The embalmed body of Joseph was laid in one (Gen. 1: 26). This is the only mention made of coffins in the Bible; what were in use among the Jews were biers (II Sam. iii: 31; Luke vii: 14). Some of the Egyptian coffins were wood. There were fine sarcophagi of stone, some of which, all covered with hieroglyphics, are conspicuous objects in the Egyptian room of the British Museum. There were coffins of baked clay in Mesopotamia. Cedar was used in Athens for inclosing the remains of heroes, and marble and stone among the Romans. But among the classical nations the later practice at least was to burn the dead and deposit the ashes in an urn.

Coffin, Charles Carleton, an American novelist and lecturer; born in Boscawen, N. H., July 26, 1823; began life as a civil engineer; afterward gave his attention to telegraphy. In 1851 he began to write for the Boston papers; and during the Civil War and the Austro-Prussian War of 1866 was war correspondent for the "Boston Journal," writing over the signature of "Carleton." His books include: "Days and Nights on the Battle-Field" (1864); "Our New Way Round the World" (1869); "Story of Liberty" (1878); "Life of Garfield" (1883); and "The Drum-Beat of the Nation" (1887), the first volume of a series. He died in Brookline, Mass., March 2, 1896.

Coffin, Levi, an American philanthropist; born near New Garden, N. C., Oct. 28, 1798. He was a farmer's boy and early evinced interest in the negro's welfare.

Proving successful in business, he actively aided slaves to gain freedom, largely through the "underground railroad." Thousands of escaping slaves were aided on their way to Canada by him. He helped found the Freedman's Bureau in 1863, and after the Civil War was active in schemes to advance the welfare of the colored people. He was known popularly as "President of the Underground Railroad." He died in Avondale, O., Sept. 16, 1877.

Coghlan, Charles Francis, an American actor; born in Paris, France, in 1841. He was educated for the bar in London, but went on the stage, making his American début in 1880 as Captain Absolute in "The Rivals." For many years he took leading parts, being a refined and capable impersonator of old-school gentlemen. He wrote "Jocelyn," "Lady Barter," and other plays. He died in Galveston, Tex., Nov. 27, 1899.

Coghlan, Joseph Bullock, an American naval officer; born in Kentucky; entered the navy in 1860; became a captain in 1896; commanded the "Raleigh" in the battle of Manila Bay and several expeditions in Philippine waters in 1898; promoted rear-admiral April 11, 1902; commanded the North Atlantic Station in 1902-1903; and was in charge of the Caribbean squadron at the establishment of the Republic of Panama in 1903. He died Dec. 5, 1908.

Coghlan, Rose, an American actress; born in Peterboro, England, in 1853. She rose from humble rôles in England to be leading lady, making her American début in 1872. From 1880 to 1889 she was Wallack's leading lady and since 1893 has been a "star."

Cohesion, the force by which the various particles of the same material are kept in contact, forming one continuous mass. Its action is seen in a solid mass of matter, the parts of which cohere with a certain force which resists any mechanical action that would tend to separate them. According to Sikingen, the relative cohesive strengths of the metals are as follows:

Gold	150,955
Silver	190,771
Platinum.....	262,361
Copper.....	304,696
Soft iron.....	362,927
Hard iron.....	559,880

Cohesion in liquids is very much weaker, the parts being disjoined with much more facility; and in substances existing in the gaseous form it is entirely overcome, the particles repelling instead of attracting each other. Cohesion in bodies is weakened or overcome by two general causes—by the repulsion communicated by heat, or by the attraction which may be exerted by the particles of one body on those of another.

Heat communicated to a solid body always diminishes the force with which the

attraction of aggregation or cohesion is exerted; if the heat be increased to a sufficient extent the cohesion is so far weakened that the body passes into the liquid form; and if carried still farther, the attractive force is entirely overcome, repulsion is established between the particles, and the body passes into the gaseous state. If a liquid be poured on a solid, it often happens that their mutual attraction is sufficiently powerful to overcome the cohesion of the solid; its particles are consequently disunited, to combine with those of the liquid, and it entirely disappears. This forms the chemical process of solution. A similar effect is sometimes produced by the chemical action of a gaseous body.

When these powers whether of heat or of chemical attraction are withdrawn, cohesion resumes its force, but with results which are different, according to the circumstances under which this happens. When the attraction of aggregation is suddenly and forcibly exerted the particles are united, in general, indiscriminately, and according to no regular law. If a body which has been melted is suddenly cooled to a sufficient extent it becomes solid, and forms a mass of no regular structure or figure; or if its cohesion has been suspended by the chemical attraction exerted by another body toward it, and if this attraction suddenly cease to operate, the force of cohesion is resumed, and the solid substance appears in the form of a powder. This latter case forms the chemical operation denominated precipitation. But if the force of cohesion is exerted more slowly the particles are united, not indiscriminately, but usually with regularity, so as to form masses of regular structure and figures, bounded by plane surfaces and determinate angles. This forms the operation of crystallization; and such masses are denominated crystals.

Cohesion Figures, a class of figures produced by the attraction of liquids for other liquids or solids with which they are in contact, and divided into surface, submersion, breath, and electric cohesion figures. Thus a drop of an independent liquid, as oil or alcohol, will spread itself out on the surface of water always in a definite figure, but differing with each fluid dropped on the water. Breath figures are produced by putting a drop of the liquid to be examined on a slip of mica, and breathing on it. when each fluid takes a distinct characteristic shape. Electric cohesion figures are produced by electrifying drops of various liquids placed on a plate of glass.

Cohoes, a city of Albany county, New York; at the confluence of the Mohawk and Hudson rivers, and the junction of the Erie and the Champlain canals; and on the New York Central and the Delaware and Hudson railroads; 9 miles N. of Albany. The

Mohawk river has a fall of over 70 feet at this point, and supplies unlimited power, making Cohoes a very important manufacturing community.

Business Interests.—The Mohawk river is crossed by a dam above the falls, and the water is supplied to the mills and factories by means of canals. According to the Federal census of 1890, there were 212 manufactories in Cohoes, with a capital of \$12,901,901; employing 8,939 hands; paying \$3,155,950 for wages, and \$5,739,987 for stock used; and having products of a combined value of \$10,836,260. The principal manufactures were cotton, woolen and worsted knit goods, foundry and machine shop products, boots and shoes, tobacco, paper boxes, and bread and bakery products. There is one National bank, with a capital of \$250,000, and surplus of \$100,000, besides several savings banks. The assessed property valuation in 1900 exceeded \$11,000,000.

Public Interests.—In 1899 the city had 25 miles of streets, of which 3 were paved; 18 miles of sewers; 22 miles of water mains; and electric lighting and water plants, the latter owned by the city. The city is connected with Albany, Troy, and other neighboring cities by electric street railways. The most noteworthy buildings are the public library, St. Bernard's Academy, and several of the numerous churches. At the end of the school year 1897-1898 there were 12 public schools, with 2,938 pupils and 69 teachers, and public school property valued at \$175,000. There was also the Egbert Public High School. Pop. (1890) 22,509; (1900) 23,910; (1910) 24,709.

Cohort, a division of the Roman army, the 10th part of a legion, containing three maniples or six centuries. The number of men varied with that of the legion, the 10 cohorts always containing an equal number. When the legion numbered 4,000 men, the cohort consisted of 60 triarii, 120 principes, 120 hastati, and 100 velites, in all 400 men. The centurion of the first century of the first maniple of the first cohort was the guardian of the eagle or colors of the legion, and hence the first cohort was always regarded as superior in dignity to the others.

Coimbra, capital of the Portuguese province of Beira, on a hill above the Mondego river, here crossed by a stone bridge, 135 miles N. N. E. of Lisbon. Its streets are steep and narrow, its manufactures confined chiefly to earthenware and combs, and its interest consists mainly in its historical associations. The place derives its name from the Roman Conimbria, traces of which lie to the S.; it was held by the Goths, and from them passed to the Moors,

Coin

from whom it was finally conquered in 1064, by Fernando the Great, aided by the gallant Cid. Coimbra was the capital of Portugal for about two centuries and a half from its erection into a kingdom in 1139, and many of the early kings are buried in and around the old town. Of the public buildings, the most noteworthy are the older of the two cathedrals, the Church of San Salvador, and the ruined Convent of Santa Clara; across the river is the *Quinta das Lagrimas* ("House of Tears"), where Inez de Castro was murdered. The University of Coimbra, the only one in Portugal, was originally established at Lisbon in 1288, but was permanently transferred here in 1537. It has five faculties and some 900 students; attached to it are a museum, an observatory, a botanical garden, and a library of over 60,000 volumes. Pop. (1900) 18,144.

Coin, a piece of metal on which certain characters are stamped by authority, giving the piece a certain legal current value. Homer speaks of brass money, 1184 B. C. The invention of coin is ascribed to the Lydians, whose money was of gold and silver. Both were coined by Pheidon, tyrant of Argos, about 862 B. C. Money was coined at Rome under Servius Tullius, about 573 B. C. The most ancient known coins are Macedonian of the 5th century B. C. Brass money only was in use at Rome previously to 269 B. C. (when Fabius Pictor coined silver). Gold was coined 206 B. C. Iron money was used in Sparta, and iron and tin in Britain. In the earlier days of Rome the heads were those of deities, or of those who had received divine honors. Julius Cæsar first obtained permission of the Senate to place his portrait on the coins, and the example was soon followed. The Britons and Saxons coined silver.

Fineness of United States Coin.—The gold coins are nine-tenths fine; the silver coins, nine-tenths fine; the copper-nickel coins, such as the 5-cent piece, are one-fourth nickel and three-fourths copper; the bronze coins are 95 per cent. copper and 5 per cent. tin and zinc. The alloy in the gold coins is silver and copper; in the silver coins, copper. It is a felony to counterfeit coins, or to have such counterfeit in one's possession with the intention of uttering or passing. It is also a crime to "sweat" or lighten coins in weight by filing with intention to pass them as of full weight.

Coinage, the act or process of coining money. In the United States there is free and unlimited coinage of gold; that is, standard gold bullion may be deposited at the mints in any amount, to be coined for the benefit of the depositor, without charge for coinage; but when other than standard bullion is received for coinage a charge is

Coke

made for parting, or for refining, or for copper alloy, as the case may be. The depositor receives in gold coin the full value of the gold in his bullion, less such charges as are specified by law. Subsidiary silver and standard silver dollars, under existing law in the United States, are coined only on Government account. They are coined from bullion purchased by the Government, and the profits of such coinage belong to the Government. There is at present no authority for the purchase of bullion for the coinage of standard silver dollars, but, if necessary, sufficient bullion may be purchased to maintain the stock of subsidiary silver. The Government is still coining standard silver dollars from the bullion under the Act of July 14, 1890. The amount of bullion on hand Nov. 1, 1893, when the purchasing clause of that Act was repealed, was 140,699,852.67 fine ounces, costing \$126,758,280, the Coinage value of which was \$181,914,961. Between Nov. 1, 1893, and Sept. 1, 1896, there was coined from this bullion 15,169,491 standard silver dollars, of which \$10,410,528 represent the cost of the bullion coined, and are held in the Treasury for the redemption of Treasury notes of 1890, while the remainder, \$4,758,433, constitute the gain or seigniorage, and, being the property of the United States, have been paid into the Treasury to be used like other available funds. See MINT.

Coke. Of the coke industry it may be truly said that it has revolutionized the iron and steel trade of the world. Today this great fuel industry ranks with the great industrial enterprises in which fame and fortune have been won. Coke-making, as now carried on in many States and Territories, had its birth in the Connellsville region of Southwestern Pennsylvania. The originator of this industry never dreamed of the far-reaching effect it would eventually have on the iron and steel industries. Today its effects are universal. Less than half a century ago the successful manufacture of coke in Western Pennsylvania shifted the pig iron industry to Pittsburg, and thus laid the foundation for that city's present industrial greatness.

The Connellsville coking-coal seam embodies some peculiar geological conditions. It is a detached portion of the Pittsburg coal basin, and extends along the W. slope of Chestnut Ridge, the extreme W. range of the Alleghenies from Latrobe, Pa., on the main line of the Pennsylvania railroad 50 miles E. of Pittsburg, S. into Maryland and West Virginia. Its average width is not more than 4 or 5 miles, and the region contains something over 100,000 acres, its borders having been somewhat extended recently through the introduction of improvements in the coking processes, whereby the

production of a good quality of coke is made possible from the coal lying on the borders of the main coking field.

In the Connellsville region the standard beehive oven, the type now in general use, has a diameter of from 10 to 12 feet, and a height of from 6 to 8 feet, and is built of fire brick or stone. It is arched in the interior, and has an opening in the top for charging and for the escape of the gases during the coking process, and a door in the lower front side through which the finished product is "drawn," this door being closed during the coking process. The average charge of coal per oven is from $3\frac{1}{2}$ to 4 tons, the heavier charge requiring more time for the coking process. When the charge is leveled it has a depth of from $2\frac{1}{2}$ to 3 feet in the oven, thus leaving sufficient room for the accumulating gas and for the expansion and rising of the coke during the processes of its manufacture. It is the practice to charge every other oven each day, and the charge is ignited by the heat retained in the walls of the ovens. The ignition is indicated by a puff something like a powder explosion. For 24 hours the gas is allowed to escape, and then the oven is closed up. Furnace coke in general use requires 48 hours for the coking process, while foundry coke is a 72 hour coke. The last 12 hours of the coking process are usually consumed in cooling. Pure water is essential for coke cooling. The object is to expel the water, hydrocarbons and the sulphur, and leave a fixed residuum of ash, carbon and such of the sulphur as cannot be driven off during the coking process. Should the water used in cooling the coke contain sulphur or other deleterious substances, these would be readily absorbed by the coke, and would injure the iron or steel manufactured with such coke.

The operation of the beehive oven is extremely simple. Nevertheless there have been numerous improvements in the ovens erected during the past few years, and especially is this the case in the coking fields adjacent to the Connellsville region, but not strictly in the main coking district. These new ovens are larger in size, have improvements in the way of draft, and electricity enters largely into their operation. The mines which supply these new ovens are lighted with electricity, electric mining machines are used, and electric haulage shaft and tippie operations have been largely introduced. Electricity has supplanted the old "Larry" for the purpose of charging the ovens, and electric and automatic coke-drawers and car-loaders have supplanted hand labor. One great trouble with the beehive oven is the impossibility of obtaining by it an absolute uniformity of the product.

To improve the process of manufacture, larger charges and increased natural air

drafts have been employed, but with no decided results. The beehive ovens erected during the past few years are somewhat larger in size than the old ovens. There have also been various minor changes. In the beehive oven the mass of coal, as it fuses into coke, swells and rises. If, on quenching, it falls back to its original bulk, it makes a hard coke; if not, a soft coke is the result. There is also a lack of uniformity of porosity which is necessary to give toughness and hardness to a furnace or foundry fuel.

The general reduction of the coking industry to a science awaits the introduction of the by-product coke oven wherein the coal is coked in an airtight chamber and an absolute uniformity of the product is assured. The coke yield under the by-product system would be 73 per cent. of the coal charge against 66 per cent. by the beehive system. The resultant economy through the utilization of the by-product would amount to at least 60 cents for each ton of coal coked, and for the 20,000,000 tons coked in the Connellsville region during 1900 the by-products which are now a total waste would represent \$12,000,000. However, during these days, when there is such a great demand for coke, there is not likely to be any great progress by these new coking ideas.

One of the features introduced into the coke business by the H. C. Frick Coke Company is coke crushing. This company has now in operation three great crushers, each having a daily capacity of 2,000 tons. The coke is crushed into sizes corresponding to anthracite coal and is shipped all over the country for various manufacturing and domestic purposes. This and other firms manufacture a special 72 hour foundry coke which combines to the highest degree the requisites of a foundry fuel.

During the past 30 years there has been a wonderful railway development in the region, and today the numerous roads in this district are the most profitable in the country. The coke shipments by the Pennsylvania, the Baltimore and Ohio, and the Pittsburgh and Lake Erie lines of the Vanderbilt system at present exceed 200,000 tons weekly. The year 1907 was the most prosperous in the history of the industry in the United States, the output aggregating 40,779,564 short tons, valued at \$111,539,126. Since the birth of the coke industry in the Connellsville region of Pennsylvania 25 States and Territories have engaged in it; but the Connellsville region still retains its preëminence. In 1908 there were 551 coking plants in the United States, with 101,218 ovens built and 2,241 building, which used 39,440,837 short tons of coal, and produced 26,033,518 short tons of coke, valued at \$62,483,983.

Coke

Coke, Sir Edward, an English lawyer; the son of a Norfolkshire gentleman; born in 1551. After finishing his education at Cambridge he went to London, and entered the Inner Temple. His reputation and practice rapidly increased. He was chosen recorder of the cities of Norwich and of Coventry, knight of the shire for his county, and, in spite of the rivalry of Bacon, attorney-general. As such he conducted the prosecutions for the crown in all great state cases, notably those of Essex and Sir Walter Raleigh, which Coke conducted with great rancor and asperity. In 1613 he became chief-justice of the Court of King's Bench; but his rough temper and staunch support of constitutional liberties brought him into disfavor with King James and his courtiers. In 1621 he was committed to the Tower, and soon after expelled from the privy-council.

In 1628 he was chosen member of Parliament for Buckinghamshire, and greatly distinguished himself by his vindication of the rights of the Commons, and by proposing and framing the famous Petition of Rights. This was the last of his public acts. On the dissolution of the Parliament he retired to his seat in Buckinghamshire, where he died, in September, 1634. His principal works are "Reports, from 1600 to 1615," "Institutes of the Laws of England," in four parts; the first of which contains the celebrated commentary on Littleton's Tenures ("Coke upon Littleton"); "A Treatise of Bail and Mainprise," "Complete Copyholder," etc.

Col ("neck"), in geography, a depression or pass in a mountain-range. In those parts of the Alps where the French language prevails, the passes are usually named Cols—as the Col de Balme, the Col du Géant, etc.

Colberg, or **Kolberg**, a seaport and watering-place of Prussia, in the province of Pomerania, on the Persante, near its mouth in the Baltic, 170 miles N. N. E. of Berlin. It stands on a hill, surrounded with three suburbs. The principal church dates from 1316. In 1102 Duke Boleslaus of Poland vainly besieged Colberg, which endured long sieges in the Thirty Years' War, in the Seven Years' War, and again in 1807, when it was most gallantly defended against the French. Colberg has manufactures of woollens, agricultural machines, and spirits; and salmon and lamprey fisheries. Pop. (1900) 20,200.

Colbert, Jean Baptiste (kōl-bār'), Marquis de Seignelay, a French statesman; born in Rouen in 1619. He served his apprenticeship in a woollen-draper's shop, and afterward went to Paris, where his talents introduced him to Mazarin, who soon employed him in most important affairs of

Colbert

state. On his death-bed, Mazarin warmly recommended Colbert to Louis XIV., who, in 1661, appointed him controller-general of finances. Colbert's administration became a blessing to France. Order was restored in the finances, the revenue increased, and the royal treasury was soon enabled to furnish the means for foreign wars as well as for internal improvements. Commerce was extended, and roads and canals—including that of Languedoc—were made. He organized anew the colonies in Canada, Martinique, and St. Domingo, and founded others at Cayenne and Madagascar. Made minister of marine in 1669, he found France with a few old rotten ships; three years later, she had a fleet of 60 ships of the line, and 40 frigates. Colbert improved the civil code, introduced a marine code of laws, as well as the so-called *Code Noir* for the colonies; and statistical tables of the population were first made out by his orders. While attending to material interests, he did not neglect the arts and sciences; all



JEAN BAPTISTE COLBERT.

men of learning and genius found in Colbert a generous patron. The Academies of Inscriptions, Science, and Architecture were founded by him. In short, Colbert was the patron of industry, commerce, art, science, and literature—the founder of a new epoch in France. Notwithstanding the ingenuity of Colbert, the unbounded extravagance of his master led him to raise money in ways objectionable to his judgment, and to maintain war-taxes in time of peace. He died in 1683. His son, also named Jean Baptiste, born in 1651, succeeded his father as minister of marine, and minister of the king's household. By his capacity and energy, he raised the French navy to its highest power, and in 1684 he led in person the maritime expedition against Genoa. He died in 1690.

Colbrand, or **Colbronde**, the Danish giant slain by Sir Guy of Warwick. By the death of this giant the land was delivered from Danish tribute.

"I am not Sampson, nor Sir Guy, nor Colbrand, to mow 'em down before me."
Shakespeare, "Henry VIII.," v: 4

Colburn, Zerah, an American mathematical prodigy; born in Cabot, Vt., Sept. 1, 1804; displayed such remarkable powers of calculation that in 1810 his father left Vermont to exhibit him. At this period he answered correctly such questions as "How many hours in 1811 years?" in 20 seconds; and a few years later much more complicated problems were solved with equal rapidity. He was shown in Great Britain, and for some time in Paris; from 1816 to 1819 he studied at Westminster School at the expense of the Earl of Bristol. His father died in 1824, and he returned to the United States, where he served as a Methodist preacher for nine years, and from 1835 was Professor of Languages in Norwich University, Vt., where he died March 2, 1840. His remarkable faculty disappeared as he grew to manhood.

Colby College, a co-educational institution in Waterville, Me.; founded in 1818, under the auspices of the Baptist Church; name changed from Waterville College in 1867 and from Colby University in 1899; has endowment funds of \$754,500; buildings valued at over \$325,000; volumes in the library, over 46,000; average annual ordinary income, about \$43,000; average faculty, 18; students, about 280.

Colchester, a borough, and sea-port of England, 50 miles N. E. of London. It is a very ancient and flourishing place, and possesses some fine architectural remains. It has a large oyster-fishing trade, and exports of corn and malt. In 1648 Colchester stood a memorable siege of 11 weeks against the Parliamentary forces, who eventually starved out the royalist garrison and hung the leaders.

Colchicum, a genus of plants, order *Melanthaceæ*. The perianth is tubular, and very long, rising from a spathe, the limb campanulate, 6-partite petaloid, the capsule 3-celled, with the cells united at the base. *C. autumnale*, the meadow saffron, is found in meadows and pastures of the north temperate regions. The leaves and fruit attract little attention in spring when they are in perfection; both wither before the summer is far advanced. The flowers, on the contrary, which are pale-purple, flourish from August to October. To a superficial observer the plant looks like a crocus, and in fact it has received the erroneous name of autumnal crocus; but it has six stamens, while the crocus genus has but three. The corms of the meadow saffron are poisonous,

but much use has been made of them in medicine.

Colchicum Corm, the fresh corm of *C. autumnale*, or common meadow saffron, which is collected about the end of June, and stripped of its coat, sliced transversely, and dried at 150° F. The fresh corm is about the size of a chestnut flattened where it has an undeveloped bud. The dried slices are about a line thick, firm, flat, and amyloseous. The taste is bitter and acrid. Used to make extract, an acetic extract, and *Vinum colchici*. According to Garrod, Colchicum increases the flow of the bile and diminishes the heart's action; it possesses the power of controlling the pain and inflammation in cases of gout and inflammatory rheumatism. The seeds, *Colchici semina*, are used to form a tincture which has the same medicinal properties. They are hard, reddish brown, spherical seeds about the size of mustard-seeds.

Colchis, or **Colchos**, a former country of Asia, to the S. of Asiatic Sarmatia, E. of the Euxine Sea, N. of Armenia, and W. of Iberia. In ancient history it is famous for the expedition of the Argonauts, and for being the birth-place of Medea. It was fruitful in poisonous herbs, and produced excellent flax. In the 15th century it was subdivided into several principalities, and is now comprised in the Russian government of Trans-Caucasus.

Colcothar, red oxide of iron, ferric oxide, F_2O_3 . A reddish-brown powder obtained when ferrous sulphate is distilled for Nordhausen sulphuric acid; it remains in the retorts. It is used as a red pigment, and is employed to polish glass, and, when finely divided, by jewelers is known under the name of rouge. It is sometimes called *croceus martis*, and was called *caput mortuum vitrioli* by the alchemists.

Cold, the term by which is signified a relative want of sensible heat. There are therefore no determinate boundaries between cold and heat, and it is a mere arbitrary distinction to call the degrees of the thermometer below the freezing-point degrees of cold. When the atmosphere, or any substance which comes in contact with our body, is at a lower temperature than the skin, it absorbs heat from it, and we call it cold.

The physiological action of cold on the animal organism requires a brief notice. All animals (the warm-blooded animals to the greatest extent) have a certain power of maintaining the heat of the body in defiance of external cold. This power is mainly due to a process analogous to combustion, in which carbon and hydrogen taken into the system in food are made to unite with oxygen derived from the air by respiration. If the combustible materials

Cold Cream

are not duly furnished, or if the supply of oxygen be deficient (as in various diseased conditions), there must be a depression of temperature. Now, if the temperature of a bird or mammal (except in the case of hibernating animals) be lowered about 30° below its normal standard (which in birds ranges from 100° to 112° , and in mammals from 96° to 102°), the death of the animal is the result. The symptoms indicating that an animal or a man is suffering from a depression of the temperature of the body are—retardation of the circulation of the blood, causing lividity of the skin, which is followed by pallor, in consequence of the blood being almost entirely driven from the surface through the contracting of the vessels; a peculiar torpor of the muscular and nervous systems at the same time manifests itself in an indisposition to make any effort or exertion, and in intense sleepiness. The respiratory movements become slower and the loss of heat goes on, therefore, with increasing rapidity, till the fatal limit is reached and death supervenes.

In hibernating animals (the marmot, dormouse, bat, etc.) the power of generating heat within their own bodies is very slight, their temperature following that of the external air, so that it may be brought down nearly to the freezing-point.

Great or prolonged atmospheric cold is a most powerful depressing agent, and is a fruitful cause of disease and even of death. Whenever the temperature of the atmosphere is suddenly reduced, and particularly when it is reduced below the freezing-point a considerable addition takes place to the mortality of the region. The effects of cold are, in ordinary circumstances, most apparent among the aged and the very young, and among those suffering from chronic disease; but when a very low temperature is long continued, even the healthy are sure to suffer, when impoverished so as not to have sufficient means of external warmth in their homes.

Cold is applied in various ways in the treatment of disease. In some forms of fever, a cold bath, or cold wet pack, is the best means of reducing a very high temperature which of itself threatens life. In many inflammations relief is best obtained by the local application of ice, or of a coiled tube through which cold water circulates. The tonic and stimulating effects of a temporary application of cold are familiar in the cold morning bath, or the use of cold water sprinkled on the face of a person who has fainted.

Cold Cream, a cooling ointment prepared in various ways. A good variety may be made by heating four parts of olive-oil with one of white wax. This ointment cools the skin, rendering it soft and pliable, and is

Coldstream

successfully applied for the cure of chapped hands.

Colden, Cadwallader, an American scientist and colonial official; born in Dunse, Scotland, Feb. 17. 1688. He was graduated from the University of Edinburgh in 1705, and emigrated to the American colonies in 1708. He devoted himself to botany and astronomy and also to public affairs, becoming surveyor-general of New York and president of the Council. He sided with the crown in the contest over the stamp act. Among his correspondents were Franklin and Linnaeus, and he wrote "Cause of Gravitation" and "History of the Five Indian Nations." He died on Long Island, N. Y., Sept. 28, 1776.

Cold Harbor, a village in Hanover county, Va., 2 miles N. E. of Chickahominy Creek, and 9 miles N. E. of Richmond. It is noted as the scene of two battles during the Civil War: June 3, 1864, between the Confederates under Gen. Lee and the Federals under Gen. Grant; and a smaller encounter, June 27, 1862, at Gaines' Mill, at this place.

Cold Storage, the method now generally employed to preserve perishable articles of food by the air of freezing machines, which reduce the temperature of the air. Cold Storage warehouses are found in all large cities, and have proved of great value in keeping fruits and meats in an unchanged condition from one season to the other. This method is also used on cars and ships transporting perishable material. It should be remembered, however, that articles taken from cold storage should be used at once, as decay speedily sets in when they are exposed to the air. The cold storage building erected by the United States Government at Manila is probably unexcelled in scientific construction. It has a storage capacity for 1,200 tons of beef, 200 tons of mutton, 50 tons of butter, 100 tons of potatoes, and 100 tons of bacon; or, in other words, sufficient food to feed an army of 10,000 men for three months. In addition to the ordinary freezing apparatus it has an ice plant with a daily output of 40 tons. The elevator with its 2,400 pound lifting capacity, as well as most of the other appliances in the building, are operated by electricity. Connecting with the elevator is an overhead tracking system extending 4 miles, and the mechanism is so complete that a ship landing at a near-by pier has only to open her hatches and her cargo is transported to the storage almost automatically. The power in the building is furnished by three 200-horsepower engines.

Coldstream, a town of Berwickshire, Scotland, 15 miles S. W. of Berwick, on the Tweed, over which there is a fine bridge by Smeaton (1766). At Coldstream was the

famous ford by which Edward I. entered Scotland in 1296, and near which he met the Scottish nobles, to settle the dispute about the crown of Scotland. By this ford also the Scots invaded England in 1640. Being convenient as a Border town, Coldstream, like Gretna Green and Lamberton toll-bar near Berwick, was formerly celebrated for its clandestine marriages.

Coldstream Guards, a regiment in the Foot Guards or Household Brigade, the oldest in the British army except the 1st Foot, now called the Royal Scots. Raised in 1660 by Gen. Monk at Coldstream, it was at first called "Monk's Regiment," but when Parliament consented to give a brigade of guards to Charles II., this corps, under the name of Coldstream Guards, was included in it.

Coldwater, a city and county-seat of Branch Co., Mich.; is on the Coldwater river, and the Lake Shore and Michigan Central railroad, 156 miles E. of Chicago. The Coldwater river supplies power for the various manufacturing establishments. It is the seat of the State School for pauper children, and has a park, two libraries, a high school, several newspapers, two National banks, and an assessed property valuation of \$3,000,000. Pop. (1890) 5,247, (1900) 6,216.

Cold Wave, a term used in the United States for a drop of at least 20° in temperature in 24 hours, bringing the temperature below the freezing point. It is due to steady winds from the N. W., which bring with them the chill conditions of the great Western Canadian plains. This chill seems due to anti-cyclonic conditions which bring down to the surface the cold air of the upper atmosphere, and cause it to flow out over the Southern and Eastern United States.

Cole, Asahel N., an American agriculturist and editor; born in 1821. He was educated in the public schools of Western New York State, and when 21 he entered politics. He figured prominently as a Republican in the party's early days, and in 1852 he founded the "Genesee Valley Free Press," the pioneer Republican paper. He was no less noted as an agriculturist, being widely known as the father of subsurface irrigation. He died in Wellsville, N. Y., July 14, 1889.

Cole, King, a legendary British king, described as "a merry old soul," fond of his pipe, and fond of his "bowl," and fond of his "fiddlers three."

Cole, Thomas, an American landscape painter; born in Lancashire, England, Feb. 1, 1801. His father, a woolen manufacturer, came to the United States when Thomas was 18 years old, and settled in

Steubenville, O. Thomas worked in his father's shop for two years, but the coming of a portrait-painter to the village made him wish to be an artist. After a few lessons he set to work to paint pictures, and traveled for a while painting portraits and landscapes, but often had to paint chairs and japanned ware for a living. At last he went to New York, and by hard work succeeded in making himself one of the best landscape-painters in this country. He then became famous and made so much money that he was able to go to Europe and study the works of the old painters. After he came back he painted some well-known pictures, among the best of which are five called "The Course of Empire," and four called "The Voyage of Life." The last, showing childhood, youth, manhood, and old age, are very popular, and are well known through engravings. He died in Catskill, N. Y., February, 1848.

Cole, Timothy, an English wood-engraver; born in London, April 6, 1852. He early came to the United States, and established himself as an engraver, first in Chicago, and afterward in New York, where he pursued his calling with much success. In 1883 he went to Europe, and began a series of engravings from the old masters.

Colebrook, Henry Thomas, an English Sanskrit scholar; born in London, June 15, 1765. In 1782 his father's influence procured him a writership in the Bengal service. His duties as revenue officer at Tirhut led him to make a minute study of the state of husbandry in Bengal; his legal functions led him to study Indian law and learn Sanskrit; and he began in 1794 publishing essays on Indian religion, poetry, and science in the "Asiatic Researches" of the Asiatic Society of Calcutta. His removal in 1795 to the magistracy of Mirzapur gave him the opportunity of cultivating the acquaintance of the learned men of the neighboring Sanskrit college at Benares, and with this advantage he brought out his "Digest of Hindu Law on Contracts and Successions." A mission to Nagpur (1799-1801) interrupted his work, and on his return he was appointed a judge of the new court of appeals at Calcutta, and at the same time honorary professor of Hindu Law and Sanskrit at the college of Fort William. Yet he contrived during this busy period to publish the first (and only) volume of his "Sanskrit Grammar" (1805), based upon Pāṇini and the native commentators, to write his famous articles on the Vedas and on the sect of Jains, besides many other valuable essays for "Asiatic Researches," and also to supplement his "Digest" by "Two Treatises on the Hindu Law of Inheritance" (1810). He died March 10, 1837.

Coleman

Coleman, Arthur Philemon, a Canadian educator; born in Lachute, Quebec, April 4, 1852. He was educated at Victoria University and at the University of Breslau, and after some years of scientific work he became Professor of Geology and Natural History in Victoria University, and in 1891 Professor of Assaying and Metallurgy in the School of Practical Science, Toronto.

Coleman, Leighton, an American clergyman; born in Philadelphia, May 3, 1837. He was graduated at the General Theological Seminary in 1861, becoming an Episcopalian priest in 1862, and, after holding important rectorships, was made bishop of Delaware in 1888. Chief work: "The Church in America." He died Dec. 14, 1907.

Colenso, John William, an English clergyman; born in Cornwall, Jan. 24, 1814. In 1846 he was appointed rector of Fornsett St. Mary, in the county of Norfolk, and 1854 first Bishop of Natal, South Africa. In the next year appeared his "Ten Weeks in Natal"; in 1861 his "Translation of the Epistle to the Romans Commented on from a Missionary Point of View"; and "A Letter to his Grace the Archbishop of Canterbury upon the Question of the Proper Treatment of Cases of Polygamy, as Found Already Existing in Converts from Heathenism." The outcry raised by his professional brethren against the "Letter" was sufficiently loud, but it was nothing to the tempest of disapprobation that burst forth in the following year (1862), when he published "The Pentateuch and Book of Joshua Critically Examined." The Bishop of Cape Town, the metropolitan Bishop, declared Colenso deposed from his see; but on an appeal to the Privy Council, in 1865, the deposition was pronounced null and void. Colenso wrote treatises on mathematics used as text-books. He died in Durban, Natal, June 20, 1883.

Coleoptera, an order of insects which, with a little change of limits and characters, has been recognized since the days of Aristotle. The number of species enumerated by naturalists, and of which examples are gathered in museums, amounts to 100,000. The Coleoptera are sometimes collectively called beetles, though that name is generally more limited in its application, and many of them are known by other names, as weevils, lady-bugs, etc. The glow-worm and the blistering-fly belong to this order.

Coleridge, Hartley, an English poet and literary critic, son of Samuel Taylor Coleridge; born in Bristol in 1796. From Oxford he went to London, and there published some exquisite sonnets in the "London Magazine." He inherited defects of character and will, and never realized the promise of his great talents. His writings in prose are

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"Biographia Borealis" (1833), "The Worthies of Yorkshire and Lancashire" (1836), and a volume of "Essays and Marginalia." His brother Derwent published a biography and his poems. He died in 1849.

Coleridge, Henry Nelson, an English author; son of Colonel Coleridge; a brother of the elder Coleridge; born in 1800. A distinguished student at Cambridge, and a contributor along with Macaulay and Praed to "Knight's Quarterly Magazine," he is best known as the editor of the "Literary Remains and Table Talk" of his uncle, Samuel Taylor Coleridge. He died Jan. 26, 1843.

Coleridge, Samuel Taylor, an English poet and philosopher; born in Ottery St. Mary, Devonshire, Oct. 21, 1772. Sent to school at Christ's Church Hospital, to which he had obtained a representation, young Coleridge took little interest in the ordinary sports of childhood, and was noted for a dreamy abstracted manner, though he made considerable progress in classical studies, and was known even at that early age as a devourer of metaphysical and theological works. From Christ's Church he went with a scholarship to Jesus College, Cambridge, where he remained for two years, but without achieving much distinction. At this time, too, his ultra-radical and rationalistic



SAMUEL T. COLERIDGE.

opinions made the idea of academic preferment hopeless, and perhaps it was partly to escape the difficulties and perplexities gathering about his future that Coleridge suddenly quitted Cambridge and enlisted in the 15th Dragoons. Rescued by his friends from this position, he took up his residence at Bristol with two congenial spirits, Robert Southey, who had just been obliged to quit Oxford for his Unitarian opinions, and Lovell, a young Quaker. The three conceived the project of emigrating to America, and establishing a panfisocracy, as they

termed it, or community in which all should be equal, on the banks of the Susquehanna. This scheme, however, never became anything more than a theory, and was finally disposed of when, in 1795, the three friends married three sisters, the Misses Fricket of Bristol. Coleridge about this time started a periodical, the "Watchman," which did not live beyond the ninth number.

In 1796 he took a cottage at Nether Stowey, in Somersetshire, where, soothed and supported by the companionship of Wordsworth, who came to reside at Allfoxden, he wrote much of his best poetry, in particular the "Ancient Mariner" and the first part of "Christabel." While residing at Nether Stowey he used to officiate in a Unitarian chapel at Taunton, and in 1798 received an invitation to take the charge of a congregation of this denomination at Shrewsbury, where, however, he did nothing further than preach the probation sermon. An annuity bestowed on him by some friends (the Wedgewoods) furnished him with the means of making a tour to Germany, where he studied at the University of Göttingen. In 1800 he returned to England and took up his residence beside Southey at Keswick, while Wordsworth lived at Grasmere in the same neighborhood. From this fact, and a certain common vein in their poetry, arose the epithet of "Lake School" applied to their works. About 1804 Coleridge went to Malta to reestablish his health, seriously impaired by opium-eating. In 1806 he returned to England, and after 10 years of somewhat desultory literary work as lecturer, contributor to periodicals, etc., Coleridge in a way took refuge from the world in the house of his friend Mr. Gillman at Highgate, London. Here he passed the rest of his days, holding weekly conversaciones in which he poured himself forth in eloquent monologues, being by general consent one of the most wonderful talkers of the time. Of the many years he spent at Highgate nothing remains but the "Table Talk" and the fragmentary notes and criticism gathered together, and edited by his nephew, valuable enough of their kind, but less than might have been expected of Coleridge. He died July 25, 1834. The dreamy and transcendental character of Coleridge's poetry eminently exhibits the man. In his best moments he has a fine sublimity of thought and expression not surpassed by Milton; but he is often turgid and verbose. As a critic, especially of Shakespeare, Coleridge's work is of the highest rank, combining a comprehensive grasp of large critical principles and a singularly subtle insight into details. Coleridge's poetical works include "The Ancient Mariner," "Christabel" (incomplete), "Remorse," a Tragedy, "Kubla Khan," a translation of Schiller's "Wallenstein," etc. His prose

works, "Biographia Literaria," "The Friend," "The Statesman's Manual," "Aids to Reflection," "On the Constitution of Church and State," etc. Posthumously were published specimens of his "Table Talk," "Literary Remains," etc.

Coleridge, Sara, an English poet, daughter of Samuel Taylor Coleridge; born in Greta Hall, near Keswick, Dec. 22, 1802. The genius of her father seemed almost to have inspired her "Phantasmion," a ballad of fairyland. Her classical learning and scientific attainments made her an authority on some of the most abstruse subjects. She died in London, May 3, 1852.

Coleridge-Taylor, Samuel, an Anglo-African composer; born in London, Aug. 15, 1875. His father was a native of Sierra Leone and his mother English. He became conductor of the Handel Society, Washington, D. C., in 1904; works (over 60) include "Hiawatha" and "The Atonement" (cantatas).

Coles, Abraham, an American prose-writer and poet; born in Scotch Plains, N. J., Dec. 26, 1813. In 1835 he graduated from Jefferson Medical College, Philadelphia. He published 13 original translations of the celebrated hymn "Dies Iræ" (1859). "Old Gems in New Settings" (1866), "The Microcosm," and "The Light of the World" (1884). He died in Monterey, Cal., May 3, 1891.

Coles, Cowper Phipps, an English naval architect; born in Hampshire in 1819; early entered the navy, and became lieutenant in 1846 and captain in 1856. In 1855 he constructed a gun-raft which was favorably reported on; from 1856 he was engaged in experiments, and ultimately produced a form of turret-ship, the general idea of which had probably occurred to him independently, although its development owed much to the invention of John Ericsson (*q. v.*). A vessel was built from his designs, with little more than 6 feet of free-board; it was commissioned as the "Captain" early in 1870, and on Sept. 7 turned bottom upward in a gale, and sank off Cape Finisterre, almost all on board, including Coles, being drowned.

Coleseed, a name for a variety of cabbage (*Brassica Napus*), and its seed, which is made into oil-cake for feeding cattle.

Colet, John, an English clergyman; born in London about 1467; studied at Oxford with the view of entering the church, and about 1493 made a prolonged visit to the Continent. While in Italy he became acquainted with the views of Savonarola, which subsequent study and experience led him to regard with increasing approval. Having returned to England in 1496, and been ordained priest, he delivered at Oxford a series of lectures on the Epistles of St.

Cole-wort

Paul, which attracted great attention, his principles of interpretation being at every point opposed to those of the scholastic theologians. In 1498 Erasmus came to Oxford, and it is one of Colet's chief claims to remembrance that he powerfully influenced that scholar's opinions on the proper methods of Scripture interpretation and on the value of the scholastic philosophy. In 1505 Colet was made Dean of St. Paul's, London, and in this office still continued to deliver lectures on different books of Scripture which gave rise to much diversity of opinion. With the large fortune he inherited on the death of his father, Colet founded St. Paul's School. He died Sept. 16, 1519.

Cole-wort, the common cultivated cabbage (*Brassica oleracea*); called also collet.

Colfax, Schuyler, an American statesman; born in New York, March 23, 1823; removed in 1836 to Indiana, where in 1845 he acquired a newspaper at South Bend, which he made the most influential Whig journal in the district. He was a delegate to the Whig conventions of 1848 and 1852; was elected to Congress in 1854 by the newly-formed Republican party, and re-elected until 1869, being thrice chosen Speaker; and in 1868 he was elected vice-president of the United States, in Grant's first term. Implicated, unjustly, as he and his friends claimed, in the Credit Mobilier charges of 1873, he spent the remainder of his life in political retirement, making public appearances only on the lecture platform, and died in Mankato, Minn., Jan. 13, 1885. He was the founder of the Daughters of Rebekah branch of American Odd Fellowship.

Colgate University, an educational institution in Hamilton, N. Y.; organized in 1819, under the auspices of the Baptist Church, but now non-sectarian in control; has grounds and buildings valued at about \$500,000; productive funds exceeding \$1,750,000; scientific apparatus, \$30,000; volumes in library, 50,000; average ordinary income, about \$150,000; fellowships, 2; scholarships, 80; faculty, 50; students, 500.

Coligny, Gaspard de, Admiral of France; born in Châtillon-sur-Loing in 1517; distinguished himself under Francis I. in the battle of Cerisoles and under Henry II., who made him colonel-general of the French infantry, and in 1552 Admiral of France. He was distinguished for valor in battle, for strict discipline, and for his conquests over the Spaniards, in particular for his defense of St. Quentin. When St. Quentin was taken by storm, the admiral was made prisoner. After the death of Henry II. the intrigues of Catharine de' Medici induced him to place himself at the head of the Calvinists against the Guises. He formed so powerful a party that the

Coligny

Catholic religion in France seemed to be in danger. Condé was more ambitious, enterprising, active; Coligny more considerate, prudent, and more fit to be the leader of a party; equally unfortunate in war with Condé, but skilled in remedying even what appeared irretrievable losses, and more to be feared after a defeat than his enemies after a victory, he was also endowed with virtues, which he practised as far as party spirit and the violence of the times permitted him. The first battle between the Huguenots and Catholics (1562, at Dreux) was lost by the admiral, but he saved his army. When the Duke of Guise was murdered at the siege of Orleans, he was accused of being the author of the murder, but he cleared himself by an oath; it was unnecessary, the nobleness of his spirit raising him above suspicion. The civil war recommenced with increased fury in 1567. Coligny and Condé encountered the Constable Montmorency at St. Denis. This indecisive action was followed by the battle of Jarnac (in 1569), which was fatal to the Calvinists. Condé fell, and the whole burden of command devolved on Coligny. He alone sustained his party, and was beaten again at Moncontour, without however losing his courage. An advantageous peace seemingly put a stop to this contest (1570). Coligny appeared at court, and was with his adherents loaded with favors. Charles IX. gave him 100,000 francs as an indemnification for his injuries, together with a seat in the council. From all sides he was warned not to trust to these caresses. As the admiral was leaving the Louvre, Aug. 22, 1572, his right hand and left arm were wounded by a shot from a window. One Maurenal had fired at him from a building belonging to the monastery of St. Germain l'Auxerrois, according to the plan of Catharine de' Medici, probably with the knowledge of the Duke of Guise. Charles testified the deepest sorrow, caused search to be made for the assassin, and said to Coligny, "My father, you have the wounds, but I the pain." This he said at the moment when the massacre of the Protestants was already prepared. The slaughter began on the night of St. Bartholomew's, Aug. 24, 1572. The Duke of Guise hastened with a numerous suite to the house of the admiral. One Behme, or Besme, at their head, entered with his drawn sword into the chamber of the old man, who, sitting in an easy chair, said with a calm mien to their leader, "Young man, my gray hairs ought to command thy respect; but do as thou pleasest; thou canst shorten my life but a few days;" on which the wretch pierced him with several stabs and threw the body out of the window into the courtyard. The corpse was given up for three days to the fury of the people, and finally was hung up by the feet on a gibbet, at Montfaucon.

Montmorency, a cousin of Coligny, had it taken down, and secretly buried in the chapel of the castle of Chantilly. The head was carried to Catherine, who had it embalmed and sent to Rome.

Colima (kō-lī'mä), a Mexican State on the Pacific coast, with an area of 2,272 square miles, and a pop. (1900) of 65,026. The soil is very fertile, the climate warm; large quantities of coffee, sugar, rice, tobacco, maize, and cotton are grown. The capital, Colima, 1,450 feet above the sea, about 40 miles E. N. E. of the port of Manzanillo, is regularly built, with narrow streets crossing at right angles, and has several large cotton factories. Pop. (1895), 19,305. Beyond the State frontier, about 35 miles N. E. of the capital, rises the volcano of Colima (12,750 feet).

Coliseum, more properly **Colosseum**, a gigantic ruin in Rome, the greatest amphitheater which Roman magnificence ever erected. It was commenced by Vespasian (reigned A. D. 69-79), and practically finished by Titus about the year A. D. 80, who dedicated it with shows in which 5,000 animals were killed. It is said to have held 100,000 spectators, of whom about 87,000 were seated. For the greater part it consists of travertine, is elliptical in shape, 1,680 feet in circumference, and 157 feet high, and has three rows of columns, one above the other: the lowest is of the Doric, the second the Ionic, and the highest the Corinthian order. The diameter of the arena from side to side was 182 feet, from end to end 285 feet. Down to the 6th century this monument of ancient grandeur remained almost uninjured, when Theodoric, king of the Goths, caused material to be taken from it for the construction of various buildings; afterward Pope Paul II. took all the stones from it which were used for the construction of the palace of St. Mark, and in later times some other palaces were erected from its fragments. At present, care is taken not to touch the ruins of the Coliseum, but it is gradually crumbling away of itself. Only a portion (from 6 to 10 arcades) of the upper range remains, the lower part is comparatively entire. The Coliseum received its name from the colossal statue of Nero which was placed in it.

Collect, a name given to certain brief and comprehensive prayers, found in all liturgies and public devotional offices. The origin of the term is not certain; according to some, it is from these prayers being said in the congregation or collection of the people; according to others, because they are a brief and comprehensive summary of many longer petitions collected into one. They are of great antiquity, being mentioned by writers of the 3d century, and occur in the sacramentary of Gelasius, patriarch of Rome, A. D. 494.

Collectivism, a word of recent origin, intended to express the central idea in the economic theory of socialism, that industry should be carried on with a collective capital. It means that capital should not be owned and controlled by individuals, but by groups of associated workers, that it should be the joint property of the community or other form of social organization. Its exact meaning depends very much on the form of socialism with which the principle is connected.

College, a collection, body, or community of persons, having certain rights and privileges, and devoted to certain pursuits. In the old Roman Empire a *collegia* was sometimes called also a *corpus*, whence the word corporate applied to persons associated together. There were many corporations, but none were allowed permanently to exist unless they obtained the sanction of the Senate or the Emperor. In Mediæval and modern times Colleges consisting of persons associated for various purposes are common, as the College of Physicians, the College of Preceptors; but in most such cases the members do not live in common.

Colleges in Connection with Universities.—Universities came into existence before Colleges, and the original state of things may still be seen in Scotland, where the immense mass of students reside where they like. The practice of living in common is only now beginning to creep in. Nevertheless, the word College has long been used in Scotland in connection with the universities, though in a vague sense. In the United States the words university and College have not heretofore been well discriminated. In England, on the contrary, the two words are very precisely distinguished.

American Colleges.—There are about 750 Colleges and universities in the United States. Among the best known American Colleges may be mentioned, with location and year of foundation: Amherst, Amherst, Mass., 1821; Bowdoin, Brunswick, Me., 1794; Charleston, Charleston, S. C., 1785; Columbia (Univ.), New York City, 1754; Dartmouth, Hanover, N. H., 1769; Dickinson, Carlisle, Pa., 1783; Georgetown, Washington, D. C., 1788; Hampden-Sidney, Hampden-Sidney, Va., 1775; Harvard (Univ.), Cambridge, Mass., 1636; Princeton (Univ.), Princeton, N. J., 1746; Randolph-Macon, Ashland, Va., 1832; Richmond, Richmond, Va., 1840; Rutgers, New Brunswick, N. J., 1766; St. Johns, Annapolis, Md., 1789; Trinity, Hartford, Conn., 1823; Union, Schenectady, N. Y., 1795; Vassar, Poughkeepsie, N. Y., 1861; Washington, Chestertown, Md., 1782; Wellesley, Wellesley, Mass., 1875; William and Mary, Williamsburg, Va., 1693; Williams, Williamstown, Mass., 1793; Yale (Univ.), New Haven, Conn., 1701.

College

At the end of the school year 1897-1898 there were 136 Colleges and universities for men and 344 for men and for both sexes. The former had 22,226 undergraduate students and the latter 132,512 males and 16,708 female students. The professors and instructors aggregated 11,571 males and 1,577 females. Combining the preparatory, collegiate, graduate, and professional departments there were 118,820 male and 35,613 female students. The combined institutions had 417 fellowships; 7,077 scholarships; 7,096,325 volumes in the library, valued at \$9,098,502; scientific apparatus, valued at \$11,004,532; grounds and buildings valued at \$126,211,099; and productive funds, \$119,632,651. The total income was \$19,213,371 and the benefactions, \$7,532,239. For details of American Colleges and universities, see their respective titles and the articles on the States and cities. See also COLLEGES FOR WOMEN; PROFESSIONAL SCHOOLS; TECHNOLOGY, SCHOOLS OF.

It is thought that Colleges first arose in connection with the University of Paris, about A.D. 1140 or 1215, and that from France they spread to England.

Till lately all members of the two older English universities were required to belong to a College; now there are a number of students unattached. A College consists first of a head, sometimes called by that name, in other cases designated a Provost, a Master, a Rector, a Principal, or a Warden. Next in dignity follow Fellows of the College and Scholars of the College: generally these are students as well. The teaching afforded by the Colleges at Oxford and Cambridge is provided by the Tutors, who appoint Lecturers with the sanction of the head of the College. The law of the college is that expressed in the will of the Founder, and someone generally possesses visitatorial powers to see that such regulations are carried out. Prior to the Reformation the clergy regarded the Colleges of Oxford, Cambridge, and other universities as clerical corporations; the right of visitation was therefore claimed by the ordinary of the diocese. Blackstone, however, states that now they are legally viewed as civil corporations.

The College de Propaganda is a name sometimes given to what is more fully and accurately termed *Congregatio de Propaganda Fide*, and popularly the Propaganda.

College de France, a celebrated institution founded by Francis I., in 1530, originally a *College de Trois Langues* merely, is now a very important educational institution, giving instruction over a very wide field of literature, history, and science. It is independent of the University of France, is directly under the Minister of Public Instruction, and is supported by the government. As in the Sorbonne, the lectures are

College of New York

gratuitous, and for the most part are designed to attract auditors older than ordinary university students. The College comprises two faculties, one literary, one scientific; each has about 20 professors. Among the professors are some of the most distinguished scholars and scientists in France, such as Renan, Laboulaye, Gaston de Paris, in the literary department, and Brown-Séquard in the science department.

College Fraternities, societies existing in American colleges which are named from the letters of the Greek alphabet and therefore commonly called "Greek Letter Societies." They are secret organizations only in their grips and passwords. They are organized chiefly for literary and social purposes and are found among women students as well as men. The first of these fraternities, the Phi Beta Kappa, was organized at William and Mary College, in Virginia, in 1776. On account of the troubled state of the colony during the Revolutionary War, the original chapter ceased to exist in 1781, but branches, or "chapters," as they are called, had already been established at Harvard and Yale, and by these other branches were afterwards organized. It still exists as the chief society, indicating scholarly distinction in 50 different colleges. Of the general fraternities now in existence the first, the Kappa Alpha, was founded at Union College in 1825. In 1827 two more were established in the same college, the Sigma Phi and Delta Phi, and in 1832 one was organized at Hamilton College, the Alpha Delta Phi.

While at first these societies did not find favor with the faculties of the colleges, the objections to them have in later years generally been withdrawn, and the number of fraternities has largely increased. There are now (1898) 29 general college Greek letter societies in the United States, which have a membership of 131,000, with some 780 active chapters and 370 inactive chapters. They own 134 houses or halls in various college towns and cities. There are seven women's college fraternities, the oldest being the Pi Beta Phi, founded at Monmouth in 1867. A number of journals are published by the societies, the oldest still in existence being the "Beta Theta Pi," established in 1872. The oldest women's journal is the "Golden Key," established by Kappa Kappa Gamma in 1882, now known as the "Key." See Baird's "American College Fraternities." WILLIAM C. LANE.

College of the City of New York, an educational (non-sect.) institution in Manhattan Borough, N. Y.; organized in 1848; has grounds and buildings valued at over \$6,500,000; scientific apparatus, \$580,000; volumes in the library, 40,000; average annual income from the city, \$585,000;

fellowships, 8; average number of faculty, 230; average student attendance, 4,500; number of graduates, over 3,500.

Colleges for Women, institutions of higher learning, designed to give women practically the same advantages of instruction and research as are afforded to men. They are of three types: independent or separate colleges; coördinate or affiliated colleges, connected more or less closely with an older college for men, and co-educational colleges.

I. Independent colleges for women of the same grade as those for men are peculiar to the United States. The earliest foundation was Mount Holyoke College, opened as a seminary in 1837; reorganized as a college in 1893. It has graduated more than 3,000 students. The first charter for a collegiate institution founded only for women was granted Elmira College in 1855. The four colleges, Vassar, opened in 1861; Smith, in 1875; Wellesley, in 1875, and Bryn Mawr, in 1885, are ranked among the 58 leading colleges of the United States in point of endowment and wealth of equipment, number of teachers and students, and variety of courses of study offered. Wells College, founded as a seminary in 1868, chartered a college in 1870, and the Woman's College of Baltimore, opened in 1888, also have good endowments and high standards. The standing of all these institutions is higher than many of the so-called universities of the country, and the degrees conferred are the same as those given in the men's colleges.

II. The affiliated colleges for women are five: Radcliffe College, at Harvard University, opened in 1879; Barnard College, at Columbia University, in 1889; Woman's College, of Brown University, in 1892; College for Women, of Western Reserve University, in 1888; Sophie Newcomb Memorial College, at Tulane University, in 1886. In all these colleges the standards of entrance and graduation are the same as in the men's colleges with which they are affiliated, and usually the instructors are the same.

III. The prevailing system of education in the United States for both men and women, began in Oberlin College, in Ohio, founded in 1833, chartered as a college in 1850, built "for the education of both sexes and all colors." Antioch College, also in Ohio, followed in 1853, by admitting both men and women on equal terms. In 1900 every State university in the country, except those of Virginia, Georgia, and Louisiana, admitted women. Of the 480 colleges for men in the United States enumerated by the Commissioner of Education, 336, or 70 per cent., admit women, or, omitting Catholic colleges (which do not admit women), 80 per cent. In the list of the 58 leading colleges in the United States there

are only 10 to which women are not admitted in some departments (all on the Atlantic seaboard).

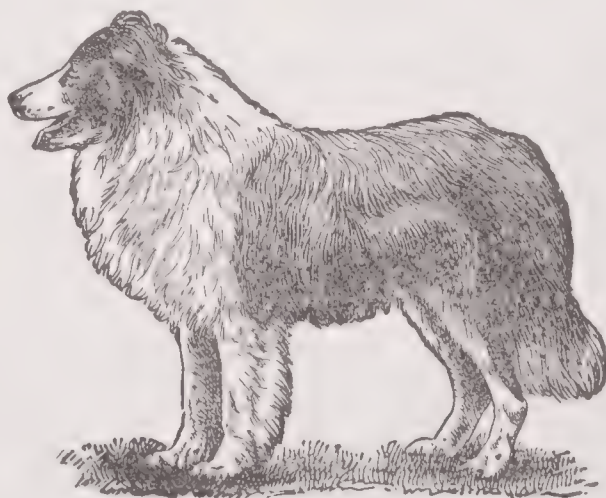
Many professional schools and colleges have been opened to women in theology, law, medicine, dentistry, pharmacy, schools of technology and agriculture, and the number of women entering these professions is increasing rapidly.

In 1890-1900 the increase of women students in medicine was 64.2 per cent.; in dentistry, 205.7 per cent.; in pharmacy, 190 per cent.; in technology and agriculture, 194.7 per cent.

There were, in 1900, in the United States, more than 20,000 women college graduates, and the number is growing so rapidly that it may be considered a national movement. In Europe the advance in this direction has been much slower. The first woman's college in Cambridge, England, was begun in 1839. Now Oxford and Cambridge give large opportunities to women, but do not confer upon them their degrees. With these exceptions, all the greater English and Scotch universities and colleges in Great Britain and in her colonies give their degrees to women. Outside of Germany, Austria, and Russia, all European university degrees are open to women. Yet Russia has the distinction of having first given women the opportunity of studying medicine on the same terms with men, and to most of the lecture rooms of German-speaking universities women are admitted by special favor, while every year sees more German universities giving their highest degrees to women.

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Collegiate Church, in England, a religious house built and endowed for a society or body corporate, a dean or other president, and secular priests, as canons or prebendaries, independently of any cathedral.



COLLIE.

Collie, a breed of the dog of obscure origin, but for which great antiquity is claimed. Buffon has gone so far as to call it the oldest known breed, an opinion not now generally entertained; though it is

Collier

only reasonable to suppose that the ancients, after providing a dog for the chase, next turned their attention to obtaining a guardian for their flocks. For many years collies were confined to Scotland and the N. counties of England, until their good points as a graceful and intelligent companion attracting more attention, they were taken S. in large numbers, and became the most popular breed of the day. Thanks to judicious breeding and a large expenditure of money, the best show collies are now all found in England. Tempted by the demand for black-and-tan dogs, a cross with the Gordon setter was resorted to, producing many collies with the flat ears and open coat of the setter, a cross to be avoided at all costs. In judging the collie the fact should never be forgotten that it is meant to do work in all weathers, requiring the best of legs and feet, a close coat, and a strong, active body capable of great speed; and that a long and beautiful coat, if unaccompanied by a thick under-coat, is a hindrance, not a protection.

The chief points of the collie are—head long and sharp, with bright, keen eyes, set rather close together, and a small ear drooping slightly at the tips; back strong and muscular; legs with plenty of bone and not too much feather, bare below the hocks, feet round and cat-like. The collie should have a short, dense under-coat fitted to withstand the severest wet or cold, with a long and beautiful outer-coat springing from it; round the neck this coat develops into a “ruff” or “frill” which sticks out in front and on each side to a great length, adding largely to the dog’s beauty. Many anecdotes are told of the collie, who from his intimate association with man has acquired almost human intelligence, a good dog being able to separate the sheep under his care from those of other flocks. The collie often deteriorates in intelligence when kept merely as a companion; he is apt to get cross-tempered, a fact which the shepherd does not consider a fault, as it prevents strangers interfering with the sheep. When not spoilt, however, no dog makes such an agreeable companion as the collie, as his instinct is to attach himself to one person, to whom he becomes devoted.

Collier, Jeremy, an English clergyman and political writer; born in 1650. He was educated at Cambridge, and having entered into orders obtained the rectory of Ampton in Suffolk in 1659. He was a zealous opponent of the Revolution of 1688, and was repeatedly imprisoned for his political writings. He is chiefly remembered now for his “Short View of the Immorality and Profaneness of the English Stage,” a work of considerable merit which is said to have effected a decided reform in the sentiments

Collimation

and language of the theater. He died in 1726.

Collier, John Payne, an English Shakespearean critic; born in London in 1789. He became known as a critical essayist on old English dramatic literature, and was editor of the new edition of “Dodsley’s Old Plays” in 1825. In 1831 his best work, the “History of English Dramatic Poetry,” was published. In 1842–1844 he published an annotated edition of Shakespeare in 8 vols.; in 1844 “Shakespeare’s Library.” Subsequently he published several editions of Shakespeare, and an excellent edition of Spenser (5 vols., 1862). He made himself notorious by claiming that he possessed a copy of the 2d Folio Shakespeare, 1632, with many marginal emendations and annotations written in the middle of the 17th century, though, as was discovered, these notes were modern fabrications. He died in 1883.

Collier, Robert Laird, an American Unitarian clergyman and writer; born at Salisbury, Md., Aug. 7, 1837. Starting in life as an itinerant Methodist preacher, he held prominent Unitarian pulpits in Chicago and Boston, and became noted as a preacher and lecturer. In later life he was London correspondent of the “New York Herald.” Besides religious writings, he published: “Henry Irving, a Sketch and a Criticism”; “English Home Life” (1885). He died near Salisbury, July 27, 1890.

Collimating Eye-piece, an eye-piece of a meridian-circle or transit so arranged as to enable the observer to see the reflected image of the wires in the field of view when the telescope is pointed vertically downward over a basin of mercury. It either consists of a cap slipped over the ordinary eye-piece and carrying a small piece of plane glass at an angle of about 45° with the line of collimation, from which the light of a lamp or sky-light is thrown down the axis, or else a separate eye-piece to replace the ordinary one for this observation, in which a piece of glass has been inserted between the lenses at an angle of 45°. In either case the return image to the eye comes obliquely through this piece of glass. The observation is for the purpose of determining the error of collimation.

Collimation, the act of aiming or pointing toward any object. The Line of Collimation of a telescope is that from the optical center of the objective to the middle wire, or to the mean of the wires of a transit, or to the zero-position of the micrometer-wires in an instrument for measuring zenith-distances. The Error of Collimation of a transit is the departure of this line from a direction at right angles to the axis. The Collimation Correction is the

amount to be applied to the observed times of transit to correct them for this error.

Collimators, telescopes used for the determination of the corrections of collimation, for flexure, or for the zenith-point of a meridian-circle or transit. They are generally fixed upon piers N. and S. of the instrument and pointed toward each other and toward the instrument itself when in a horizontal position. They are adjusted so as to be intervisible when the instrument is lifted out of its Y's, and, on looking into either, the wires of the other are seen alongside those in the field, so that they can be pointed on each other, or the instrument itself upon either in turn. Besides the above arrangement there are many others, and also other uses of collimators. Very often a long focus lens with a distant meridian-mark takes the place of one of the collimators, and it is then used also as a reference point for the azimuth-correction of the instrument. A collimator is sometimes mounted vertically over the instrument so that it can be adjusted by a collimating eye-piece over the same basin of mercury as the instrument when the latter is run out of the way. A collimator floating on mercury and interchangeable between N. and S. floating-basins is sometimes used in the determination of zenith-points and of flexure of the instrument. The general method of collimation by collimator or by reflection from the surface of mercury or of a mirror is of very wide application in astronomy, surveying, and in physical laboratories.

Collingwood, Cuthbert, Lord, an English naval commander; born in Newcastle-upon-Tyne in 1750. He entered the royal navy in 1761, and took part as flag-captain on board the "Barfleur" in Lord Howe's victory of June 1, 1794, commanded the "Excellent" during the battle off Cape St. Vincent on Feb. 14, in that year, and was made rear-admiral of the white in 1799. His most distinguished service was at Trafalgar, where his skill and resolution drew warm praise from Nelson. On the latter's death Collingwood as senior officer took command of the fleet, and gave proof of his judgment and nautical skill in his dispositions for the preservation of the captured vessels. For his services here he was elevated to the rank of baron. He died, while cruising off Minorca in the "Ville de Paris," on March 7, 1810. Collingwood was the model of a naval officer, combining daring courage with cool judgment, and firm discipline with much humanity. His "Memoirs and Correspondence" have been published.

Collins, Anthony, an English author; born in 1676. He was a friend of Locke, who described him as a man who had "an estate in the country, a library in town, and

friends everywhere." His chief works are "Discourse of Free Thinking," "Philosophical Inquiry Concerning Human Liberty," "Discourse on the Grounds and Reasons of the Christian Religion," "Literal Scheme of Prophecy Considered." He died in 1729.

Collins, Edward K., an American shipowner; born in Truro, Mass., Aug. 5, 1802. He early entered the shipping business, and after serving as superintendent of a packet line, he established in 1836 the Dramatic Packet Line from New York to Liverpool. In 1849 the Collins line between the same ports was inaugurated. The "Arctic" and the "Pacific" of this line are memorable in the history of marine disasters. The government having withdrawn mail subsidies, the line ceased operations in 1858. He died in New York city, Jan. 22, 1878.

Collins, John, an English poet; born in Bath in 1742; was a stay-maker turned actor; and his poetic fame rests upon "Scripscrapologia," a collection of poems, among which "To-Morrow" is especially readable. He died in Birmingham, May 2, 1808.

Collins, Mortimer, an English novelist and poet; born in Plymouth, June 29, 1827; His "Idyls and Rhymes," "Summer Songs," and "The British Birds," are the efforts of an inspired verse-maker. His novels: "Who Is the Heir?" (1865); "Sweet Anne Page" (1868); "The Ivory Gate" (1869); "The Vivian Romance" (1870); "The Marquis and Merchant" (1871); "Two Plunges for a Pearl" (1872); "Blacksmith and Scholar" (1875); and others, are much admired. He died at Knowl Hill, Berkshire, July 28, 1876.

Collins, Patrick Andrew, an American politician; born in Fermoy, Ireland, March 12, 1844. He came to the United States when four years old, went to the public schools until he was 16, became an upholsterer, saved more money, and graduated at Harvard Law School in 1871. He served in the Massachusetts Legislature from 1869 to 1871, and was a delegate to the Democratic National Conventions of 1876, 1880, 1884, 1888, and 1892. From 1882 to 1888 he sat in Congress and from 1893 to 1897 was Consul-General at London. He was prominent in the Fenian movement, the Land League, and other organizations. He died in 1905.

Collins, William, an English poet; born in Chichester, Dec. 25, 1721. His melancholy temperament and poetic musings marked him as a boy, as a youth at Oxford, and even as a madman in the asylum where he died. "The Passions," with "its grace and vigor, its vivid and pliant dexterity of touch," the "Ode to Evening," a mosaic of euphonies; the "Dirge in Cymbeline"; and the "Ode on the Death of

Thomson," chiefly perpetuate his fame. He died in Chichester, June 12, 1759.

Collins, William, an English painter, father of the novelist; born in London Sept. 8, 1788. His picture of the "Young Fifer," exhibited in 1811, was purchased by the Marquis of Stafford for 80 guineas, and in 1813 he at once raised himself to a position of eminence by his "Sale of the Pet Lamb," so well known by engravings. In 1820 he was elected a Royal Academician. For his picture of the "Fisherman's Departure," painted in 1826, and presenting a beautiful specimen of his skill in the delineation of coast scenes, he received the sum of 350 guineas. Other noted works of his are "Rustic Hospitality," "Sunday Morning," and "Happy as a King." In 1836 he visited Italy with his family and remained abroad for nearly two years. Two admirable sacred pictures, "Our Saviour with the Doctors in the Temple," and "The Two Disciples at Emmaus," were exhibited respectively in 1840 and 1841. About 1844 decided symptoms of heart disease began to show themselves, but though frequently suffering extremely from this malady he continued to work at his profession with unabated industry, one of his last pictures being "Early Morning," exhibited in 1846. He died Feb. 17, 1847. A life of him was published by his son, William Wilkie Collins.

Collins, William Wilkie, an English novelist; born in London, Jan. 8, 1824. He was educated at a private school. After a short time spent with a firm in the tea trade he adopted the profession of the law, and was a student at Lincoln's Inn when his father died. He wrote a biography of his father in two volumes in 1848, and from that time he made literature his profession. His first novel was printed in 1850, and was called "Antonina; or, The Fall of Rome: a Romance of the Fifth Century." "Rambles Beyond Railways; or, Notes in Cornwall Taken Afoot," published in 1851, wandered from the track of romance, in which his successes were destined to be so phenomenal, but in 1852 he was back in fiction with "Basil, a Story of Modern Life," and "Mr. Wray's Cash Box; or, The Mask and the Mystery: a Christmas Sketch." "Hide and Seek" was presented in 1854, and at about the same time he became a contributor to the magazine "Household Words," in which "After Dark" and one of his most successful works, "The Dead Secret," were originally published.

Several of his novels, including "The Woman in White" and "No Name," were published originally in "All the Year Round." "Armada" and many of his subsequent stories were printed in American magazines before appearing in book-form, and he is said to have received enor-

mous prices for some of these. "The Moonstone," "Man and Wife," "The New Magdalen," and "The Law and the Lady" are other works of his that have wide circulation. His principal books have passed through many editions, both in England and the United States, and have also been translated into French, Italian, German, Dutch, Danish, and Russian. The works of very few modern writers have had greater circulation or acquired more general popularity than his. He also made occasional incursions into the field of dramatic writing, but in this direction he never achieved a marked success. He died in London Sept. 23, 1889.

Collision, in maritime affairs, the shock of two ships coming into violent contact, whereby one or both may suffer more or less injury. Collision may happen without blame being imputable to either party, as where the loss is occasioned by a storm, in which case the misfortune must be borne by the party on whom it happens to light. Or a collision may arise where both parties are to blame — where there has been a want of due diligence or skill on both sides; in which case neither party has an action against the other. Thirdly, it may happen by the misconduct of the suffering party only, and then the rule is that the sufferer must bear his own burden. Lastly, it may have been the fault of the ship which ran the other down; and in that case the injured party would be entitled to an entire compensation from the other. Strict laws and regulations to prevent collisions have been laid down, which contain rules concerning lights, and sailing and steering rules.

By the rule of the road at sea, if two sailing ships are approaching each other end on, or nearly so, the helms of both must be put to port, so that each may pass on the port side of the other; in crossing so as to involve risk of collision the sailing ship with the wind on the port side shall keep out of the way of the ship with the wind on the starboard, but if they both have the wind on the same side, the ship which is to windward shall keep out of the way of the one that has it to leeward. If a steamship and a sailing ship are approaching so as to involve collision the former must keep out of the way of the latter. If one vessel is overtaking another she must keep out of the way of the last named vessel.

Collodion, or **Collodium**, a substance prepared by dissolving one part of gun cotton in a mixture of 36 fluid parts of ether and 12 fluid parts of rectified spirit. The gun cotton or pyroxylin used for making collodion is prepared by immersing one part of raw cotton fiber in a mixture of five fluid parts of sulphuric acid, and five fluid parts of nitric acid, for three minutes. then care-

fully washing it with water, and drying it in a water bath; it must be kept in a well-corked bottle. Collodion is used in photography; also in surgery, to form a protecting surface to the skin. It is a colorless, very inflammable liquid, which dries quickly when exposed to the air, leaving a thin, transparent film insoluble in water or in rectified spirit.

Collodion Process, a process in photography invented by Archer, who first published an account of it in the "Chemist" for March, 1851. An iodized collodion is made by impregnating a solution of gun cotton in ether, with a small quantity of iodide of potassium or cadmium. A film of the iodized collodion is spread on the glass, which is then immersed in a solution of nitrate of silver. The image is taken in the camera, developed by a weak solution of pyrogallie acid and acetic acid, or a solution of protosulphate of iron. Excess of iodide of silver is removed by hyposulphite of soda or cyanide of potassium. This gives a negative. A positive is obtained by laying the negative on prepared paper and exposing them to light.

Collop Monday, the Monday after Quinquagesima Sunday and preceding Shrove Tuesday; so named because on that day the faithful ceased eating flesh, meat or collops.

Collot d'Herbois, Jean Marie (kol-lō' dārb-wä'), one of the most sanguinary leaders in the French Revolution; born in Paris in 1750. Before the Revolution he was a clever strolling player. He joined the club of the Jacobins, and soon gained a great ascendancy; won the prize for his "*Almanach du Père Gerard*," and became a member of the Convention, and of the Committee of Public Safety. He was charged with several provincial missions, and made himself a name of infamy by his execution of them. In 1793 he went to Lyons, where he had more than 16,000 persons put to death, and made it a capital crime to look sad or pitiful. An attempt was made to assassinate him, which only made him more popular, and he contributed powerfully to the fall of Robespierre. He was soon after denounced, arrested, and in March, 1795, transported to Cayenne, where he died in 1796.

Collyer, Robert, an American clergyman; born in Keighley, Yorkshire, England, Dec. 8, 1823. He came to the United States in 1849, being then a Wesleyan preacher and a blacksmith, but became a Unitarian, and preached some years in Chicago, where he founded Unity Church in 1860. He was made pastor of the Church of the Messiah, New York city, in September, 1879, and pastor emeritus in 1896. Included in his publications are: "Nature and Life" (1866); "The Life that Now Is" (1871);

"A History of the Town and Parish of Ilkley" (England, 1886, written in connection with Horsefall Turner) and "Lectures to Young Men and Women" (1886).

Collyridians, a sect toward the close of the 4th century, so denominated from the little cakes which they offered to the Virgin Mary. The sect consisted chiefly of Arabian women, who, out of an extravagant devotion to the Virgin, met on a certain day of the year to celebrate a solemn feast, and to render divine honors to her as to a goddess, eating the cakes which they offered in her name. It is said that the members of this sect were not native Arabs, but immigrants from Thrace and Scythia. While pagans they had been accustomed to offer similar cakes to Venus or Astarte.

Colman, George, an English dramatist, known as the Elder; born in Florence, Italy, April 28, 1732, his father being at that time British envoy to the grand-duke's court. From Westminster School he went to Christ Church, Oxford, where he graduated as M. A. in 1758, having previously in conjunction with his friend Bonnel Thornton published a series of essays after the manner of the "Spectator," under the title of the "Connoisseur." He wrote in 1760-1761 the comedies of "Polly Honeycombe" and the "Jealous Wife." The "Clandestine Marriage" we owe to him and Garrick. This was left unfinished. It is one of the best pieces in our theatrical repertory. The "English Merchant," the "Oxonian in Town," and other pieces, followed the foregoing. In 1777 he purchased of Foote for an annuity the little theater in the Haymarket, and continued in the personal superintendence of it till 1790, when a paralytic attack not only deprived him of the use of one side, but destroyed his intellect, leaving him hopelessly insane. He, nevertheless, lingered on in a lunatic asylum at Paddington till his death, Aug. 14, 1794.

Colman, George, the Younger, an English dramatist and humorous poet; born in London (?) Oct. 21, 1792. "The Iron Chest," "John Bull" (for which he received an unprecedentedly large sum), and "The Heir-at-Law," are most widely known among his racy and rather noisy but most laughable comedies. "Broad Grins" and "Poetic Vagaries" are very amusing rhymes. He died in London, Oct. 17, 1836.

Colman, Samuel, an American painter; born in Portland, Me., March 4, 1832; studied in Europe in 1860-1862; was elected a member of the National Academy in 1862; and first president (1866-1871) of the American Society of Painters in Water Colors. He has traveled extensively, and his pictures include scenes from Algeria, Germany, France, Italy, and Holland.

Colocasia, a genus of plants, order *Araceæ*. The spadix has a clavate or pointed top destitute of stamens, while on the closely allied genus *Caladium*, the summit of the spadix is covered with stamens, though the extreme apex ultimately becomes bare. The leaves of the colocasia are petate, the stem herbaceous, the juice milky, the rootstocks tuberous. India is the home of the genus, though species are now cultivated in most hot countries. The rootstocks of *C. himalensis* form a chief portion of the food of some hill tribes. *C. antiquorum*, called by Linnæus *Arum C.*, the best known species, is cultivated in India, Egypt, etc., for its leaves, which though acid are boiled till they are wholesome, and eaten as spinach. It has been introduced into greenhouses. The stems and the tubers of *C. indica* are eaten in Brazil. The rootstocks of *C. esculenta macrorhiza*, called "tara" or "kopeh" in the South Sea Islands, are used as food. The leaves of *C. esculenta* have a quivering motion at uncertain intervals every day. Lecoq, who first observed this, attributes it to the incessant pulsation of the imprisoned sap.

Colocynth, the pith of the bitter apple; the fruit of the *Citrullus Colocynthus*, which is violently purgative. It is imported dried, and generally peeled, from Turkey, and is rarely used alone. One of the most valuable purgatives is the compound extract of Colocynth, which is a combination of this drug with aloes, scammony, cardamom seeds, and soap. In large doses, Colocynth is an irritant poison.

Cologne (kō-lōn'), German, *Köln* (keuln), a city of Rhenish Prussia, on the left bank of the Rhine, forming, in connection with Deutz, which serves as a tête-du-pont on the opposite side of the river (across which are several bridges), a fortress of the first rank. The old fortifications, dating from the Middle Ages, have been swept away, new works being constructed in accordance with the principles of modern fortification. The town itself has been improved and extended, but Cologne is still irregularly built and largely in the antique style. There are many fine old buildings as well as excellent modern ones; the churches in particular are interesting.

The most important edifice of all is the cathedral, begun in 1248, one of the finest and largest Gothic structures in Europe. It was only completed in the 19th century, there being expended on it in 1828-1884 over \$5,000,000. It is in the form of a cross; its entire length is about 445 feet; breadth, 200 feet; height to ridge of roof, 202 feet; height of the two western towers, between which is a grand portal, 520 feet, being thus among the highest edifices in the world. The council-house, museum, and Gross St.

Martin Church with its imposing tower should also be mentioned. The manufactures embrace sugar, tobacco, glue, carpets, leather, machinery, chemicals, pianos and the celebrated eau de Cologne. The trade by river and railway is very great.

Cologne is of pre-Christian origin, and was originally called *Oppidum Ubiorum*, being the chief town of the Ubii, a German nation. The Romans made it a colony A. D. 51, and called it *Colonia Agrippina* (whence the name Cologne). It was annexed to the German Empire in 870, and became one of the most powerful and wealthy cities of the Hanseatic League, but latterly it declined. In 1792 it ceased to be a free city. It was taken by the French in 1794, ceded to them by the Treaty of Lunéville in 1801, and restored to Prussia in 1814. Pop. (1895) 321,564; (1910) 511,042.

Cologne Earth, a native pigment similar to the Vandyke brown in its uses and properties as a color.

Colombia, a Republic of South America, at the northwestern extremity of that continent; bounded on the N. by Costa Rica and the Caribbean Sea; E. by Venezuela and Brazil; S. by Brazil and Ecuador; and W. by the Pacific Ocean; area, 444,980 square miles; pop. (1905, official estimate) 4,279,674; capital, Bogota.

Topography.—The surface of the country is extremely varied, with lofty mountains in the W., and vast plains in the E. scarcely above the level of the sea. The Andes spread out in three great ranges, from the extensive plateau of Pasto in the S. W.; forming valleys running from N. to S. parallel to the three chains. Of the sections outside the main Cordilleras, the principal are the Sierra Nevada de Santa Marta, in the N., and the low Baudo range, along the N. W. coast. From the Central Cordillera the principal rivers, the Magdalena and the Cauca, flow into the Caribbean Sea, besides several affluents of the Amazon in the E., and the Patia, which forces its way to the Pacific, through a gorge between cliffs, 10,000 to 12,000 feet high, and forms the only notable break in the long wall of the Western Cordillera from Darien to Patagonia. The Eastern Cordillera consists of a series of extensive tablelands, cool and healthy, where the white race flourishes as vigorously as in Europe. E. from this Cordillera stretch vast llanos or plains, through which flow the Meta, the Guaviare, and other tributaries of the Orinoco. Besides these, the chief rivers are the San Juan (navigable 150 miles), on the Pacific coast; the Atrato and Zulia (150 miles), flowing N.; the Arauca (600), which, as well as the Meta (700) and Guaviare (850), feeds the Orinoco; and the Caqueta (1,350), the Putumayo (1,100), and the Napo (750),

tributaries of the Amazon. The lakes are unimportant.

Climate and Productions.—Colombia possesses all the climates of the world; perpetual snows cover the summits of the Cordilleras, while the valleys abound in the rich vegetation of the tropics. The mean temperature ranges from 32° to 82°, according to the elevation. The climate of Panama is notoriously unwholesome, and in some parts of the N. marsh fevers abound. The rainy season falls from November to April, except among the low-lying forests of the S. E., where the rain-fall is distributed throughout the year, and in the Choco coast district of the N. W., where, shut in from the N. E. winds, the heavy atmosphere hangs motionless, and mists and torrents of rain alternate. Colombia naturally yields a variety of productions corresponding to this great diversity of climate and of elevation. The hot region, extending to an elevation of about 3,200 feet, produces in abundance, rice, cacao, sugar-cane, bananas, yams, tobacco, indigo, cotton caoutchouc, vegetable ivory, and many medical plants; and the forests, with their tagua and other stately palms, their rare balsamic resins and valuable dyewoods, are ablaze with flowers and creepers, and steeped in the perfume of the delicate vanilla orchid. In the temperate zone, from 3,200 to 8,500 feet above the sea, many of these plants are equally common, but the cocoanut palm gives place to the oak, the encenillo, groups of laurels, and arborescent ferns, and here flourish the coffee plant, the odorous cherimoya and curibano, the fig, and the cinchona tree. The wax-palm extends beyond this region, and is found at a height of nearly 11,000 feet, and large crops of potatoes, grain, and leguminous plants are raised in the cold region; but from 10,000 feet rises the bleak paramo with its scanty vegetation, ending in lichens at the snow-line. In the N. departments, and in the immense llanos of the E. great herds of cattle, descended from those imported by the Spaniards, are reared; in the central districts, shorthorns and other English, Dutch, and Norman cattle and horses have been introduced, and are largely raised throughout the temperate zone. Among the natural mineral products are gold, silver, iron, copper, lead, coal, sulphur, zinc, antimony, arsenic, cinnabar, rock-salt, crystal, granite, marble, lime, gypsum, jet, amethysts, rubies, porphyry, and jasper; while much of the world's platinum is obtained from the upper San Juan, and the principal source of the finest emeralds is at Muzo in Boyaca.

Commerce.—Official reports for 1897 showed imports to the value of \$16,679,500, chiefly linen, woolen, iron, and steel goods, clothing, and food stuffs; exports, \$13,290,000, chiefly coffee, ingots of gold, silver ore,

cacao, cotton, dye stuffs, hides, live stock, caoutchouc, timber and tobacco. The import trade is principally with Great Britain.

Finances.—For the fiscal year 1899-1900 the expenditures were estimated at 34,000,000 pesos (1 peso = 43.8 cents U. S. gold), and the revenue, 34,305,000 pesos. The principal expenditures were for war, internal development, justice, debt, and finance. The external debt in 1896 was \$16,572,210; internal debt, consolidated, 5,633,046 pesos, and floating, 1,892,110 pesos; total, 7,525,156 pesos; exclusive of paper currency amounting to 30,862,352 pesos.

Communications.—In 1897 there were 400 miles of railways in operation and 270 miles under construction, besides 85 miles contracted. The roads of Colombia are, as a rule, simple mule paths, but the government is employing soldiers to improve the roads. In 1897 the merchant shipping of Colombia consisted of one steamer of 457 tons and seven sailing vessels of 1,770 tons. There were 6,835 miles of telegraphs with 319 stations, which handled an average of 350,000 telegrams and cablegrams per year. In 1893 the postoffice carried nearly 1,000,000 inland letters, postal cards, newspapers, etc., and sent over 550,000 abroad. Since 1891 numerous attempts have been made to construct a ship canal across the Isthmus of Panama following the line of the railroad, but most of them have been failures. Since 1894 the work has been carried on more systematically, and in 1897 the company had raised 48,420,184 francs, of which 25,334,622 francs had been expended and 18,976,987 had been invested as guarantee, leaving a balance on hand of 4,108,534 francs.

Government.—The government is that of a republic, the chief magistrate being a president, elected for six years. The president has a cabinet consisting of six members, responsible to Congress. The legislative power vests in a Congress of two Houses, called the Senate and House of Representatives. The Senate, numbering 24, is composed of three representatives from each department. The House of Representatives is elected for four years by universal suffrage and consists of one member for each 50,000 inhabitants. Congress elects for a term of two years, a substitute, who, failing the president and vice-president during the presidential term, fills the vacancy.

Education, Religion, etc.—In 1870 a system of compulsory education was adopted which has on the whole proved successful. Parochial, secondary, normal, and technical schools are now within general reach, and nearly all the departments boast universities of more or less efficiency. Journalism is largely represented in most of the large towns; and at the capital a considerable number of books are published every year.

Colombia

The State Church is the Roman Catholic, which in the management of its own affairs is independent of civil authority; religious orders were suppressed in 1863, and toleration in matters of religion is guaranteed; but, by the terms of a concordat entered into with the Holy See in 1888, in the universities and all educational establishments public instruction is directed in conformity with the dogmas of the Roman Catholic Church. Religion is one of the obligatory subjects of study.

History.—The N. coasts of Colombia were visited by Ojeda and Amerigo Vespucci, in 1499, and afterward by Bastidas; in 1502 Columbus explored part of the country, and endeavored to found on the Isthmus of Panama the first Spanish colony on the American mainland. In 1513 Balboa discovered the Pacific, and Pizarro and Almagro sailed along the W. coast of Colombia on their way to Peru in 1526. Ten years later Jimenez de Quesada broke the power of the Muyscan empire, and the Nuevo Reino de Granada was formed. As the country was opened up, the Indians sank, in spite of legislation designed for their protection, to the condition of serfs, and the policy of the crown, aided by the Inquisition, which was introduced in 1571, put an end to the democratic institutions of the early settlers. The country formed a presidency (except during the years 1718–1724) from 1564 to 1739, a period memorable for the disastrous descents of Drake, Morgan, Dampier, and others on the coast towns; it was then raised to a viceroyalty, which lasted until the war of independence. A revolution broke out July 20, 1810, which ended in the election of Bolivar to the presidency of the Republic of Colombia, a term which, like the viceroyalty, embraced all that now belongs to Venezuela, Colombia, and Ecuador. Independently of the singular difficulties of communication, and of the resulting absence of anything like natural unity, this unwieldy state contained from the beginning the germs of its own dissolution in the national character of its inhabitants. So long as union was necessary to meet external dangers, it maintained an imposing attitude in the eyes of the world; but gradually sectional interests and political jealousies did their work, and in 1831 the ill-assorted elements of the confederation were separated. What is now Colombia was then formed under the title of the Republic of New Granada, but in 1861 a fresh civil war led to the establishment of the United States of Colombia. In 1863 a constitution was adopted, based on that of the United States of America, with a president elected for two years; but this proved altogether unsuited to the Colombians, and, after twenty years' trial, brought about the revolution of 1884–1885. In 1886 a fresh constitution was adopted

Colombo

for the new Republic of Colombia, placing the central authority in the hands of the Federal government.

SEÑOR DON L. CUERVO MARQUEZ.

On June 28, 1902, President Roosevelt approved an Act of Congress providing for the construction of a canal across the isthmus, authorizing him to acquire at a cost not exceeding \$40,000,000, all the rights of the new Panama Canal Company, and empowering him to secure from the Republic of Colombia the perpetual control of a strip of land not less than six miles wide and certain concessions of jurisdiction for the proper operation and maintenance of a canal. A treaty for these purposes was negotiated in Washington, ratified by the United States, and was rejected unanimously by the Colombian Senate on Aug. 12, 1903. In October Colombia proposed to conclude a new canal treaty in consideration of the payment of \$25,000,000 by the United States for the advantages it would receive, and an agreement to let the territory remain a part of Colombia. In the meanwhile forces secretly working in the Department of Panama culminated on Nov. 3 in the secession of the Department and a proclamation of its independence as a republic. The new republic at once assured the United States that it would observe all the obligations that the rejected canal treaty would have imposed on Colombia. On Nov. 13 the republic was formally recognized by the United States; on the 18th a new Panama Canal treaty was negotiated in Washington, in which the United States guaranteed to maintain the independence of the Republic of Panama, and the latter granted all the concessions, rights, privileges, and matters of sovereignty that the United States had asked; and on Dec. 2 the treaty was ratified by the Panama Junta. The Colombian government protested against the actions of the United States, sought unsuccessfully to gain the support of European nations, offered to grant the United States all that it desired in the matter of the proposed canal, and made threats of attempting to regain Panama by force. Finally, Colombia tried unsuccessfully to have the action of the United States referred to the International Court of Arbitration. By the end of the year the new republic had been recognized by every nation of importance. See PANAMA; PANAMA CANAL.

Colombo, a seaport town, the capital of Ceylon, on the S. W. coast, and about 70 miles W. by S. of Kandy, with which it is connected by railway. It is a pleasant town with an extensive fort, within which are some of the best houses, and which occupies a projecting point of land. On the N. side of the fort, on the margin of the sea, is the Pettah or Black Town, inhabited chiefly by Singhalese, while in the environs are

Colon

most of the houses occupied by the English. The public buildings comprise the government offices, government house, supreme court, museum, etc. Pop. (1901) 158,093.

Colon. See ASPINWALL.

Colonia, a department of Uruguay, on the Plata, below the Uruguay river. The uplands are barren, but in the fertile valleys and plains are numerous European colonies, engaged in agriculture and stock-raising. Area, 2,192 square miles; pop. (1905) 55,686. The capital, Colonia del Sacramento, on the Plata, about 100 miles above Monte Video, has a good harbor, a dock for vessels of 1,000 tons, ruined fortifications, and some 1,500 inhabitants.

Colonial Animals, organisms which cannot be fairly regarded as unities, but consist of numerous more or less similar individuals united in a common life. Among the usually single-celled simplest animals or protozoa, loose colonies not unfrequently occur, and are of not a little importance as suggestions of the bridge between the single-celled and many-celled animals. Such colonies arise when the original cell, instead of reproducing discontinuously, retains its daughter-cells in union with itself or with one another, just like the egg-cell of a higher animal. By sacrifice of individuality at the epoch of reproduction, a higher unity is formed. In the same way a simple cup-shaped sponge, by continuous budding, forms a colony of similar forms, which may possess more or less distinct individuality. The common fresh-water *Hydra*, to mount a step higher, buds off daughter *Hydræ*, which remain for a while connected with the parent organism, and make it temporarily colonial.

Colonial Office, the English government office where business connected with the government of the colonies is carried on. A Secretary of State for the colonies was first appointed in 1768. In 1782 the title was abolished again and the colonies placed under the Home Secretary, and in 1801 the Secretary for War. In 1854 the original arrangement was reverted to, and there have been colonial secretaries ever since.

Colonization Society, American. See AMERICAN COLONIZATION SOCIETY.

Colonna, a village in the Papal States, which gave its name to one of the most powerful and celebrated aristocratic Roman families. The Colonna produced in the Middle Ages many distinguished members, among whom, besides Pope Martin V., were:

COLONNA, PROSPERO, son of Antonio Colonna, prince of Salerno. He assisted Charles VIII. of France to conquer Naples, but subsequently aided in retaking it for the House of Aragon. He served under the great Gonsalvo, and was charged by him to conduct Cesare Borgia prisoner to Spain. In 1513 Prospero defeated the Venetians

Colonna

near Vicenza, was captured by the French two years later, but won several victories over them in 1521 and the following years. He died in 1523.

COLONNA, POMPEO, nephew of the above, a restless and intriguing Roman cardinal. He quarreled in succession with the Popes Julius II., Leo X., and Clement VII., and had part in all the troubles of the Court of Rome. When Clement VII. was the prisoner of the Constable de Bourbon, Pompeo exerted his influence for his liberation. He at length became viceroy of Naples. He died in 1532.

COLONNA, VITTORIA, an Italian poetess, daughter of Fabrizio Colonna, high constable of Naples, born in 1490. When four years old, she was betrothed to a boy of the same age, Fernando d'Avalos, son of the Marchese di Pescara. At 17 they were married. After her husband's death in the bat-



PROSPERO COLONNA.

tle of Pavia (1525), Vittoria found her chief consolation in solitude, and the cultivation of her poetical genius. During seven years of her widowhood she resided alternately at Naples and Ischia, and then removed to the convent of Orvieto, and afterward to that of Viterbo. In her later years, she left the convent and resided in Rome, where she died in February, 1547. Her poems were chiefly devoted to the memory of her husband. Among them, the "Rime Spirituali" (Venice, 1548), is remarkable for truth of sentiment and enlightened piety. The Colonna palace, at the base of the Quirinal, in Rome, is celebrated for its splendid picture-gallery and magnificent gardens.

Colonna, Cape (ancient *Sunium Promontorium*), a headland of Greece, forming the southernmost point of Attica, and crowned by the ruins of a temple of Minerva, 13 of whose white marble columns, from which

Colonnade

the cape derives its modern name, are still standing.

Colonnade, a range of columns. If the columns are four in number it is *tetrastyle*; if six in number, *hexastyle*; when there are eight, *octastyle*; when ten *decastyle*, and so on, according to the Greek numerals. When a colonnade is in front of a building it is called a *portico*; when surrounding a building, a *peristyle*; and when double or more, *polystyle*. The colonnade is, moreover, designated according to the nature of the intercolumniations introduced as follows: *pycnostyle*, when the space between the columns is one diameter and a half of the column; *systyle*, when it is of two diameters; *eustyle*, when of two diameters and a quarter; *diastyle*, when three; and *aræstyle*, when four. A colonnade differs from an arcade in this respect, that the columns of the former support straight architraves instead of arches.

Colonus, in civil law, a freeman of inferior rank, corresponding with the Saxon *ceorl* and the German rural slaves. It has been held probable that many of the *ceorls* were descended from the *coloni* taken into Saxony by the Romans. The names of the *coloni* and their families were all recorded in the archives of the colony or district, from which fact they were also known as *adscriptitii*.

Colonus, an eminence near Athens, to which Œdipus retired during his banishment to Thebes, and from which Sophocles gave the title of "*Œdipus Coloneus*" to one of his finest tragedies. According to Pollux, there were two places at Athens known as *Ekuestris* and *Agoræus Colonus*.

Colony, a settlement formed in one country by the inhabitants of another. Colonies may either be formed in dependence on the mother country or in independence. In the latter case the name of colony is retained only in a historical sense. Among ancient nations the principal promoters of colonization were the Phœnicians, the Greeks, and the Romans; the greatest colonizers in modern times have been the English and the Spaniards, next to whom may be reckoned the Portuguese, the Dutch, and the French. The Germans have done little directly as colonizers.

Ancient Colonies.—The Phœnician colonies were chiefly commercial, serving as entrepôts and ports of repair for Phœnician commerce along the coasts of Africa and Spain, in the latter of which they numbered, according to Strabo, more than 200. Carthage, which was itself a colony of Phœnicia, was the greatest colonizing State of the ancient world. The Greek colonies, which were widely spread in Asia Minor and the islands of the Mediterranean, the coasts of Macedonia and Thrace, in South Italy and Sicily, were commonly independent, and frequently

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soon surpassed the mother States in power and importance. The colonies of Rome were chiefly military, and while the empire lasted were all in strict subordination to the central government. As the Roman power declined the remains of them amalgamated with the peoples among whom they were placed, thus forming in countries where they were sufficiently strong what are known as the Latin races, with languages (Spanish, Portuguese, French, and Italian) which are merely modifications of the old Roman tongue.

Portuguese.—These were the first great colonizers among modern States. In 1419 they discovered Madeira, the Azores, and the Cape Verde Islands; the Kongo and the Cape of Good Hope followed; and before the century was out Vasco de Gama had landed at Calicut on the Malabar coast of India. The first Portuguese colonies were garrisons along the coasts where they traded; Mozambique and Sofala on the E. coast of Africa, Ormuz and Muscat in the Persian Gulf, Goa, and Damao on the W. coast of India. Colonies were established in Ceylon in 1505; in the Moluccas in 1510. Brazil was discovered in 1499, and this magnificent possession fell to Portugal, and was colonized about 1530. Bad government at home and the subjection of the country to Spain caused the loss of most of the Portuguese colonies. The Portuguese now possess several territories in Asia, at Goa, Damao and Diu, India; Macao, China; and some islands in the Indian Archipelago. In Africa they possess the Cape Verde and other islands; settlements in Senegambia, Guinea, Mozambique, Sofala, Angola, Benguela, Mossamedes, amounting in area to about 700,000 square miles; but Portuguese influence is really limited to a very small portion of this.

Spanish.—Soon after the Portuguese the Spaniards began the work of colonization. In 1492 Columbus, on board of a Spanish vessel, discovered the island of San Salvador. Haiti, or San Domingo, Porto Rico, Jamaica and Cuba were soon colonized, and before the middle of the 16th century Mexico, Ecuador, Venezuela, New Granada, Peru, and Chile were subdued, and Spain took the first rank among the colonizing powers of Europe. The Spaniards, however, never really attempted to develop the industrial resources of the subject countries. In 1899 Spain sold to Germany the Caroline Islands; all of the Ladrones excepting Guam, which had been ceded to the United States in 1898; and the Pelew or Palaos group; and only retained her African possessions. The government over the latter territory is in the form of a protectorate, under the governorship of the Canaries, which islands form a province, and not a colony proper.

Dutch.—Philip II. barred Dutch vessels from the port of Lisbon, and this forced

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the Dutch to import directly from India or lose the large carrying trade they had acquired. Several companies were soon formed, and in 1602 they were united into one, the Dutch East India Company, with a monopoly of the East India trade and sovereign powers over all conquests and colonies in India. The Dutch now rapidly deprived the Portuguese of nearly all their East Indian territories, settled a colony at the Cape of Good Hope (1650), established a West India Company, made extensive conquests in Brazil (1623-1660), which were soon lost, and more permanent ones on some of the smaller West India Islands, as San Eustatia, Curacoa, Saba, etc. The growing power of the British and the loss of Holland's independence during the Napoleonic wars were heavy blows to the colonial power of the nation; but the Dutch still possess numerous colonies in the East Indies, the most important of which are Java, Sumatra, Dutch Borneo, the Molucca Islands and part of New Guinea; also several small islands in the West Indies, and Surinam.

English.—No colonizing power of Europe has had a career of such uniform prosperity as Great Britain. The English attempts at colonization began nearly at the same time with the Dutch. After many fruitless attempts to find a N. E. or N. W. passage to the East Indies, English vessels found their way round the Cape of Good Hope to the East Indies in 1591, and the East India Company was established in 1600. On the suppression of the Indian mutiny (1857-1858) the government of India was transferred to the crown by act of parliament in 1858. The English claim to North America, though allowed to lie dormant for nearly a century, was not relinquished and in the reign of Elizabeth led to colonization on a large scale. Australia was discovered in the beginning of the 17th century, and the first Australian settlements were British penal colonies. In 1851 the discovery of the abundance of gold in Victoria gave a great impetus to the prosperity of the Australian colonies. In 1874 the Fiji Islands, and in 1884 part of New Guinea were annexed as crown colonies. In South Africa, Cape Colony, first settled by the Dutch in 1652, became an English colony in 1814. The latest annexations in this quarter are Griqualand West (1880), the Transkeian Territories (1875-1884, Walfisch Bay (1884), Bechuanaland (1885), and the former Orange Free State and Transvaal Republics (1900). Further N. are the crown colonies, Lagos, the Niger Districts, the Gold Coast, Gambia, and Sierra Leone, all, except Lagos, which was acquired in 1861, ancient possessions of the British crown. In Europe, Great Britain has a few colonies acquired for military reasons, Gibraltar in 1704, Malta and Gozo, 1800, Heligoland (Ceded to Ger-

Colony

many in 1890), 1807. It is estimated that the existing British colonies and dependencies embrace about one-sixth of the land surface of the globe and nearly the same proportion of its population.

French.—In 1900 the chief colonial possessions of France were 32 in number, but representing an area only a third as great as that of England. Among the most important are Pondicherry, and a few other small territories in India; Cochin China, Tonquin, and the protectorates of Annam and Cambodia in Southeastern Asia; New Caledonia, the Loyalty and Marquesas Islands, etc., in Oceania; in Africa, Algeria, Tunis, Senegambia, Islands of Reunion, the protectorate of Madagascar, etc.; in America, Martinique, Guadeloupe, St. Bartholomew, and Guyana. Algeria is now officially a French department. One Senator and one Deputy are allowed to represent French Indo-China in the Chambers at Paris. Cochin-China, populated by Annamites, Cambodians, Chinese, Malays and Malabarians, is entitled, however, to but one representative, a deputy. Tonquin, the adjacent French colony, is not represented, the government being administered by resident French officials. The African colonists are administered by the Minister of the Colonies through governors or commissioners-general. Algeria, however, on the N. coast, is given a distinct government and laws, and is looked upon as a part of the Republic, the Chambers alone having the right to legislate for it. Crossing to the West Indies, France allows Martinique and Guadeloupe each one Senator and two deputies. French Guiana, however, has only one representative, a deputy.

Germans and Danes.—In recent years Germany has made a strong effort to take rank as a colonial power, and has acquired in Africa the territories of Damaraland and Luderitzland to the N. of Cape Colony, the Kame-run District, a considerable portion of territory formerly claimed by the Sultan of Zanzibar, the Kilima-Njaro, the greater part of Somaliland, etc.; also in the Pacific a portion of New Guinea, now called Kaiser Wilhelm's Land; the Bismarck Archipelago; and the Caroline, Pelew, and Ladrone (excepting Guam) Islands. Denmark's dependencies, Iceland, Greenland, and the Faroe Islands, though of considerable extent are of small value. In the West India Islands, it has St. Thomas, settled in 1672; Santa Cruz, purchased from France in 1733; St. John; and some smaller islands.

Since the United States has acquired Porto Rico, the Philippine and Sulu Islands, and the Ladrone Island of Guam, the question of colonial government has become a national issue.

There are 126 colonies in the world and nearly as many distinct forms of colonial government, varying from practical inde-

Colophon

pendence to absolute control by the mother country.

RANDALL R. HOES.

Colophon, an ancient Ionian (Greek) city of Asia Minor about 8 miles N. of Ephesus, one of the places that claimed to be the birthplace of Homer, and the native city of Mimnermus, the elegiac poet, and of other eminent men.

Colophon, the device or imprint at the end of a published work, which in old books frequently stated the name of the author as well as the printer's name, along with the date and place of publication, most of which information is now put in the title page.

Colophony, the resinous substance which remains when turpentine or pure resin is heated till the water and volatile oil are expelled. It is used for making varnishes and cements, in preparing ointments, and as a reducing agent in the soldering of metals, for adulterating soap, and for rubbing the bows of violins. Colophony distilled with lime in retorts gives off gases of the paraffin series, also propylene, amylene, acetone, and a substance having the formula $C_5H_{10}O$.

Color, the name given to distinguish between the various sensations that lights of various rates of vibration give to the eye. The optic nerves are excited by vibrations of the light-bearing ether when the rapidity of the vibrations is not greater than or less than two limits, which perhaps vary slightly with different eyes, just as some ears cannot hear intensely shrill sounds or dull sounds that are perceived by others. Every vibration between these limits is recognized as light; its intensity or brightness is observed; but besides this, the eye is differently affected by light of different times of vibration, in a way that it is not possible to describe. It is to this variation in the sensation that the name color is given. The word color is also applied to the properties of bodies that cause them to emit the light that thus affects our senses.

In considering the subject we must remark in the first place that ordinary white light, the light which comes from an incandescent solid or liquid, consists, as Newton showed by his celebrated experiment of passing it through a triangular glass prism, of a large number of colored lights, which, meeting the eye together, produce the sensation of white light. The colors of the spectrum are usually said to be seven — red, orange, yellow, green, blue, indigo, violet; although in reality there is an enormous, if not an infinite number of distinct colors in it. These colors are frequently called the primary colors, and other tints and shades are producible by mixing them; but in a stricter sense the primary colors are three in number, namely, red, green, and violet (or blue). These three colors or kinds of light cannot be resolved into any others,

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while a yellow ray, for instance, can be resolved into a red and green, or can be produced by the mingling of red and green light, consequently yellow is not now regarded by scientific men as a primary color. Inasmuch, however, as a yellow and a blue pigment will always produce a green when mixed, red, yellow, and blue may still in a sense be regarded as primary. In the scientific sense of the word white and black are not considered colors, a white body reflecting and a black body absorbing all the rays of light without separating them, whereas the colors proper are due to separation of the rays of light by partial absorption and reflection or by refraction. That the colors of the spectrum may be recombined so as to make white light, the following experiment shows. Let a disk be painted as nearly as possible with the primary colors of the spectrum in sectors of the magnitude indicated in the diagram. If this painted circle be made to whirl rapidly round its center, all the colors will practically be seen simultaneously at each point, owing to the persistence of the impression on the retina of the eye (see PERSISTENCE OF VISUAL IMPRESSION), and the effect will be that the circle will appear white. If the proportions of the colored sectors be altered, or if any of them be cut or covered with white or black paper, various colors or shades of color are producible. If one complete sector be removed, and the wheel whirled round, the color produced is the complementary color to the removed sector. By complementary color is meant the color or colors which, with any color or colors mentioned, together make white; thus any of the primary colors is complementary to the other two, and a secondary color is complementary to the remaining primary. (See the plate.)

The color resulting from the mixture of two or more lights is the color which is seen when they fall on the same part of the retina. There are various methods of mixing lights, such as, (1) by combining reflected and transmitted light; (2) by causing two or more spectra to overlap; and (3) by employing a rotating disk composed of differently colored sectors, such as shown above. Colored disks of paper, each having a radial slit, are very convenient for this purpose, as any moderate number of such disks can be combined, and the sizes of the sectors exhibited can be varied at pleasure. The mixed color obtained by the rotating disk is to be regarded as a mean of the colors of the several sectors — a mean in which each of these colors is assigned a weight proportional to the size of its sector. Thus if the 360 degrees which compose the entire disk consist of 100° of red paper, 100° of green, and 160° of blue, the intensity of the light received from the red when the disk is rotating will only be $\frac{10}{36}$ of that which would be received from the red sector when seen at

rest; and the total effect on the retina is represented by $\frac{10}{36}$ of the intensity of the red, plus $\frac{10}{36}$ of the intensity of the green, plus $\frac{16}{36}$ of the intensity of the blue; so that the resultant color may be called the mean of 10 parts of red, 10 of green, and 16 of blue. All the results of mixing colors can be represented geometrically by means of a cone or pyramid within which all possible colors will have their definite places. The vertex will represent total blackness, or the complete absence of light; and colors situated on the same line passing through the vertex will differ only in intensity of light. Any cross-section of the cone will contain all colors, except so far as intensity is concerned, and the colors residing on its perimeter will be the colors of the spectrum ranged in order, with purple to fill up the interval between violet and red. It would seem that the true form of the cross-section is approximately triangular, with red, green, and violet at the three corners. When all the colors have been assigned their proper places in the cone, a straight line joining any two of them passes through colors which are means of these two; and if two lines are drawn from the vertex to any two colors, the parallelogram constructed on these two lines will have at its further corner the color which is the sum of these two colors. A certain axial line of the cone will contain white or gray at all points of its length, and is called the line of white. It is convenient to distinguish three qualities of color, which may be called hue, depth, and brightness. Brightness or intensity of light is represented by distance from the vertex of the cone. Depth depends upon angular distance from the line of white, and is the same for all points on the same line through the vertex. Paleness or lightness is the opposite of depth, and is measured by angular nearness to the line of white. Hue or tint is that which is often *par excellence* termed color.

All authorities are now agreed in accepting the doctrine, first propounded by Dr. Thomas Young, that there are three elements of color sensation, or three distinct physiological actions, which by their various combinations produce our various sensations of color. Each is excitable by light of various wave lengths lying within a wide range, but has a maximum of excitability for a particular wave length, and is affected only to a slight degree by light of wave length very different from this. The complete diagram of all color is theoretically a triangular pyramid, having for its three edges the colors which correspond to these wave lengths; but it is probable that we cannot obtain one of the three elementary color sensations quite free from admixture of the other two, and the edges of the pyramid are thus practically rounded off. One of these sensations is excited in its greatest

purity by the green, another by the extreme red, and a third by the extreme violet. These three actions are ascribed to three distinct sets of nerves, having their terminations in different parts of the thickness of the retina, a supposition which aids in accounting for the approximate achromatism of the eye, for the three sets of nerve terminations may thus be at the proper distances for receiving distinct images of red, green, and violet respectively, the focal length of a lens being shorter for violet than for red. As it is completely established that the difference between the colors of the spectrum is a difference of vibration-frequency, there is an obvious analogy between color and musical pitch. Attempts have been made to compare the successive colors of the spectrum with the notes of the gamut; but forcing is necessary, as in almost all details the relations between colors are strikingly different from the relations between sounds.

When white light falls on the various objects that surround us it is not always reflected back to our eye as white light. The bodies are illuminated by it, but they have the power of so altering it that they appear to us colored. The reason of the natural colors of bodies is a difficult subject, and one that is scarcely yet understood. It is usual to say that the surfaces of bodies have the power of absorbing certain parts of the white light and reflecting the remainder back, and that what we see is the complementary color to that which is absorbed. This is generally the case with light passing through a transparent colored body. But there is good reason for thinking that this is not really the case always. Experiment, in fact, seems to show that the light which comes from colored bodies is frequently generated by the bodies themselves by a kind of luminous resonance, as it has been called; just as a harp with two or three strings will send out a sound by resonance when a loud noise of any kind is made near to it, but the sound emitted by the harp will be only that belonging to its two or three strings, and not a clash like that which set it in vibration. The subject is one of much difficulty, as we know nothing of the molecular construction of the surfaces of bodies.

Lastly, we have to speak of the colored lights produced by ignited gases. The lights themselves are often far less complicated than white light, though we have spoken of them last. Incandescent gases instead of giving out white light, as incandescent solids and liquids do, give out light of colors depending on the nature of the gas or vapor. Seen by the eye the flame is colored, and examined by the spectroscope it is found to be in many cases a very simple light indeed. Thus sodium vapor gives a yellow light, and on looking at a flame containing nothing but sodium it is seen to consist of two particu-

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lar yellow lights shown by two bright yellow lines in its spectrum. Thallium, another metal, gives a simple green light. Hydrogen gas also gives a pale blue flame when burning, and shows some five or six bright lines. So also do other gases. These colored flames are taken advantage of by the pyrotechnist, who mixes the powder for his fireworks with various bodies which give colored flames. See LIGHT: SPECTRUM.

Colorado, a State in the Western Division of the North American Union; bounded by Wyoming, Nebraska, Kansas, Oklahoma, New Mexico, and Utah; gross area, 103,645 square miles; admitted to the Union, July 4, 1876; number of counties, 56; population (1890) 412,198; (1900) 539,700; (1910) 799,024; capital, Denver.

Topography.—Colorado is very mountainous, being traversed by the Rocky Mountains, which extend over nearly the entire breadth of the State. The average altitude of the State is 7,000 feet, the lowest portion being 3,000 feet above the sea, and there are over 100 mountain peaks more than 13,000 feet high. The Sawatch or Saguache range, or Great Divide, is a continuation of the Sierra Madre range of Mexico, and contains the peaks, Mt. Harvard, 14,375; Mt. Elbert, 14,351; and the Mountain of the Holy Cross, 14,175 feet. The Park Range joins this range in the N., its highest points being Mt. Irwin, 14,336 feet, and Mt. Gray, 14,341 feet. The Front Range contains Pike's Peak, 14,147 feet, and Evans, 14,330 feet, and is situated a little E. of the main ranges. In the S. is the Sangre de Cristo range, containing Blanco Peak, the highest in the State, 14,464 feet. In the W. part are several lower ranges, running in a general N. W. and S. E. direction. The valleys are a distinguishing feature of the scenery, and are known as parks. San Luis is the largest and has an area of 8,000 square miles, quite level, and at an elevation of 7,000 feet. The only lake of any size in Colorado is in this park, is about 6 miles in length, and is fed by nearly 20 streams. Colorado is the principal watershed in the Western States, many of the largest rivers having their origin here, among them the Platte, Colorado, San Miguel, Arkansas, and Rio Grande del Norte. Nearly all these rivers wind their way through rocky cañons, varying from one to 3,000 feet in depth. "Monument Park" and the "Garden of the Gods" contain "buttes," rising above the meadow land, shaped like towers and pillars, caused by erosion.

Geology.—The mountains of Colorado are mostly of azoic and eozoic formation, while the E. and S. W. slopes are of palæozoic, bordered by metalliferous, jurassic, and triassic strata in the W. central parts. The extreme E. plain is largely tertiary, and the S. W. is chiefly cretaceous, the valleys of the

Colorado

South Platte and Arkansas rivers being of this formation.

Soil, Climate, etc.—Colorado has about 15,000 square miles of fertile arable land, and about 70,000 square miles of grazing land. Most of the land will produce abundant crops under irrigation, which is now being carried on extensively, one irrigating canal having a length of 54 miles. The mountains are well covered with pine, spruce, and fir forests. The climate is very healthful and mild, and people suffering from pulmonary and asthmatic troubles find much relief here. There are various mineral springs, which are valuable for medicinal purposes. The hot sulphur springs in Middle Park and Wagon Wheel gap, and the hot, iron, and soda springs in Manitou are popular resorts.

Mineralogy.—Colorado is by far the first State in the Union in mineral wealth. In 1900 it ranked first in the production of gold, silver and lead, and beside being rich in copper, zinc and manganese, ranked eighth in iron and ninth in coal. In 1899 gold was the most valuable output, the yield having a value of \$35,000,000. Of this the Cripple Creek mines contributed \$20,000,000. Thirty-three counties, outside of Cripple Creek, contributed the remainder. The mines at Cripple Creek and Leadville are the best developed in the country. The year ended with an enormous glut of ore which the smelters and reduction mills were unable to handle. Mines in Leadville which can produce from 400 to 500 tons of ore per day were compelled by orders from the smelters to limit their shipment to 200 tons. There was an enormous falling off in the value of the production of silver, the output only reaching \$12,680,256, actual value as distinguished from coin value, a decrease of \$16,890,702, from that of the preceding year, the depreciation of silver leading to the partial abandonment of many of the silver mines. The lead product had a value of \$4,641,529. Leadville was formerly the center of lead production in the State, but its output dropped from 70 per cent. in 1895 to 30 per cent. in 1898. The Creede district became conspicuous as a producer of lead, and largely increased shipments were credited to the San Juan country. The lead is found in connection with silver in argentiferous galena. Zinc was for years but little appreciated by smelters; but with the opening of a trade with Belgium, this ore was mined and smelted at the rate of 200 tons per day. The output of zinc and manganimiferous iron in 1899 was \$575,000. Copper is mined in small quantities, and the refuse of gold and silver bearing copper ores are smelted, giving an output in 1899 valued at \$1,854,226. The iron industry showed a marked revival in 1898, the production amounting to 318,480 long





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tons, an increase over the preceding year of 131,166 long tons, or over 70 per cent. A considerable amount of this ore was used as flux in the silver smelters. Three different varieties of iron were produced, brown hematite, 302,368 long tons; red hematite, 10,070 long tons, and magnetite, 6,042 long tons, with a total value of \$553,406. The coal production in 1898 amounted to 4,076,347 short tons, valued at \$4,686,081, and coke, 445,982 short tons, valued at \$1,155,093. In addition to the mineral products mentioned, there are found sulphur, kaolin, platinum, quicksilver, salt, tellurium, marbles, sandstone, natural gas, and petroleum.

Agriculture.—During the calendar year 1900, the most profitable crops were hay, yielding 1,783,133 tons, valued at \$13,551,811; wheat, 7,207,117 bushels, valued at \$4,252,199; potatoes, 1,863,288 bushels, valued at \$1,527,896; oats, 2,272,390 bushels, valued at \$1,407,128; barley, 314,266 bushels, valued at \$157,133; and rye, 39,480 bushels, valued at \$21,319. There were 145,713 horses, valued at \$4,068,081; 8,580 mules, valued at \$399,827; 2,185,327 sheep, valued at \$6,250,036; 93,499 milch cows, valued at \$3,384,664; and 1,021,922 other cattle, valued at \$28,297,538. According to the census of 1890, the State had 16,389 farms, comprising 4,598,941 acres, worth with buildings, \$85,035,180.

Manufactures.—In 1900 there were 3,570 manufacturing establishments reported, employing \$62,825,472 capital, and 24,725 persons; paying \$15,146,667 for wages and \$66,886,016 for materials; and having a combined output valued at \$102,830,137. The principal industries were lead smelting and refining (\$40,732,271); iron and steel (\$6,108,295); flour and grist (\$4,528,062); foundry and machine shop products (\$3,986,915); copper smelting and refining (\$3,893,034); slaughtering and meat packing, wholesale (\$3,562,375). In the fiscal year 1898-1899 the internal revenue on taxable manufactures in the revenue district of Colorado and Wyoming was \$1,248,135.

Banking.—In 1900 there were 40 National banks in operation, having \$4,387,000 capital, \$3,337,050 in outstanding circulation, and \$10,950,092.45 in reserve. There were also 30 State banks, with \$1,430,000 in capital, \$8,136,722 in deposits, and \$9,885,023 in resources. In the year ending Sept. 30, 1900, the exchanges at the United States clearing-house at Denver aggregated \$214,477,525, an increase over the previous year of \$49,201,020.

Education.—In 1899 the school population was 135,880; enrollment in the public schools, 108,816; and average daily attendance, 69,065. There were 1,739 public schools; 3,294 teachers; public school property valued at \$6,495,855; receipts of the

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year (1897-1898), \$3,004,587; and expenditures, \$2,281,713. For higher instruction there were 39 public high schools, a public normal school at Greeley, and a private normal school at Denver. The private secondary schools are Mount St. Gertrude, at Boulder; Mount St. Scholastica's Academy, Canon City; the Presbyterian College of the Southwest, Del Norte; St. Mary's School, Leadville; and Jarvis Hall Military Academy, Montclair. The universities and colleges for men and for both sexes are the University of Colorado (opened 1877, non-sect.), University of Denver (1864, M. E.), Colorado College (1874, non-sect.), and the College of the Sacred Heart (1876, R. C.).

Churches.—The strongest denominations numerically in the State are the Roman Catholic, Methodist Episcopal, Presbyterian, Baptist, Protestant Episcopal, Congregational, Lutheran, and Disciples of Christ. All denominations reported in 1890: organizations, 647; churches and halls, 463; members, 86,837; and value of church property, \$4,743,317. In 1899 there were 476 evangelical Sunday schools, with 3,200 officers and teachers and 44,000 scholars.

Railroads.—The total length of railroads within the State, Jan. 1, 1900, was 4,642.35 miles. New steam and electrical construction in 1899, the latter connecting large mining camps, amounted to about 350 miles. The principal railroad systems are the Union Pacific; the Missouri Pacific; the Atchison, Topeka, and Santa Fe; the Denver and Rio Grande; and the Colorado and Southern.

Postoffices and Periodicals.—In 1900 there were 751 postoffices of all grades, and 329 periodicals, of which 42 were daily, 253 weekly, and 28 monthly.

Finances.—The assessed valuation of all taxable property in 1899 was \$212,202,886. The total debt in 1898 was \$3,877,942, with assets of \$842,275, making a net debt of \$2,728,667. The tax rate was \$4.30 per \$1,000, besides an additional poll tax of \$1.

State Government.—The governor is elected for a term of two years, and receives a salary of \$5,000 per annum. Legislative sessions are held biennially. The Legislature has 35 members in the Senate (elected for four years and 65 in the House (elected for two years), each of whom receives \$7 per day and 15 cents per mile traveled. There are three Representatives in Congress.

History.—The name Colorado comes from that of the river, meaning "red water." Explorations were made here by United States army officers in 1806, 1819, and 1842-1844, and several fur-trading stations were established. In 1854 Conejos, in the Rio Grande Valley, was founded by

Colorado Beetle

colonists from New Mexico, and a Jesuit mission established. Gold was discovered in 1858, and as a consequence of this, Denver, Boulder, and Auraria were speedily founded and made a county in the territory of Kansas. In 1861 Colorado, according to its present limits, was organized as a territory, and in 1876 was admitted into the Union, receiving the popular designation of the "Centennial State." C. S. THOMAS.

Colorado Beetle, a beetle first described by Thomas Say, in 1824, from specimens found by him near the Upper Missouri. He



COLORADO BEETLE.

a, insect; b, caterpillar; c, eggs.

called it *Doryphora decemlineata*. The genus *doryphora* had been previously founded by Illiger. The genus is American, and is placed under the *chrysomelidæ*. The larva of the species distinguished as *decemlineata* feeds greedily on the potato, and having attracted notice in Colorado for its ravages among the crops of that esculent in the territory, it moved eastward year by year, till in 1874 it had reached the Atlantic seaboard.

Colorado College, a co-educational (non-sect.) institution in Colorado Springs, Col.; organized in 1874; has grounds and buildings valued at over \$1,100,000; endowment funds exceeding \$700,000; scientific apparatus, \$135,000; volumes in the library, 57,000; ordinary annual income, about \$80,000; average number of faculty, 57; average student attendance, 780; number of graduates since organization, over 520.

Colorado River, or **Colorado of the West**, a great river of the United States and Mexico, formed at about 38° N. lat. and 110° W. lon., by the junction of the Green and Grand rivers. The Green river rises in the Rocky Mountains in the W. of Wyoming, receiving in its S. W. course the waters of the Bear, the White, the Uintah, and San Rafael. From Flaming Gorge, a point in the N. W. of Colorado, where the Uintah Mountains rise, the Green river cleaves its way rapidly through cañons, the walls of which tower up to a height of nearly 1,500 feet. The Grand river rises in the Rocky Mountains, W. of Denver, Col., receiving in its S. W. course the South Fork or Gunnison, the San Miguel, and Dolores. After the junction the Colorado flows S. W. through Utah, joined on the E. by the San Juan, on the W. by the Dirty Devil and Es-

Colorado River

calante; S. W. through the N. of Arizona, till its waters are increased by the Colorado Chiquito, or Little Colorado of Arizona.

From the mouth of the Little Colorado the river bends W., and for the first 200 miles shoots through the wonderful "Grand Cañon." The walls of this water-worn trench are often vertical, or nearly so, for a distance of thousands of feet at a time; sometimes they slope steeply, or constitute magnificent terraces. The cliffs or rock-walls attain a height of from 4,000 to 7,000 feet above the stream, which runs with a varying descent of from 5 to 200 feet to the mile, and whose channel now contracts to 30 feet in width and now widens to 300 feet. There are frequent whirlpools and waterfalls. Below the cañon the valley opens, and there is much fertile bottom-land on one or both sides of the river. Numerous tributaries pierce the high plateau on either side, the whole presenting a strangely intersected topography. Escaping from the Grand Cañon, the river flows S. W. to the borders of Nevada, receiving from the W. the Paria, Tapeat's river, the Kanat (of Arizona), and the Virgen (of Nevada).

Above Callville, Nev., the Colorado, as also its tributaries, again bores its way through deep cañons, the sides of which in some places present walls of solid rock nearly 7,000 feet high; the plateaus at the top of these rock masses, generally treeless, are again surmounted by terraces of 1,000 feet or more in height. These lower and higher terraces are both piled with massive ruins, once the walled towns and cities of the Toltecs, as is supposed, a race said to be represented by the present Moqui Indians in the N. E. of Arizona. Below Callville the river is again shut in by the last of the cañons, the Black Cañon, 25 miles long, and from 1,000 to 1,500 feet high. Shortly after receiving the Virgen, the Colorado takes a S. course, severing Arizona and Sonora on the E. from Nevada, California, and Lower California on the W., and receiving on the E. Bill Williams's Fork and the Gila. After absorbing the Gila the river sweeps round in a W. direction for 7 or 8 miles, and soon expands to a width of 1,200 feet. Thence it pursues a tortuous course of 180 miles, the last portion being through Mexican territory, to its mouth in the Gulf of California. From the sources of the Green river the Colorado measures a total length of about 2,000 miles. It is navigable for steamers as far as Callville, 612 miles from its mouth, and can be made navigable, it is thought, to the foot of the Grand Cañon, 57 miles higher.

Colorado River, one of the chief streams of Texas. Rising in the high table-lands of Bexar, near the line of New Mexico, about lat. 32° 30' N., and lon. 102° W.,

it flows S. E., receiving in its upper course the Conca, the San Saba, and the Lano on the S., and the Pecan from the N., and empties into Matagorda Bay. Austin, Bastrop, and Columbus are on its banks, and Matagorda near its mouth. For most of its course it flows through a fertile region, and has an average width of 250 feet. It is a clear stream; its name, meaning red, was originally applied to the Brazos, N. and E., but the two were interchanged. The Colorado is some 900 miles long, and navigable to Austin or farther.

Colorado Springs, a city and county-seat of El Paso county, Col.; on the Denver and Rio Grande, the Denver, Texas and Gulf, the Santa Fe, Rock Island, and Missouri Pacific, and the Colorado Midland railroads; 70 miles S. of Denver. It is situated on a plain 6,000 feet above sea level, and is a health resort for victims of lung troubles. The summer population usually exceeds 35,000. The city is the center of the gold mining district of Colorado, and the seat of Colorado College, two sanitariums, St. Francis Hospital, the State School for Deaf Mutes, and the Childs-Drexel Printers' Home. It has electric railway connection with adjacent towns, electric lights, public schools, several daily and weekly newspapers, churches, two National banks, and an assessed property valuation of over \$13,000,000. The city was founded by Gen. William J. Palmer (1836-1909), who gave it a chain of picturesque parks, including the famous Monument and Manitou Parks, and other scenic wonders, and in 1908 it was also given the still more famous Garden of the Gods by the heirs of Charles E. Perkins. Pike's Peak, Seven Falls, Cheyenne Cañon, and the Cave of the Winds are easily reached. Pop. (1900) 21,085; (1910) 29,078.

Color-blindness, a singular affection, producing an inability to distinguish one color from another, and in certain rare cases to discern color at all, the eye perceiving only light and shade, or black and white. Almost no attention appears to have been paid to this subject till the end of the 18th century, when the famous chemist Dr. Dalton brought it into notice by publishing in 1794 an account of his own case as marked by this peculiarity. More recently Dr. George Wilson of Edinburgh also examined minutely into this phenomenon, and collected many striking instances. It would appear that color-blindness is much more common among men than women, and that of the former one in 20 is unable to discern the nicer shades of color, and one in 50 to distinguish certain primary colors from one another. The colors most liable to be confounded are red and brown with green, purple and green with blue, red with black, light hues of all sorts with white, and dark shades with black. Many of the instances ad-

duced by Dr. Wilson are exceedingly curious. The cause of this remarkable affection in almost every carefully investigated case has been found to be seated in the sensorium, not the visual apparatus, and to consist in the absence of the elementary sensation corresponding to red. To persons thus affected the solar spectrum appears to consist of two decidedly distinct colors, with white or gray at their place of junction. One of these two colors is doubtless nearly identical with the normal sensation of blue or violet. The other color extends a considerable distance into what to normal eyes is the red portion of the spectrum. The scarlet of the spectrum is thus visible to the color-blind, not as scarlet but as a deep dark color, perhaps a kind of dark green, orange and yellow as brighter shades of the same color, while bluish green appears nearly white. The eyes of persons so constituted present in general nothing abnormal either internally or externally, while their power of vision is equal to, and in many cases even superior to, that of persons in whom no such peculiarity exists. The colors most easily distinguished by the color-blind are yellow and blue, the latter color if pure and well-illuminated being the one many of the color-blind see best, which is rarely mistaken for other colors, and the use of yellow spectacles has accordingly proved advantageous in some cases. It is a curious fact that the substitution of artificial for daylight often enables persons affected in this manner to discern colors.

Color Hearing, a vision of colors, which in some persons is thought to accompany their perception of sounds. The facts are not yet brought under any scientific rules; they seem to vary with different experimenters. Bleuler and Lehmann have written on the subject.

Coloring, one of the essential parts of painting—namely, that part which relates to colors. Besides a knowledge of the art of preparing and mixing colors, and the whole mechanical process, from the beginning to the finishing of a picture, which in the various kinds of painting varies according to the materials of each, coloring comprehends the knowledge of the laws of light and colors, and all the rules deducible from the observation of their effects in nature, for the use of the artist. This subject has been treated by Leonardo da Vinci in his work on painting; Lomazzo and Gérard Lairesse in books on the same subject; Mengs in his "Praktischer Unterricht"; Goethe in his "Farbenlehre"; etc. The skill of the painter presupposes a natural ability founded on superior sensibility—namely, the ability to image forth, and in the imitation to express with characteristic truth the peculiar substances and color of any object under the influences of the light and air. To make this imitation success-

ful an accurate attention to the local tones and tints is requisite. By local tones we understand the natural color of an object as it appears on the spot where it stands, or from the spot where the spectator is supposed to be stationed. In works of art the natural color of an object appears always as a local tone, because every object must be regarded from only one point of view, conformably to which the natural color is modified according to the supposed distance. By tints we understand, in a more restricted sense, the gradations of the clear and obscure which lights and shadows produce on the colored surface. In no object of art do these modifications and shades exist in greater delicacy and diversity than in the naked human body, which is consequently the most difficult subject for a painter. Coloring, in as far as it is an imitation of the color and character of flesh (the naked body), is called carnation. If, in addition to the accurate coincidence of the natural colors, local tones, and tints of a painting with its original, the artist hits the expression of the peculiar character of the substance of which the object consists, the coloring is called true. But to truth should be joined beauty which is attained by the harmonious union of all the tones of the painting into one leading tone. The coloring must conform to and promote the object of the painting as a work of art, and by the harmony of the colors and lights, as well as by the truth of the local colors, and of the individual parts of the subject, constitute one beautiful whole. In the choice of lights and the distribution of colors the artist should aim not only at clearness of representation, but at the same time at the production of a pleasing harmony, which should aid the general impression of the piece. Consequently harmony and chiaroscuro are comprehended in the idea of correct, beautiful coloring. We often see pictures in which the colors are true to nature, but which have little merit and are deficient in a harmonious union of excellences.

Coloring Matters. This name ought to include every substance, organic or inorganic, which is the cause of color in another, but in practice it is restricted to the natural coloring matters of vegetables and animals. The reason of this restriction probably is that these coloring matters are distinctly different from the tissues or fluids which contain them, whereas the color of a mineral is not in general due to an isolable body, but is peculiar to the mineral itself. It is impossible, for instance, to take away the color of a copper compound, or the green or yellow of one of chromium. In the mineral world the analogy to the coloring of plants is found rather in rocks; for example, in a sandstone colored with oxide of iron, where the coloring matter may be removed without the rock mass being destroyed.

The organic coloring matters derived from vegetables are both important from their uses in the arts and interesting from their character and decompositions. They may be divided into two classes, those which exist ready formed in the plant, and those which are obtained by the spontaneous or artificial decomposition of some principle in the plant. Of those belonging to the first class, chlorophyll, the green coloring matter of the leaves, and the different colors in the flowers are the most obvious. Those, however, which are used in the arts are not at first sight apparent, being contained in the seed, bark, stem, or roots, from which they can be extracted by water, alcohol, ether, dilute alkalies, etc. The second class includes bodies which result by oxidation or other chemical change from some usually colorless matters, to which the name chromogens, color-producers, has been given; the question having been raised whether all coloring matters, even in plants, have not been produced from prior chromogens. The coloring matters have been subjected to investigation by numerous chemists, but notwithstanding very little is known about their real constitution. It is certain that many of the crude colors of commerce are mixtures, and it is highly probable that when better known their constituent principles will turn out to be diverse in constitution. Coloring matters are generally odorless, with a rough taste, soluble, some in water, others in alcohol. Indigo and alizarine can be sublimed, but most are decomposed by a slight elevation of temperature. They all consist of carbon, hydrogen, and oxygen, to which in some cases nitrogen is added. Some exhibit a weak acid tendency, combining with the oxides of lead, copper, and especially tin, iron, and aluminum, and forming insoluble colored compounds called lakes. Some have the power of attaching themselves permanently to different vegetable and animal fibers, as silk, wool, cotton, and linen; others are unable to give a color which will not redissolve in water; in such cases the fiber is mordanted, that is, treated with one of the metallic oxides just mentioned, and then when immersed in the color, the lake is precipitated in the fiber. The coloring matters are liable to change by exposure to daylight, they are also affected by a number of chemical reagents — certain blues, for example, are turned green by alkalies, and red by acids — they are destroyed by nitric acid, bleached by chlorine, decolorized, but not always permanently destroyed, by sulphurous acid and sulphuretted hydrogen, etc.

Of the coloring matters the yellows are the most abundant, and different varieties are obtained from different plants: fustic, turmeric, quercitron, Persian berries, morindin, saffron, annatto, purree, chrysophanic acid, and others; of the blues indigo and lit-

mus are the most familiar; and of the reds and purples, madder, logwood, Brazil-wood, safflower, etc. Most require complicated operations to separate them in the pure state.

The only green coloring matter known, of no importance as a dye but indispensable to the life of the plant, is chlorophyll. It was formerly supposed that this is a single substance which could be obtained from an alcoholic extract of leaves by adding lime, then decomposing the lime-chlorophyll compound with an acid, and agitating with ether, from which the chlorophyll was obtained by evaporation. But by another process it was found that it could be separated into two bodies, one yellow, the other blue; and by the application of the spectroscope, Stokes showed that chlorophyll contains four coloring matters, two yellow and two green, differing in optical properties. By further study in the same direction Mr. Sorby thinks he has proved that besides the greens there are four or five distinct yellow coloring matters, to which he has given special names. It is quite obvious, if this be so, that our knowledge of the nature of chlorophyll is just beginning, and each coloring matter will become an object of chemical and physiological investigation.

The animal coloring matters are found mainly in the three fluids, bile, blood, and urine. The biliary coloring matter, or cholechrome, as it is called, has been much investigated, and with results similar to those in the case of chlorophyll, to wit, the isolation of a number of distinct bodies with different chemical properties and different absorption spectra. The names given to them are *bilirubin*, an orange-yellow powder, soluble in chloroform, benzol, and alkalis; *biliverdin*, a green powder, insoluble in chloroform, but soluble in alcohol; *biliprasin*, a black mass, of a dark green color when powdered, insoluble in chloroform, soluble in alcohol and in alkalis; it is produced spontaneously from the preceding when dissolved in an alkali and exposed to air; *bilifuscin*, a black mass, of a dark brownish green color when powdered, slightly soluble in chloroform, readily in spirit. These different bodies exhibit different reactions with acids and metallic salts, and by decomposition yield other coloring matters. Other chemists have procured bilirubin as a bright red coloring matter by direct action of chloroform, and besides a brown modification called *biliphœin*. The same uncertainty, therefore, prevails regarding the bile pigments with the vegetable colors, the uncertainty being due to the similarity of the bodies and the difficulty of separating them, and also to the possible decomposition of the bodies themselves by the action of the solvents.

The artificial coloring matters may be divided into two classes, those which exist ready formed in nature as many of the com-

mon red and brown paints, or which are formed by the mechanical mixture of such naturally existing colors, and those produced by chemical operations. The latter are of mineral or of organic origin, examples of the first class being afforded by Scheele's, Guignet's and other greens, artificial ultramarine, smalt, and others, and of the latter by Prussian blue, and the aniline colors. See DYEING: DYESTUFFS.

Color Printing, the art of producing pictures, designs, cards, etc., in various colors by means of lithography, printing from metal blocks, etc. The ordinary methods are: (1) the chromo-lithographic, in which a tracing of the original picture, or the like, is first made, and a copy transferred to as many stones as there are colors in the original, every color requiring a fresh stone. The drawing on each stone is made to fit in, or register, with the preceding one, and as the paper passes through the machine an additional color is added every time, and thus the picture is built up color upon color (each being allowed to dry before the next is put on) until it is completed. Some chromos or oleographs may have as many as 25 or 30 printings or colors. (2) Block or surface color-printing is specially adapted for book illustrations or work where nicety of detail or rapidity is required. As in chromo-lithography various printings are necessary; but these are reduced in number by printing several tints of the same color at one operation. Each block, which is usually of zinc and prepared in the usual way, is capable of producing three or more gradations of the same color; the darkest shade from the normal surface, lighter shades being got from parts which have been bitten or corroded in an almost imperceptible degree—the deeper corrosions giving the lightest shade. When the tints of one color are thus printed from one block and at one operation, a second block with gradations, in the same way, is used, registering as in chromo-lithography, and so on till the picture is finished.

Colossæ, an ancient town of Asia Minor, in the S. part of the province of Phrygia, on the Lycus river 12 miles E. of Laodicea. It is mentioned by Xenophon as "a populous city, prosperous and great," but in the time of Strabo was "a small town." Ruined by an earthquake in A. D. 61, it was again rebuilt, and in the Middle Ages was named Chonæ.

Colossians, Epistle to the, a letter written to the Colossians by the Apostle Paul either from Rome or Cæsarea, at the same time that he wrote the epistles to the Ephesians and to Philemon. It contains a summary of Christian doctrine, especially dwelling on the divine power and majesty of Christ, and a series of practical exhortations to specific duties of Christian morality.

Colossus (Lat.; *Kolossos*, Gr.), in sculpture, a statue of enormous magnitude, from which our adjective colossal is derived. The practice of executing statues of colossal dimensions and proportions is of very great antiquity. The people of the East from the most ancient times have been celebrated for colossal sculpture. The pagodas of China and of India and the excavated caverns of the East abound with colossi of every description. The Asiatics, the Egyptians, and in particular, the Greeks, have excelled in these works. The celebrated colossus of Rhodes was reckoned one of the seven wonders of the world. This statue which by some has been reckoned among the fables of antiquity was raised by the Rhodians in honor of Apollo. There are many contradictory accounts in ancient authors concerning this colossal statue, but the following is probably not far from being correct. When Demetrius Poliorcetes, King of Macedon, laid siege to the city of Rhodes (304 B. C.) they were succored by their allies. The Rhodians, in recognition of their regard for the services of their allies, and of the protection of their tutelary deity Apollo, resolved to erect a brazen statue of the Sun of a prodigious size. Chares, the disciple of Lysippus, was intrusted with the project. He had scarcely half finished the work when he found that he had expended all the money he had received for the whole, which overwhelmed him so completely with grief and despair that he hanged himself. Laches, his fellow countryman, finished the work in the space of three olympiads (12 years), and placed the enormous statue on its pedestal. Pliny gives all the honor to Chares. Scarcely 60 years had elapsed before this monster of art was thrown from its place by an earthquake, which broke it off at the knees; and so it remained till the conquest of Rhodes by the Saracens in A. D. 684, when it was beaten to pieces and sold to a Jew merchant, who loaded above 900 camels with its spoils. Strabo, Pliny, and other ancient authors who lived at the time that the colossus of Rhodes is said to have been in existence, have given its height at 70 cubits, or about 105 English feet. Other authors who flourished since its destruction report its height at 80 cubits. Pliny relates several particulars, as that few persons could embrace its thumb, and that its fingers were as long as ordinary statues, which, calculated by the proportion of a well made man, would make its height nearer to 80 than 70 cubits. Some modern authorities, make the height about 90 feet. The statue stood at the entrance of the harbor of Rhodes, but there is no authority for the statement that it bestrode the harbor mouth, and the Rhodian vessels could pass under its legs. Some antiquaries have thought that the fine head of the Sun which is stamped on the Rhodian

medals, is a representation of that of the colossus.

Of other colossal statues, those which were executed by Phidias are among the most celebrated for beauty and elegance of workmanship. They were his Olympian Zeus and his Athena of the Parthenon. The virgin goddess was represented in a noble attitude, 26 cubits or 39 feet in height, erect, clothed in a tunic reaching to the feet. In her hand she brandished a spear, and at her feet lay her buckler and a dragon of admirable execution, supposed to represent Erichthonius. On the middle of her helmet a sphinx was carved, and on each of its sides a griffin. On the ægis were displayed a Medusa's head and a figure of Victory. This colossal work contained, on its various parts curious specimens of minute sculpture in bas-relief which Phidias is said to have brought to perfection. He executed the statue of Zeus Olympus, and succeeded even in excelling his own Athena. This colossal statue was 60 feet. We should not forget the magnificent and extravagant proposal of Dinocrates to Alexander the Great, of forming Mount Athos into a colossus of that conqueror; nor a similar proposal in modern times, of sculpturing one of the Alps, near the pass of the Simplon, into a resemblance of Napoleon. Among other celebrated colossi of ancient times, historians record as eminently beautiful that which was executed by Lysippus at Tarentum. It was 40 cubits or 60 feet in height. The difficulty of carrying it away prevented Fabius from removing it to Rome.

Colossi were in use also in Italy before the time when the Romans despoiled their vanquished enemies of their works of art. The Jupiter of Leontium in Sicily was 7 cubits in height, and the Apollo of wood that was transported from Etruria, and placed in the palace of Augustus at Rome, 50 feet. The same emperor also placed a fine bronze colossus of Apollo in the temple of that god which he built near his own palace. The earliest colossus recorded to have been sculptured in Rome was the statue of Jupiter Capitolinus, which Spurius Carvilius placed in the capitol after his victory over the Samnites. There has been dug up among the ruins of ancient Rome a colossal statue of the city of Rome, a personification reckoned among the tutelary divinities of the empire. The superb colossi on the Monte Cavallo, believed to represent Castor and Pollux (the Dioscuri), are magnificent specimens of Grecian art; so are the Farnese Hercules, and the gigantic Flora of the Belvedere.

Among modern works of this nature is the colossus of San Carlo Borromeo, at Arona, in the Milanese territory. It is of bronze, 60 feet in height, and has a staircase in its interior for the purpose of occasional repairs and restorations. The bronze

colossus, copied from one of the Monte Cavallo statues, in Hyde Park, London, and a few but little larger than life, such as decorate some public buildings and commemorative columns, are nearly all that Great Britain can boast of in this noble style of art. The four colossal statues at Paris which are in front of the façade of the palace of the Chamber of Deputies, represent four of the greatest French legislators — Sully, Colbert, L'Hôpital, and D'Aguesseau. Germany possesses a colossal statue of Hermann or Arminius, leader of the Cherusci, who inflicted such a severe defeat on the Romans under Varus. This statue is 90 feet in height to the point of the upraised sword which itself is 24 feet in length; the height of the figure to the point of the helmet is 55 feet. The statue stands on the top of a Gothic dome 93 feet in height, the monument, which was inaugurated in 1875, being situated on a wooded hill near Detmold. In September, 1883, was also erected near Rudesheim, in commemoration of the unification of the empire, a statue of Germania, 34 feet high, on a pedestal over 81 feet high. In the United States a figure of "Liberty Enlightening the World," 151 feet high (with pedestal 305), has been erected in New York, overlooking the harbor and serving as a beacon. It was the work of the French sculptor Bartholdi, and was constructed mainly through the efforts of a French-American Union formed in 1874. In 1880 it was presented by France to the United States, and six years later it was placed on its present site, Bedlow's Island. The Lion of Belfort is another colossal statue by the same sculptor in commemoration of the siege of that city during the Franco-German War.

Colquitt, Alfred Holt, an American legislator; born in Walton county, Ga., April 20, 1824. He was graduated at the College of New Jersey in 1844, and settled in his native State as a lawyer. He served in the Mexican war, and was elected to Congress in 1852 as a Democrat. Upon the outbreak of the Civil War he entered the Confederate army as a captain. He was elected governor of Georgia in 1876 and United States Senator in 1882 and in 1888. He died in Washington, D. C., March 26, 1894.

Colt, Samuel, an American inventor; born in Hartford, Conn., July 19, 1814. He had a common school education and was employed in his father's textile mill; but went to sea as a sailor boy when aged 15. His attention being drawn to fire-arms while at sea, he began to perfect a revolver and patented it in 1835. Its great success led to the erection by him at Hartford of one of the most extensive weapon factories in the world. He died in Hartford, Jan. 10, 1862.

Colton, Charles Caleb, an English writer, born in Salisbury in 1780. He held the

united living of Kew and Petersham, but was eccentric in his manners, extravagant in his habits, and irremediably addicted to gambling and its attendant vices. Bewildered by his pecuniary obligations he fled to the United States, and after a sojourn there of some years he took up his abode in Paris, where he acquired a fortune of \$125,000 by gambling, which was soon dissipated. Through apprehension of a surgical operation he committed suicide April 28, 1832. He wrote several satirical poems, "Hypocrisy," "Napoleon," etc.; but his most remarkable work is "Lacon; or, Many Things in Few Words."

Colton, Gardner Quincy, an American scientist; born in Georgia, Vt., Feb. 7, 1814. He received a common school education and learned chair making, removing to New York in 1835, and taking up the study of medicine and science in 1842. Lecturing on chemistry and physics a few years later, accident led him to a discovery of the anæsthetic properties of nitrous oxide, or "laughing gas," credit for which is also given to Dr. Horace Wells. He perfected an electric motor in 1847, went to California in 1849, and resumed his scientific lectures in 1860. He later built up a large dental practice. He died in Rotterdam, Holland, Aug. 11, 1898.

Colton, Walter, an American writer; born in Rutland, Vt., May 9, 1797; became Professor of Moral Philosophy and Belles-lettres at Middletown Academy, Conn. (1825); in 1828-1830 was editor of the "American Spectator," Washington. In 1845 he went to California, and in Monterey established the first newspaper of the State, called the "Californian." He wrote many books of interest, including "Visit to Athens and Constantinople" (1836), and "Three Years in California" (1850). In 1851 Dr. Cheever edited "The Sea and Sailor, Notes of France and Italy, and Other Literary Remains," with a biography of the author. He died in Philadelphia, Pa., Jan. 22, 1851.

Coltsfoot, a composite plant, *Tussilago Farfara*. The species now named is cordate, angular, toothed, downy beneath. The flowers are yellow, and come forth in March and April, before the leaves appear. It is abundant in the United States in moist and clayey soils. The leaves have been used medicinally as an infusion, or have been smoked like tobacco for the cure of asthma.

Coluber, a linnæan genus, comprehending all the snakes now included under the family *Colubridæ*. The same genus, as limited by Cuvier and his successors, is the typical one of the family *Colubridæ*, and the sub-order *colubrina*. Dr. J. E. Gray, F. G. S., defined it thus: Ventral shields broad,

anal spurs none, tail usually conical and elongate. The species are very numerous, some of them beautifully colored, and all are harmless. For a long time the common snake of England was called *C. natrix*; now it is termed *Natrix torquata*, or *Tropidonotus Natrix*. *C. dumfriesensis* of Sowerby is probably an immature variety of the common species. *C. austriacus* is common in Germany and France. *C.* or *Boscanion Constrictor*, the black snake of Catesby — (which must not be confounded with the *Boa Constrictor*) — is common in all the Southern and South Atlantic States. It is rarely molested by those who know its habits, as it is very useful in destroying rats and kindred vermin. It sometimes attains a length of eight or nine feet.

Columba, or **Columba Noachi** (Lat. "Noah's dove"), a small constellation S. of Lepus and Canis Major, about the time of whose origin there is very frequent misstatement. It is generally stated that it was introduced by Royer in 1679 or 1680. This is easily disproved by the fact, seldom noted, that Bayer in his "Uranometria," published in 1603, on the 37th map, just below Canis Major, pictures the dove flying with the olive-branch in its mouth. Dr. Gould states that it was introduced by Petrus Plancius, an eminent Dutch geographer and teacher of Petrus Theodori. The latter died in 1596. The constellation is known today by the simple name of Columba, and is situated between Puppis, Pictor, Cælum, Lepus, and Canis Major.

Columba, St., a native of Ireland (Gartan in Donegal); born in 521. In 545 he founded the monastery of Derry, and subsequently established many churches in Ireland. About 563 he landed in the island of Hy, now called Iona, and founded his Church. About 565 he went on a mission of conversion among the northern Picts, and traversed the whole of Northern Scotland, preaching the Christian faith and founding monasteries, all of which he made subject to that which he had set up on the island of Hy. The Columban Church was in some points of doctrine and ceremonial opposed to that of Rome, to which it owed no allegiance. Shortly before his death he revisited Ireland. There is a well-known life of St. Columba, "*Vita Sancti Columbæ*," written by St. Adamnan, abbot of Iona. He died in Iona, 597.

Columbacei, a sub-order of birds ranked under the order *Rasores*. The *Columbacei* are called also *Gemitores*. It contains the various kinds of doves and pigeons. They are distinguished from the more typical *Rasores* by their strong wings and sustained flight. Their toes are four, viz., three before and one behind, the former never united toward their base by a membrane;

the hallux is on the same level in the other toes. The species are monogamous, and pair for life; lay generally but two eggs for a brood, but breed often, and feed their young with macerated food from their own crops. They are more helpless at birth than the young of the typical *Rasores*. The *Columbacei* are divided into the following families: *Columbidæ*, true pigeons; *Gouridæ*, ground pigeons; *Treronidæ*, or tree pigeons; *Didunculidæ*, and *Dididæ*, or *Dodos*.

Columbanus, St., a monk; born in Ireland about 540. He went to France in 590, and founded the celebrated monastery of Luxeuil, over which he presided for 20 years. The enmity of Queen Brunehaut caused him to be ordered back to Ireland, from whence he journeyed into Italy, where he founded the monastery of Bobbio in 615. The order of the Columbans was united to that of the Benedictines in the beginning of the 8th century.

Columbarium, a dovecote or pigeon-house. When it is used in the singular columbarium also signifies a particular kind of sepulchral chamber used by the Romans to receive the ashes of bodies which had been burned. The name was derived from the chamber being supported by the small niches or holes, resembling the holes in a dove-cote (*columbaria*), in which the urns (*ollæ*) were deposited.

Columbella, a genus of mollusks, of the family *Buccinidæ*; small, prettily marked shells, with a long narrow aperture, a thickened and dentated outer lip, a crenulated inner one, a small lamellar operculum. Recent species known 205, fossil 8. The former are from the sub-tropical and tropical parts of the old and new worlds; the latter from the Tertiary.

Columbia, the popular name of the United States; derived from Columbus, the discoverer of the New World, and applied to its greatest nation from a feeling of poetic justice to the memory of the great explorer.

Columbia, a city of Lancaster county, Pa.; on the Susquehanna river, the Philadelphia and Reading, and the Pennsylvania railroads, and the Pennsylvania and Susquehanna canals; 10 miles W. of Lancaster. The Susquehanna, here over a mile wide, is crossed by a bridge connecting with Wrightsville. This bridge is one of the longest in the United States. Columbia is the trade center for Lancaster and surrounding counties, and has numerous silk and lace mills, sugar refineries, ironworks, and brush factories. It is connected by electric railways with all nearby towns, and is lighted by electricity. It is the seat of Franklin and Marshall College, and has a public library, St. Peter's convent school,

several newspapers, three National banks, and an assessed property valuation of \$4,000,000. The city was founded as Wright's Ferry in 1726, by Quakers, and in 1798 it was one of the places voted upon for the National capital. The original bridge crossing the Susquehanna was burned in 1863 to prevent the Confederates marching on Philadelphia. Pop. (1890) 10,599; (1900) 12,316; (1910) 11,454.

Columbia, city, capital of the State of South Carolina, and county seat of Richland county; on the Congaree river near the junction of the Broad and Saluda rivers, on five railroads and the Columbia canal. The city is built on a bluff, 15 feet above the river, has a fine park, and is noted for its beautiful shade trees and flower gardens.

Business Interests.—Within a few years there has been a large improvement in the manufacturing industries of the city. Since 1895 several costly cotton factories have been completed. One of these alone in 1899 employed 1,000 persons and operated 65,000 spindles and 1,500 looms. White labor is almost wholly employed. In 1900 there were five mills in operation, using upward of 50,000 bales of cotton. Besides the cotton factories there are several sawmills, sash and door factories, foundries, machine shops, etc. There are two National banks, with an aggregate capital of \$200,000, and surplus funds amounting to \$130,000, and several private banking concerns. The assessed valuation in 1892 (last reported) was about one-half the cash value, nearly \$5,000,000.

Public Interests.—The city is well supplied with water and gas, and has abundant sources of water-power. The most noteworthy buildings include the State House, costing about \$4,000,000; Executive Mansion; State Penitentiary; Insane Asylum; United States Government Building; City Hall; University of South Carolina; and a Presbyterian Theological Seminary. Besides the educational institutions mentioned there were, in 1899, four public school buildings, with property valued at \$42,500; 2,324 pupils, and 35 teachers; one public high school for whites and one for negroes, and Benedict College.

History.—Columbia was laid out in 1786, and the State Legislature first met there in 1790. During the Civil War a large part of the city was burned by the Federal troops, destroying the old State House with an extensive library, a convent, several churches, and the railroad depot. Pop. (1890) 15,353; (1900) 21,108; (1910) 26,319.

Columbia, District of. See DISTRICT OF COLUMBIA.

Columbia River, after the Yukon the largest river on the W. side of America;

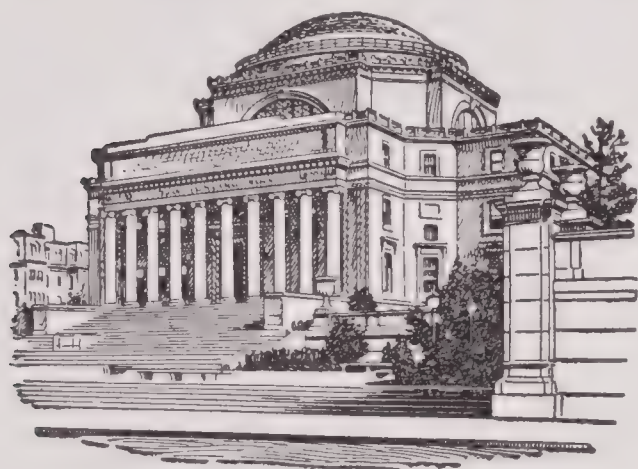
rises in British Columbia, on the W. slope of the Rocky Mountains, near Mounts Brown and Hooker, in about lat. 50° N.; has a very irregular course, generally S. W. through Washington; forms the N. boundary of Oregon for about 350 miles; and enters the Pacific by an estuary 35 miles long and from 3 to 7 wide. Its estimated length is 1,400 miles. The area drained by this stream and its affluents, of which the largest are Clarke's Fork and the Snake river (with very remarkable cañons), has been computed at 298,000 square miles. The river is broken by falls and rapids into many separate portions, and the ingress and egress are embarrassed by a surf-eaten bar. Still, it is open to steamboat navigation from its mouth to the Cascades (160 miles), and goods are carried past the obstruction, for 6 miles, by railway; the next reach, of 50 miles, extends to Dalles, where another railway, of 14 miles, has been constructed past the Great Dalles channel; and immediately above this are two sections, of 185 and 250 miles respectively, navigable for small steamboats. The extraordinarily abundant salmon-fisheries of the Columbia have been largely developed. There are a number of canneries, mostly near the mouth of the river (where a great jetty now makes a good harbor), the annual export of canned salmon exceeding 500,000 cans.

Columbia University, a seat of learning in New York city. The design of establishing a college in New York was more than 50 years in contemplation before it was carried into effect. In 1746 provision was made by law for raising money by public lotteries. Five years later the proceeds of these lotteries amounted to about \$1,700 and were given to trustees. The fact that two-thirds of these trustees were in communion with the Church of England, and that some of them were vestrymen of Trinity Church excited opposition to the proposal as a scheme to strengthen the Established Church and delayed the procurement of a royal charter. Friends of the enterprise proceeded, however, with the arrangement for opening the college and elected for their first president the Rev. Dr. Samuel Johnson, of Stratford, Conn., who assumed the office July 17, 1754, in the school house belonging to Trinity Church. There was a class of eight students.

The cosmopolitan character of the governing body of the college is due to its charter. To meet the objections that had been made, it was so drawn as to include in its board of governors, besides other ex-officio representatives, not only the rector of Trinity Church, but the senior minister of the Reformed Protestant Dutch, Ancient Lutheran, French, and Presbyterian Churches. It is probably due to this cir-

cumstance that Columbia almost alone of all the pre-Revolutionary colleges in the United States has never had a theological faculty connected with it. The trustees, at present, are members of the Episcopal Church, and also of the Reformed, Presbyterian and Roman Catholic Churches, showing that this cosmopolitan character has never been lost. A prominent Hebrew Rabbi was at one time a member of its councils.

The charter of King's College, the original name of Columbia, was granted by George II., and finally passed the seals on Oct. 31, 1754, from which day the college dates its existence. It received from Trinity Church, according to a promise previously given, a portion of a grant of land known as "the King's Farm," upon the site of which its first building was erected. It was stipulated in the royal charter that its president should be a communicant of the Episcopal Church and that proper selections from the liturgy of that Church should be used in the religious services of



LIBRARY OF COLUMBIA UNIVERSITY.

the college. This caused much angry controversy, and after the Revolution it was stricken out of the charter, but remains as the condition of the deed of gift from Trinity Church. King's College played a conspicuous part in securing and confirming the independence of the United States. The Revolutionary War caused a suspension of the activities of the college, and in 1776 the college building was used as a military hospital. After eight years the college work was resumed by act of the Legislature, May 1, 1784, under the name of Columbia College.

On April 13, 1787, the Legislature revived the original charter with amendments, which abolished ex-officio membership of its governing body, canceled the requirement that the president should hold a certain form of religious belief or that a certain form of prayer should be used in the services of the college, and named a body of 29 trustees, which, when reduced to 24 members, was made a self-perpetu-

ating body under which government the college has remained. The medical faculty was organized in 1792 and a professorship of law was established in 1793.

The original site of the college was in what became later the block bounded by College Place, Barclay, Church and Murray streets. In 1857 the college was moved to 49th and 50th streets and Madison avenue, where it remained until 1897. In 1892, for \$2,000,000, purchase was made of 17½ acres of land lying between 116th and 120th streets, Amsterdam avenue, and the Boulevard. Here in 1897 the college was reorganized on the basis of a university.

Columbia University, in a technical sense, consists of the Faculties of Law, the first professor of which (1792) was James Kent, who, during the period of his second appointment in 1823 delivered the courses of lectures which developed into the first two volumes of his famous "Commentaries"; of Medicine; Philosophy; Political Science; Pure Science; and Applied Science. The College of Physicians and Surgeons, the outcome of the Medical Faculty, established in King's College in 1767, became in June, 1860, the Medical College of Columbia. In 1891 it surrendered its separate charter and became an integral part of Columbia College. These faculties offer advanced courses of study to members of the senior class of the university, and lead through the Bachelor's degree to the university degrees of Master of Arts and Doctor of Philosophy. The degree of Master of Laws is conferred for advanced work in Law done under the Faculties of Law and Political Science together. The Faculties of Law, Medicine, and Applied Science, conduct respectively the Schools of Law, Medicine, and Mines, Chemistry, Engineering, and Architecture, to which students are admitted as candidates for professional degrees on terms prescribed by the faculties concerned. The School of Mines was due to the exertions of Thomas Egleston, who was made Professor of Mineralogy and Metallurgy in 1864, and who opened the School of Mines the same year in the basement of the old college building in 49th street. There is also the School of Chemistry, Engineering, and Architecture, set off from the School of Mines in 1896. Out of the School of Mines grew the School of Pure Science, established in 1892. Under President Barnard's influence, in April, 1889, the Trustees gave their official approval to the plan for founding Barnard College for Women studying for Columbia degrees. It is financially a separate corporation, but educationally it is part of the system of the university. Teachers' College, a professional school for teachers, is also financially a separate corporation and educationally a part of the university. It was founded

in 1888, chartered in 1889, and included in the university in 1898. It offers courses of study, each of four years leading to a diploma, for secondary, elementary, and kindergarten teachers; also courses of two years leading to a departmental diploma in Art, Domestic Science, Domestic Art, and Manual Training. Some of these courses are accepted by Columbia University, and may be taken without extra charge, by students of the university in partial fulfillment of the requirements for the degrees of Bachelor of Arts, Master of Arts, and Doctor of Philosophy. The university has over 600 professors and instructors; over 7,400 students in all departments; about 450,000 volumes in its libraries; 27 fellowships; 188 scholarships; and property of all kinds valued at over \$34,000,000.

The presidents of the university have been: Samuel Johnson (1754-1763); Myles Cooper (1763-1775); the Rev. Benjamin Moore (1775-1776); William S. Johnson (1787-1800); Charles H. Wharton (1801); the Rt. Rev. Benjamin Moore (1801-1811); William Harris (1811-1829); William A. Duer (1829-1842); Nathaniel Moore (1842-1849); Charles King (1849-1864); Frederick A. P. Barnard (1864-1889); Henry Drisler, acting (1888-1890); Seth Low (1890-1901), the latter resigning on being nominated for Mayor of New York; Nicholas M. Butler (1902-).

Columbidæ, a family of birds, the typical one of the order or sub-order *Columbæ*, including the true pigeons and doves. The bill is moderate and compressed, having at its base a soft skin in which are the nostrils. The feet have three divided toes before and one behind.

Columbine, a popular name for *Aquilegia vulgaris* or other species of the genus *Aquilegia*. The common columbine has drooping purplish-blue flowers with five flat sepals; five petals, with long spurs, often curved; five follicles, the root-leaves twice or thrice ternate, the others singly ternate. The word is also applied to a female character in the Italian comedy, the "Daughter of Cassandra," in which she is the sweetheart of Harlequin; and to the female dancer in the English pantomime.

Columbite (-lum'bīt), a mineral of a black or brownish-black color and high specific gravity, the native niobate (or columbate) of iron and manganese, usually containing tantalate of iron. Its crystals belong to the orthorhombic system. It is found in some parts of Italy, Bavaria, Finland, the Ural region, Greenland, and in the United States—especially in most of the States near the Appalachian mountain system, and in California, Colorado, and South Dakota.

Columbus, a city and county-seat of Muscogee county, Georgia; on the E. bank of the Chattahoochee river; on the boundary line between Georgia and Alabama; and on the Central of Georgia, the Southern, and the Columbus Southern railroads; 100 miles S. W. of Macon. It is connected by steamship lines with Appalachicola, Fla. On account of its large manufacturing interests it is known as the "Lowell of the South." The city is regularly laid out, with streets 60 to 125 feet in width.

Business Interests.—Columbus is the leading cotton manufacturing city in the South. There are eight cotton factories, five run by water power and three by steam, 14 flour and grist mills, and numerous machine shops, iron foundries, saw-mills, planing-mills, etc. In 1898-1899 Columbus received for shipment and manufacture 23,094 bales of cotton, of which 17,872 bales were from Alabama, 2,061 from Florida, 2,349 from Mississippi, and 812 from South Carolina. There are three National banks, with an aggregate capital of \$300,000 and a surplus fund of \$180,000, and several private banking concerns. The assessed valuation in 1900 aggregated over \$9,000,000, and the tax rate was \$17.30 per \$1,000.

Public Interests.—The noteworthy buildings are the Court House, Presbyterian Church, Temperance Hall, Springer Opera House, Georgia Home Insurance Company, Bank of Columbus, Garrard Building, and numerous churches. Four handsome bridges connect Columbus with its suburbs in Alabama. At the end of the school year 1898-1899 there were 11 public school buildings, with 2,390 pupils and 54 teachers, and school property valued at \$100,000. For higher education there were a public high school, Moore's Private School, and Wynn-ton and Columbus colleges.

History.—Columbus was laid out in 1828; incorporated as a city in 1829; and captured by the Federal forces, April 16, 1865. Pop. (1900) 17,614; (1910) 20,554.

Columbus, a city and county-seat of Lowndes county, Mississippi; on the Mobile and Ohio railroad and the Tombigbee river; 150 miles S. E. of Memphis and the same distance N. E. of Jackson. It is the farming trade center of the county; is the seat of Columbus Industrial Institute and College, Franklin Academy, and the State bank. It has a court house and several weekly and semi-weekly newspapers. Its assessed property valuation is over \$12,000,000. Pop. (1900) 6,484; (1910) 8,988.

Columbus, a city of Ohio, a port of entry, capital of the State, and county-seat of Franklin co., situated at the confluence of the Scioto and Olentangy rivers, very nearly in the geographical center of the

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State, 120 miles N. E. of Cincinnati, and 140 miles S. W. of Cleveland. It covers an area of $16\frac{1}{4}$ square miles, and has a population estimated in 1907 at about 150,000.

Streets, Parks, and Public Buildings.—The city is laid out in the form of a rude Maltese cross, three arms of which are E. of the Scioto river, and the fourth arm is W. of it. The streets, of which about 160 miles are improved, are broad and level, uncommonly well paved, and traversed by over 110 miles of street railroad. The principal thoroughfares are High and Broad streets, which intersect at right angles in the center of the cross. High street, extending the entire length of the city from N. to S., a distance of nearly 7 miles, has a width of 100 feet, and is the principal business street. Broad street extends for about an equal distance from the E. to the W. limits of the city, has a width of 120 feet, and affords a delightful drive over an asphalted roadway shaded for a good part of its length with four rows of trees. At the intersection of these two streets, two blocks E. of the Scioto river, is Capitol square, a small park of 10 acres, in which is situated the State Capitol, a massive structure in the Doric style, built of gray limestone quarried in the vicinity. It is 304 feet long, 184 feet wide, covers nearly 3 acres, and has cost \$2,500,000. The McKinley Memorial is a fine work of art, located at the main entrance to the Capitol grounds, on High street. Other notable public buildings are the State penitentiary, the post office and custom house, the State arsenal, the court house, the city hall, and the Carnegie library. The union station is a very handsome structure, centrally located.

There are a number of parks, both large and small, the area of the public parks being about 200 acres, besides 100 acres of other parks. The most notable among the former are the Franklin, City, Olentangy, and Goodale parks. The Barracks, a United States military post, are also surrounded by a pretty park.

Churches, Charities, Hotels, etc.—Besides the public buildings mentioned above, there are a large number of handsome structures used for churches, hospitals and asylums, theaters and clubs, and educational and business purposes. Among the 130 churches of the city the First Congregational Church, the Broad Street Presbyterian and Methodist Episcopal churches, St. John's (R. C.) Church, the Jewish Temple, and the Christian Science Church are notable for their architecture. There are twelve hospitals, besides a number of private sanitariums. The number of charitable institutions is unusually large, including institutions for the deaf and dumb, the blind, and the feeble-minded, homes for children, orphans, and the friendless, the Codman guild-house,

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etc. There are some fifty hotels, many of which are fine spacious structures equipped with all the modern appliances and elegancies. The principal theaters are the Southern, the Empire, the Grand Opera, and the High street theaters. The largest halls in the city are the Columbus auditorium, with a seating capacity of 8,000; the Memorial Hall auditorium, with a seating capacity of 6,000; and the auditorium of the Board of Trade building, with a seating capacity of 2,000. The most attractive club buildings are those of the Columbus Club, situated in the central portion of the city; the Arlington Country Club, situated in the beautiful suburb of Arlington; and the Columbus Country Club, about four miles E. of the city limits.

Educational Institutions.—The educational facilities offered by Columbus are truly remarkable for a city of its size. At the head of its educational institutions stands the Ohio State University, founded in 1870, and composed of a college and schools of agriculture, engineering, law, pharmacy, and veterinary medicine, which are attended by over 2,000 students. The university is situated on fine grounds, comprising 345 acres in the N. part of the city, and has a complex of handsome buildings, among which may be mentioned University, Hayes, Biological, and Townsend halls, and the armory and gymnasium building. The university library has over 50,000 volumes. Other institutions of higher or professional learning are the Starling Medical College and the Ohio Medical University, the Columbus Law School, the Lutheran Seminary, known as Capitol University, and the Columbus Art Institute. For secondary education the city maintains four high schools housed in magnificent structures, besides several normal schools, and the two Roman Catholic academies, St. Mary's and the Josephinum, the former for girls and the latter for boys. There are also schools of music, oratory, etc., and numerous business schools. The elementary school system embraces many kindergartens, both public and private, 40 public schools, with nearly 600 teachers, 8 Roman Catholic parochial schools, and a score or more of private schools. Besides the university library mentioned above, there are the State Library, with about 105,000 volumes, and the City Public Library, with several branches. There are 5 daily newspapers, one of which is in German, besides a large number of weekly, monthly, and trade publications.

Industries and Commerce.—The numerous industries of Columbus include the manufacture of boots and shoes, railway cars, carriages and wagons and their materials, bricks and tiles, furniture, flour and grist, iron and steel products (including wire rope and cable, bolts, nuts, and rivets, stoves and furnaces, etc.), malt liquors, planing-

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mill products, harness and saddlery, paints, patent medicines, etc. According to the United States Census of Manufactures of 1905, the five leading industries of Columbus were the following: Boots and shoes, with \$2,245,000 of capital invested, 2,306 wage-earners, who received \$926,000 in wages, and a product valued at \$5,425,000; carriages and wagons, with \$1,764,000 of capital, 986 wage-earners, who received \$498,000 in wages, and a product valued at \$2,198,000; foundry and machine-shop products, with \$5,708,000 of capital, 2,586 wage-earners, who received \$1,385,000 in wages, and a product valued at \$6,260,000; malt liquors, with \$3,721,000 of capital, 455 wage-earners receiving \$369,000, and a product valued at \$2,134,000; and patent medicines, with \$869,000 of capital, 163 wage-earners receiving \$55,000, and a product valued at \$3,214,000. The industrial growth of the city since 1880 is shown in the following table:

Year	Number of Establishments	Capital	Wage-Earners	Wages	Cost of Materials Used	Value of Products
1880	316	\$5,379,000	5,490	\$1,961,000	\$5,534,000	\$9,647,000
1890	708	16,179,000	12,053	5,658,000	11,184,000	22,888,000
1900	914	25,392,000	17,066	7,719,000	20,195,000	39,667,000

The special United States Census of Manufactures of 1905 was confined to factories proper, to the exclusion of neighborhood industries and hand trades. Compared with the corresponding figures for 1900, the results are shown in the following table:

Year	Number of Establishments	Capital	Wage-Earners	Wages	Value of Products
1900	408	\$23,462,000	13,787	\$6,028,000	\$34,748,000
1905	460	30,308,000	14,777	7,563,000	40,436,000
Per cent. Increase	12.7	29.2	7.2	25.5	16.4

The trade of Columbus is extensive, including bituminous coal and iron mined in the vicinity, grain, live stock, and wool, Southern lumber and fruits, etc. Eighteen steam and eight electric railroads enter the city, and 148 passenger trains enter and leave it daily. In 1906 there were nine National banks, with resources and liabilities aggregating nearly \$29,900,000, besides a number of State banks. In the same year the transactions of the clearing house amounted to \$267,940,000.

Administration and Public Interests.—The city is administered by a mayor elected for two years, a unicameral council elected by wards, a board of public works, intrusted

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with extensive powers and appointed by the mayor, and heads of departments who are largely elective. The city owns its water-works, which have a daily capacity of 53,000,000 gallons, and are being considerably enlarged by the construction across the Scioto river of a great dam of concrete, which will furnish a reservoir 700 acres in area. The estimated cost is \$1,000,000. To this great improvement will be added a filtration and softening plant, the cost of which is estimated at \$1,200,000. The municipal electric-light plant, costing over \$500,000, has proved very successful. A plant has also been established for the scientific disposal of sewage, for which has been made an appropriation of \$1,200,000. Other extensive and costly improvements under way are the extension of sewers, and the establishment of "under and over crossings" where the tracks of steam and street railways cross. The municipal budget is about \$3,000,000 annually. The bonded debt stood in May, 1907, at \$11,980,000, and the net debt at \$9,550,000.

History and Population.—In 1810, Chillicothe then being the capital of the State, the legislature passed an act making the present site of Columbus the future capital. In 1812 the new city was laid out in the midst of an unbroken forest, and in 1816 it was incorporated as a borough and became the actual capital. In 1824 it became the county-seat of Franklin co. In 1833 and in 1849-50 it suffered from visitations of cholera. In 1850 the first railway train entered the city, and in 1889 the city was made a port of entry. The population numbered 700 in 1815; in 1820, 1,500; in 1830, 2,435; in 1840, 6,251; in 1850, 17,811; in 1860, 25,227; in 1870, 31,551; in 1880, 51,647; in 1890, 88,150; in 1900, 125,560; in 1910 (Federal census), 181,516. In 1900 the population was composed of 63,301 males and 62,259 females. The negroes numbered 8,201, or 6.5 per cent. of the total population, and the foreign-born numbered only 12,328, or 9.8 per cent. of the total. Of the latter 6,296 were Germans, 2,079 were Irish, 1,297 were English, Scotch, and Welsh, and the remainder were from other countries.

Columbus, Bartholomew (in Spanish, BARTOLOMEO COLON; in Italian, BARTOLOMEO COLOMBO, his real name), an Italian navigator, brother of Christopher Columbus; born probably in Genoa about 1445. Facts concerning his early life are wanting, but it is known that he was a sailor by profession, and he is said to have had headquarters as a mariner and map-maker at Lisbon in 1470, apparently having preceded his brother to Portugal. In 1486-87 he was with Bartholomeu Diaz on the west coast of Africa, and in 1488 or 1489 he was sent to England to seek the help of Henry VII. in his brother's project. He was captured by pirates, landed in England destitute, and was unsuccessful

in his mission to the king. At the court of Charles VIII. of France, whither he next repaired, like failure awaited him. Returning to Spain in January, 1494, after his brother had sailed on his second voyage, he took command of a small fleet and carried supplies to him at Española, bringing the admiral timely aid at a critical moment in his experience with the Spanish colony there. Christopher made him adelantado, or governor, of Española in 1495, and he governed the island from 1496 to 1498 during the absence of his brother. He founded the town of San Domingo in 1496, and suppressed an insurrection of the natives. He was with the admiral on his last voyage, after sharing his imprisonment in Spain, and rendered further valuable services to him, quelling a mutiny among the sailors at Puerto la Gloria in 1504. He is believed to have been in Rome after his brother's death. In 1509 he accompanied his nephew, Diego Columbus, to Española, and was made governor for life of the neighboring island of Mona. He died at Seville in December, 1514.

Columbus, Christopher (in Spanish, CRISTOVAL COLON; in Italian, CRISTOFORO COLOMBO, his real name), the discoverer of America; born in Genoese territory, in 1445 or 1446. His father, a Genoese woolcomber of some means, who was yet living two years after the discovery of the West Indies, is said to have removed his business from Genoa to Savona in 1469. It was formerly believed that Christopher was sent to the University of Pavia, and that there he devoted himself to the study of mathematical and natural sciences and received instruction in nautical astronomy. Historians, however, do not now accept this belief as resting upon good authority. From the most trustworthy evidence it would appear that, having been apprenticed in early years to his father's trade, he followed it for a considerable period. He appears to have been engaged in it at Genoa or Savona as late as 1473, when it is conjectured that he entered upon the life of a sailor. Little or nothing is known of his earliest experiences at sea. It seems certain, however, that this unknown period was laborious and eventful. "Wherever ship has sailed," he wrote, "there have I journeyed." What coasts he visited on his earlier voyages we do not know; many stories of his youthful exploits have been told that cannot be reconciled with undisputed history. He probably visited many places on the Mediterranean, at last arriving at Lisbon, where he married Phillipa Moniz or Muñiz, said to have been a daughter of Bartholomé Perestrello, a distinguished navigator, who had founded a colony in Porto Santo, an island recently discovered and belonging to the Madeira group, and had left many charts and nautical instruments. Columbus probably lived

at Lisbon till about 1485. He made use of Perestrello's materials, and his opinion that the other side of the globe contained land, belonging to Eastern Asia and connected with India, which was as yet little known, became more and more fixed. While the Portuguese were seeking to reach India by a S. E. course round Africa, he was convinced that there must be a shorter way by the W. He supported his views with three different arguments, derived from natural reasons, from the theories of geographers, and from the reports and traditions of mariners. He believed the world to be a sphere; he underestimated its size; he overestimated the size of the Asiatic continent. The farther that continent extended to the E., the nearer it came round towards Spain. The air was full of rumors, and the weird imaginings of many medieval navigators had taken shape and substance, and appeared bodily to men's eyes. All were hints and rumors to bid the bold mariner sail westward, and this at length he determined to do.

Columbus applied in vain to the city of Genoa for assistance, and equally fruitless were his endeavors to interest John II. of Portugal in the enterprise. He also sent letters on the subject to Henry VII. of England, with the same ill success. He then determined to apply to the Spanish court, Ferdinand and Isabella being at this time the sovereigns of Spain, and after an eight years' struggle with the obstacles thrown in his way by ignorance and malice, he received three small vessels. These were named the "Pinta," the "Niña," and the "Santa Maria"; and according to Jal each of them was fully decked and had four masts and a crew of 90 men. The dignity of high admiral and viceroy of all the countries he might discover was conferred on him, the former to be hereditary in his family. A certain share of the profits arising from his expedition was secured to him by a written contract with the sovereigns. He aimed at nothing less than the discovery of Cipango (supposed to have been Marco Polo's name for the modern Japan) and the conversion to Christianity of the Grand Khan.

It was early in the morning of Friday, Aug. 3, 1492, that Columbus set sail from the port of Palos. Eighteen years had elapsed since he conceived the idea of this enterprise. Most of that time had been passed in almost hopeless solicitation, amid poverty, neglect, and ridicule; the prime of his life had been wasted in the struggle. Nor should it be forgotten that it was to Isabella alone that he was finally indebted for the means of executing his project, which had been coldly rejected by the prudent Ferdinand. Having provided himself at the Canary Islands with fresh water, he sailed S. W. into an ocean

never before navigated. But when 21 days had elapsed without the sight of any land, the courage of his men began to sink. It was certain, they said, that they should perish, and their visionary commander ought to be forced to return. Some of them even proposed to throw him overboard; and Columbus had to exert all the powers of his daring and commanding spirit to prevent an open rebellion.

The occurrence of a strange phenomenon, which surprised even him, filled his pilots with consternation: the needle deviated a whole degree. But the sea appeared suddenly covered with grass, and again showed symptoms of shoals and rocks. Numbers of birds were also seen. Columbus sailed in the direction from which they flew. For some days the voyage was continued with revived courage, till at last the dissatisfaction of the crews began to break out into open violence; but Columbus, after endeavoring to pacify his men by promises, finally assumed a different tone, and told them it was useless to murmur; that he was determined to persevere. Fully convinced that he must be near the land, he promised a reward to whosoever should first discover it. On the nights of Oct. 11 and 12 Columbus himself descried a light which sometimes flickered in the distance and sometimes disappeared, and at two o'clock in the morning of the 12th a cannon shot from the "Pinta" announced that a sailor belonging to that vessel had discovered land.

It was the island of Guanahani which Columbus believed to belong to Eastern Asia and to be connected with India, a belief which he carried with him to his grave. Hence the mistaken name of Indians applied to the natives of America, and that of West Indies applied to the group of islands of which Guanahani forms one. On landing Columbus threw himself on his knees and kissed the earth, returning thanks to God. The natives collected round him in silent astonishment, and his men, ashamed of their disobedience and distrust, threw themselves at his feet, begging his forgiveness. Columbus drawing his sword planted the royal standard, and in the name of his sovereigns took possession of the country, which, in memory of his preservation he called St. Salvador. He then received the homage of his followers, as admiral and viceroy, and representative of the sovereigns.

Having received information from the natives that there was a rich gold country toward the S., Columbus directed his course toward that region, and reached Cuba on Oct. 28, and Española (Hispaniola, Haiti) on Dec. 6; but as one of his vessels was wrecked, and the other separated from him, he resolved to carry the news of his success to Spain. Having built a wooden fort

from the wreck of his vessel, he left in it 39 volunteers, and set out on his return Jan. 4, 1493. The day after he left the island he met the "Pinto" which had been missing. Both vessels were afterward nearly wrecked in a tremendous storm. Columbus, more interested for his discovery than for himself, wrote an account of his voyage on a piece of parchment which he secured in a cask, and threw the whole overboard, in the hope that it might be carried ashore. He had hardly finished this work when the gale subsided. March 15, he reëntered the port of Palos amid the acclamations of the people, the thunder of cannon, and the ringing of bells. He hastened immediately to Barcelona where the court then was, and entered the city in a triumphal procession with the productions of the newly discovered countries carried before him. A chair was placed for him next to the throne, and seating himself, he gave an account of his discoveries. He was created a grandee, and all the marks of royal favor were lavished on him.

On Sept. 25, 1493, he set sail from Cadiz with three large ships of heavy burden, and 14 caravels, carrying 1,500 men. On Nov. 3 he discovered the island of Dominica, and afterward Mariegalante, Guadeloupe, and Porto Rico, and on the 22d he arrived at Hispaniola. Finding the colony he had left destroyed, he built a fortified town, which he called, in honor of the queen, Isabella, and of which he appointed his brother Diego governor. He immediately left the island in order to make new discoveries, visited Jamaica, and returning after a voyage of five months, worn down with fatigue, found to his great joy that his brother Bartolommeo, who had escaped from his captivity, had arrived at Isabella with provisions and other supplies for the colony.

In the meantime a general dissatisfaction had broken out among his companions, who, instead of the expected treasures, had found hardships and labor. They set on foot many calumnies, and gave the most unfavorable description of the country and the viceroy. Columbus thought he could not better oppose these reports than by sending considerable treasures to his sovereigns, and for this purpose collected gold from the natives, which was not done without violence and some cruelty. Aguado, a personal enemy of Columbus, was sent as commissioner to investigate the complaints against the great discoverer, who, thinking it time to vindicate himself in the presence of his sovereigns, prepared to return to Spain. Having appointed his brother Bartolommeo *adelantado*, or lieutenant-governor, he embarked for Spain in March, 1496, with 225 Spaniards and 30 natives. In Spain calumny was silenced by his presence, and probably still more by his treasures. Yet his

enemies were powerful enough to detain the supplies intended for the colony a whole year, and to retard the fitting out of a new expedition.

It was not till May 30, 1498, that he sailed with six vessels on his third voyage. To man these vessels criminals had unwisely been taken—a measure which Columbus himself had advised, and which had been taken up with great satisfaction by his enemies. Three of his vessels he sent direct to Hispaniola; with the three others he took a more S. direction for the purpose of discovering the mainland, which information derived from the natives induced him to suppose lay to the S. of his former discoveries. He visited Trinidad and the continent of America, the coasts of Paria and Cumana, and returned to Hispaniola, convinced that he had reached a continent. His colony had been removed from Isabella, according to his orders, to the other side of the island, and a new fortress erected called St. Domingo. Columbus found the colony in a state of confusion.

After having succeeded in restoring it to tranquillity by his prudent measures, in order to supply the deficiency of laborers he distributed the land and the inhabitants, subjecting the latter to the arbitrary will of their masters, and thus laying the foundation of that system of slavery which has lasted down to our time. His enemies, in the meantime, endeavored to convince his sovereigns that he had abused his power, and that his plan was to make himself independent, till at last even Isabella yielded to the wishes of Ferdinand, who had previously become convinced of the truth of the slanders. Francisco de Bobadilla was sent to Hispaniola, with extensive powers, to call the viceroy to account. As soon as he reached the island he summoned Columbus to appear before him, and put him in irons. His brothers were treated in the same manner. All three were sent to Spain, accompanied by a number of written charges, drawn up from the statements of the bitterest enemies of Columbus. Columbus endured this outrage with noble equanimity, and wrote, as soon as he had arrived in Cadiz, Nov. 25, 1500, to a lady of the court vindicating his conduct, and describing in eloquent and touching language the treatment he had received. The fetters with which he had been bound he kept to the day of his death, and his son Hernando states that he even ordered that they should be inclosed with him in his coffin. Orders were immediately sent directing him to be set at liberty, and inviting him to court, where his sovereigns received him with the same distinction as formerly. Isabella was moved to tears, and Columbus, overcome by his long suppressed feelings, threw himself upon his knees, and for some time could not utter a word for the violence of his

tears and sobbings. He then defended himself by a simple account of his conduct, and was reinstated to his dignities. Ferdinand even consented to dismiss Bobadilla which was intended for the first step toward the promised restoration of the great discoverer in his dignities. But these dispositions in the monarchs were soon changed. There was much talk of great expeditions, and in the meantime Nicolas de Ovando y Lares was sent as governor to Hispaniola. Columbus still urged the fulfilment of the promises solemnly made to him; but after two years of delay he became convinced that there was no intention to do him justice.

But his noble mind had now learned to suffer, and he was principally desirous of completing his work. Supposing the continent which he had seen to be Asia, he did not doubt that he should find, through the Isthmus of Darien, a way to the East Indies, from which the first fleet of the Portuguese had just returned richly laden. In four slender vessels supplied by the court for this purpose Columbus sailed from Cadiz on his fourth and last voyage, May 9, 1502, with his brother Bartolommeo and his son Hernando; arrived contrary to his original intention off St. Domingo, June 29, and was denied permission to enter the port for the purpose of refitting his vessels, and escaping a storm that was approaching. He succeeded, nevertheless, in anchoring his small squadron in a place of safety, and rode out the storm, while a fleet of 18 vessels, which had put to sea in spite of his warning, was almost entirely destroyed. He then continued his voyage to Darien, but without finding the expected passage. Two of his vessels were destroyed by a gale; the two others were wrecked off Jamaica, where he was scarcely able to save himself and his companions. Here the severest trials awaited the constancy of Columbus. Separated from the other part of the world, his destruction seemed to be certain. But he succeeded in procuring a few canoes from the natives, and prevailed on some of his boldest and best men to attempt a voyage to Hispaniola, in two canoes, in order to inform the governor of his situation. Several months elapsed without a glimpse of hope. Part of his companions, reduced to despair, rebelled, repeatedly threatened his life, separated from him, and settled on another part of the island. Here they alienated the minds of the natives by their cruel treatment so much that they ceased to bring them supplies. The death of all seemed inevitable; but Columbus, whose courage rose with the danger, preserved his men in this crisis.

He had fortunately ascertained that a total eclipse of the moon was about to take place, and threatened the natives with the

vengeance of his God if they should persist in their enmity. As a proof of his assertion the moon, he said, would lose its light, in token of the chastisement which awaited them. When they beheld his threat verified they hastened to bring him provisions, and implore his intercession with the Deity. But hostilities now broke out between him and the rebels, in which several of the latter were killed, and their leader was taken prisoner. After remaining a year on the island, relief at last appeared. The two canoes had reached Hispaniola in safety, but the messengers could not prevail on the governor to undertake the deliverance of the admiral. They finally bought a vessel themselves, and it was on board this ship that Columbus left Jamaica, June 28, 1504. He went to St. Domingo, but only to repair his vessel, and then hastened back to Spain. He arrived in Spain sick and exhausted. The death of the queen soon followed, and he urged in vain on Ferdinand the fulfillment of his contract. After two years of illness, humiliations, and despondency, Columbus died in Valladolid, May 20, 1506. His remains were transported, according to his will, to the city of St. Domingo, but on the cession of Hispaniola to the French, they were removed in January, 1796, with great pomp, to the cathedral of Havana in Cuba. A splendid monument was erected to him in a convent at Seville, where his body lay before being transferred to St. Domingo. In 1898 the remains of the discoverer were removed to Spain, Cuba being no longer a Spanish possession since the war with the United States.

In the vigor of manhood Columbus was of an engaging presence, tall, well formed, and muscular, and of an elevated and dignified demeanor. His visage was long, his nose aquiline, his eyes light gray, and apt to enkindle. His whole countenance had an air of authority. Care and trouble had turned his hair white at 30 years of age. He was moderate and simple in diet and apparel, eloquent in discourse, engaging and affable with strangers, and of great amiability and suavity in domestic life. His temper was naturally irritable, but he subdued it by the benevolence and generosity of his heart. Throughout his life he was noted for a strict attention to the offices of religion; nor did his piety consist in mere forms, but partook of that lofty and solemn enthusiasm with which his whole character was strongly tinctured. Of a great and inventive genius, a lofty and noble ambition, his conduct was characterized by the grandeur of his views and the magnanimity of his spirit. For further information respecting the life of Columbus various authorities are available to the inquirer. His son Ferdinand wrote a memoir, but the original is lost, though an

early Italian version exists which has been translated into English and other languages. His own journal of his first voyage may also be read in English, both it and Major's "Select Letters of Columbus" being published by the Hakluyt Society. Among other works are "History of the Life and Voyages of Columbus," by Washington Irving; Winsor's "Christopher Columbus" (1891); Fiske's "The Discovery of America" (1891); E. J. Payne's "History of the New World" (vol. I, 1892); "Christopher Columbus," by Clements R. Markham (London, 1892); etc.

Column (Latin, *columna*), in architecture, a round pillar. In the earliest periods of the world the column was merely the trunk of a tree, or its imitation in stone, used to support the roof. The parts of a complete column are its base, on which its rests; its body, called the shaft; and its head, called the capital. Columns are used to support the entablature of an order, which has also its proper division. In the most ancient times columns of wood were the most usual, as being the most easily wrought. In countries like Egypt, where timber fit for construction is scarce and stone abundant, the latter became the principal material for columns, and those of Egypt are remarkable for the beauty of their workmanship and the durability of their materials. The Egyptian columns were numerous, close, short, and very large. They were generally without bases, and had a great variety of capitals, from a simple square block ornamented with hieroglyphics, or faces, to an elaborate composition of palm leaves, not unlike the Corinthian capital. (See the view of the temple at article ARCHITECTURE.) The Greeks, for their columns, used marble of the finest kind, with which their country abounded; and other nations the stone or material of their country. The Greeks properly considered the column as an essential part of the architecture of their temples, and never used it as a mere decoration.

The manner of constructing the columns of all the orders rests on similar principles. They are all divided into three primary parts or divisions, the base, the shaft, and the capital, except the Doric order, which has no base. The lowest or thickest part of the shaft is used by architects as the universal scale or standard whence all the measures which regulate and determine heights and projections are taken; and this standard or scale must be understood before any architectural design can be commenced. The universal architectural scale is called a diameter, and is the diameter of the lowest or the largest part of the column; and, unlike the foot, inch, or yard, is as various as the size of columns. By the diameter, of course, is meant that of the circle which forms the bottom of the column. Half of

Column

this diameter, or the length of the radius which forms the circle, is called a module, and is used as well as the diameter as a primary standard of mensuration by some writers upon architecture. These measures of length are subdivided as follows, namely: the diameter into 60 parts, and the module into 30 parts, each part being the same in length, and called a minute. Both mensurations are the same, only under different denominations; as, for instance, one author says a column, which always includes the base, shaft, and capital, is 6 diameters, 12 minutes high; while another would say of the same column and its admeasurements that it is 12 modules and 12 minutes, both meaning the self-same dimension. The Doric column has no base. The Ionic column has one peculiar to itself called the Attic, which, with that of the Corinthian order, is described under the article ARCHITECTURE.

The shafts of the different orders differ in height and even in various examples of the same order. The capitals are also as various. Columns are either plain or fluted, and the flutes and manner of dividing them are different in the Doric and Corinthian orders. The Ionic flutes much resemble the Corinthian, and in many instances are exactly similar. Columns of all the orders taper gradually toward the top, but in the middle there is generally a slight swelling called an entasis. Roman architecture being derived from the Greek, Roman columns were either exactly similar to Greek ones or modifications of the latter. The principal modifications of the column made by the Romans were that form of the Ionic capital in which there were four pairs of diagonal volutes instead of two pairs of parallel ones, and that peculiar to the Composite order, in which the capital of the Corinthian column was combined with that of the diagonal or modern Ionic.

Columns are also often used for commemorative purposes as well as for architectural supports; like the Trajan and Antonine columns in Rome, and that called the Monument in London. Of the modern columns, the last mentioned, which was erected in commemoration of the great conflagration of 1666, is one of the loftiest, the best constructed, and the most beautiful. It is a Doric fluted column, 202 feet high from the bottom of the pedestal, which is ornamented with bas-reliefs of Charles II. and his court giving protection to the fallen city, and various inscriptions, to the top of the vase of flames, by which it is surmounted.

Column, in military tactics, a deep, solid mass of troops, formed by placing several bodies of men behind each other (sections, platoons, companies, squadrons, and even several battalions). The column is either an open or a close one. When a battalion is formed in open column, room

Column

enough is left between the companies for them to wheel into line. When the distance left between the companies is very small, the battalion is said to be formed in close column. And when the distance is intermediate between that in close and that in open column, it is said to be formed either for marching or for attack. On the march and in maneuvering the arrangement of troops in column is general and convenient, and this order is usually kept up till the actual fighting is about to begin; but it is as a rule unsafe to expose troops in column to the firearms of the present day. This formation is consequently retained in combat only when time and space do not allow of any other being adopted, or for some other special reason.

By dividing a large force into columns it becomes possible to march in places where it would be impracticable to move with unbroken lines. They also increase the force and steadiness of troops, both in attack and defense. The drawing up of the infantry in line is usually advisable where there is no obstacle in the ground to prevent advancing in this order. The order in mass may be preferred where a charge is intended, in which physical force, given by the depth of the column, is necessary and also where a charge, particularly of cavalry, is apprehended. Though a cannon ball, and still more a shell, in the midst of the mass, causes a greater havoc, the probability of being hit is diminished on account of the small front exposed.

An objection to columns, founded on the difficulty of moving so dense a mass, and of changing it into a line, has been removed in modern times by the practice of making the columns consist of only one battalion, and by disposing these single battalions near each other in such a way as to support one another by their fire, instead of arranging them uselessly behind each other. By the usual way of forming the columns toward the center, those have received such a mobility and facility of development that a line may be restored in two or three minutes. The charge in close columns, which has been especially common among the French, is of the greatest effect when it succeeds; but when it fails the whole body of assailants is exposed to annihilation or to rout, no orderly retreat being possible. The attack with columns at some distance from each other has this advantage, that the facility of maneuvering is much greater. This mode of attack has been frequently employed in assaulting squares of infantry. Marching and fighting in lines, however, are the modes usually practised by cavalry. Column roads are such roads as may be passed with all kinds of arms: when the ordinary road is ruined, they are laid out across the fields and marked by poles with straw (*jalons*).

Column of July, a monument erected in Paris, in 1840, on the site of the old Bastille in honor of the citizens killed in the revolt against the government in 1830. It is a shaft of bronze on a marble base, capped with a gilded statue of the Genius of Liberty. It is 154 feet high and 13 feet in diameter.

Column of Trajan, a monument erected in Rome in 114 A.D. in honor of the Emperor. It is a Roman Doric column of marble, on which is carved representations of various scenes in Trajan's campaigns, containing 2,500 figures of men, besides animals and other objects. It is 127½ feet high, exclusive of the statue of St. Peter, which now stands on the apex of the column.

Column of Vendome, a monument erected in the Place de Vendome, Paris, by Napoleon I., to commemorate his victories over the Russians and Austrians in 1805. It is similar in design and ornamentation to the Column of Trajan, but is built of masonry encased in bronze, and is capped by the statue of Napoleon. It is 142 feet in height and 13 feet in diameter. It was overthrown in 1871, during the riotous times of the Commune, but was restored in 1875.

Colure, one of the two imaginary great circles of the celestial sphere intersecting the poles of the world; one passing through the equinoctial points of Aries and Libra and the pole of the equator; and the other through the solstitial points of Cancer and Capricorn, and the poles both of the ecliptic and equator. For this reason the first is called the equinoctial, and the second the solstitial colure. The name is supposed to have been given to them because a portion of these circles is always concealed from view under the horizon.

Colvin, Sidney, an English critic; born in Norwood, England, June 18, 1845. He became Professor of Fine Arts at Cambridge in 1873. His writings include "Children in Italian and English Design" (1872), and books on Landor, Dürer, and other writers and artists.

Colza Oil, or Rape Oil. The term colza is applied generally to the finest and lightest kinds of rape oil. This oil, familiar from its use as an illuminating agent in the moderator and other lamps, is expressed from the seeds of several plants of the cabbage and turnip genus. It is yellowish brown, has a specific gravity of .92, little or no smell, and dissolves in hot alcohol and in ether. It becomes thick and solid at very low temperatures; when heated it volatilizes, but not completely, undergoing partial decomposition. It is purified for use

by continued agitation with sulphuric acid, which destroys mucilaginous matter from the seed, and washing with water to remove all traces of the acid. The oil is largely used both in Great Britain and on the Continent in soap making, tanning, fulling of cloth, lubricating machinery, and for burning. For the last it is so well adapted that it has been specially recommended for lighthouse purposes. It is brilliant and steady, is managed with very little attention, and is cheap. In these respects it is said to be superior to spermaceti.

Coma, a morbid state which, if considered a distinct disease, is a milder form of apoplexy, but which may be properly regarded as a symptom rather than an idiopathic affection. It is characterized by a morbid condition of the brain, producing loss of sensation and voluntary motion, so that the patient seems as if in a deep sleep. It constitutes the most pronounced state of torpor which can occur, the succession being as follows: When a patient is so overcome by lassitude that he tends perpetually to sleep, is incapable of muscular exertion, and cannot, except when excited, give attention to what is passing around, his state is called lethargy; when a mechanical stimulus, such as that of pricking or pinching him, will restore him to partial consciousness, it is carus; when not even this will rouse him, it is coma. The cerebral functions are suspended in coma, and the nervous and sanguiferous systems deranged. There are two well-marked types of it, one in which the pulse is oppressed, irregular, and slow; and the other in which it is strong, with a hot skin and other marks of febrile inflammation. When coma is intense it passes into apoplexy.

Coma Berenices ("the Hair of Berenice"), a northern constellation whose origin is sometimes wrongly stated. In his introduction to "Ptolemy's Catalogue" Baily says that though it was a well-known constellation long before Ptolemy's time the latter did not introduce it into the *Almagest* as a distinct constellation, but called it *Plokamos* (Gr., "hair," or "curls"). It appears to have been restored as a distinct constellation by Tycho Brahe in his catalogue, published after his death, in 1602. Bayer, in his "*Uranometria*," published the following year, on the map of Ursa Major, pictures a head of curling hair in the lower left-hand corner of the map; and on the fifth map, that of Boötes, he delineates the same group of stars as a sheaf of wheat. As Hevelius, in his better known catalogue of 1690, also adopted this as one of the constellations, it is sometimes attributed to him. It is made up of rather faint stars, none of them

brighter than the fourth magnitude. As Bayer did not assign letters to it, it remained without any until Baily, in the "B. A. C." in 1845, attached the first three letters of the Greek alphabet to three of the brighter stars. While these have not been universally adopted by astronomers, they will probably stand as thus assigned. The constellation is surrounded by Ursa Major, Canes Venatici, Boötes, Virgo, and Leo.

Comanches, an aboriginal tribe of North American Indians, whose hunting grounds were the regions now known as Texas and Northern Mexico. They were very numerous between 1700 and 1750, having a tribal organization under chiefs of their own selection. They hunted on horseback, and were estimated to number 400,000 when first encountered by the whites. They have dwindled to insignificant proportions, and in 1899 numbered 1,553, on a reservation in Oklahoma.

Comayagua, a city of Honduras, Central America, situated in a fertile valley, 1,935 feet above the sea, on the Rio Humuya, 190 miles E. of Guatemala. Founded in 1540, it has a handsome cathedral and a college, and before 1880 was the capital of the republic. Pop., about 10,000.

Comb, a toothed implement used in every age and by all peoples for dressing and keeping clean the hair. Combs are also used for fastening the hair when dressed, and as head ornaments. In early times the bodkin, equivalent to the modern hair-pin, was employed for the latter purpose, but in medieval times elaborately ornamented combs, sometimes of precious metal, were used for ornamental hair fastening. Combs are made of horn, tortoise shell, ivory, wood, bone, metal, india-rubber, celluloid, and of a composition called xylonite. In dealing with horn, which is the principal comb-making material, the horns are cut into rectangular pieces in a manner which involves the least possible loss. These segments are damped and heated till they become soft, when they are opened out and pressed quite flat. The plates are next squared, smoothed, and trimmed preparatory to the tooth-cutting, which formerly was done with a *stadda*, or double saw, having two blades of steel set parallel to each other, with a space between them equal to the thickness of the intended tooth. Tooth-cutting is now done by small circular saws to which the plates are automatically applied, the horn moving the space of a tooth after each cut. In this way 70 or 80 teeth may be cut in an inch of ivory for fine-toothed combs. The teeth are then thinned, smoothed, and finished by means of thin wedge-shaped files. Saw-cutting is the only process available for bone, ivory, and

wooden combs, and it is used for the finer kinds of horn combs also. India-rubber combs, now so extensively used, are manufactured by pressing the caoutchouc to the required form in molds, and "vulcanizing" or combining it with sulphur afterward.

Comb, the wax cavities in which bees lodge their honey. The Comb of a bee is composed of hexagonal cells, of which there are two tiers, the cells in which are placed end to end, so that the three plates of wax, which serve as the bottom of the cell in the one tier, constitute also that of the corresponding one in the other. The mathematical problem in "maxima and minima," how to construct the greatest number of cells within the smallest possible room, and with the least expenditure of material, is solved. This the natural theologians and the older naturalists were accustomed to adduce, as one of an infinite number of proofs, that design and a Designer were displayed in nature.

Combaconum (*Kumbhakonam*), one of the oldest and most sacred cities of India, in the center of the fertile Kaveri delta, 193 miles N. E. of Madras, with Hindu temples, a government college, etc. Pop. (1901) 59,673.

Combat, Single, a very ancient usage, evidenced by Goliath (1 Sam: xvii), and by Ajax in the "Iliad." The Norse practice of principals going alone to a small holm or island, to be free from disturbance while settling their quarrels by strength and skill, gave rise to the Saxon term *Holm-Gang*. In the days of chivalry the Single Combat received the strong support of law and custom, and was resorted to both in civil and in criminal cases. The accuser or plaintiff swore to the truth of his tale, the other gave him the lie, a gage of battle was thrown down and taken up, and they fought it out under rules before an assembly, the supposition being that God would give victory to the right. The barbarous practice survives in European countries, without its excuse of superstition, in the modern duel, which is legally prohibited in the United States.

Combe, Andrew, a Scotch physiologist; born in Edinburgh, Oct. 27, 1797. He was educated at the Edinburgh High School, and afterward for the medical profession at the university there. In 1822 he commenced practice at Edinburgh, and had considerable success. In 1838 he was appointed one of the physicians extraordinary to the queen in Scotland. His chief works are: "Observations on Mental Derangement" (1831), "Principles of Physiology" (1834), "Physiology of Digestion" (1836), and "A Treatise on the Physiological and Moral Management of Infancy" (1840). Like his

brother George, he was a zealous phrenologist. He died in Edinburgh, Aug. 9, 1847.

Combe, George, a Scotch phrenologist; brother of the preceding; born in Edinburgh, Oct. 21, 1788. He was bred to the law, and in 1812 was admitted a member of the Society of Writers to the Signet. He was the first to introduce the doctrines of phrenology into Great Britain; and visited Germany and America, lecturing on his favorite science. He was also a zealous promoter of the cause of popular education and social progress; and was among the first to advocate compulsory education and the establishment of a board of health. Besides the "Constitution of Man," published in 1828, and which has had an enormous circulation, he is the author of "A System of Phrenology" (1825), "Lectures on Popular Education" (1833), "Moral Philosophy" (1840), "The Life and Correspondence of his brother, Dr. Andrew Combe" (1850), "Principles of Criminal Legislation and Prison Discipline Investigated" (1854), and the "Relation Between Science and Religion" (1857). He died in Moore Park, Surrey, Aug. 14, 1858.

Combe, William, an English writer; born in Bristol in 1741. His "Tour of Dr. Syntax in Search of the Picturesque" was once very popular. After 43 years within the rules of a debtor's prison, and previous fortunes from officer to cook, he died in Lambeth, June 19, 1823.

Combination, in law, a combination to commit a crime is an indictable CONSPIRACY, (*q. v.*). A combination to commit an act which is injurious, immoral, or contrary to public policy, is in some but not in all cases held to amount to conspiracy. Combinations of workmen to raise the rate of wages were formerly unlawful; but the law was amended in this respect in 1825, and now such combinations are freely permitted, provided they effect their purposes by lawful means.

In mathematics, the different collections which may be made of certain given quantities without regard to the order in which they are arranged in each collection. The term is almost always mentioned in conjunction with permutations in which there is regard to the order of the quantities, and a department of arithmetic is technically called Permutations and Combinations. If *a*, *b*, and *c* be three quantities to be taken two together, there will be three possible Combinations, that is, ways of arranging them in pairs, without allowing *b* to stand before *a*, or *c* before the two letters which precede it in the alphabet. These combinations will be *ab*, *ac*, and *bc*. But there can be six permutations of the same three letters, *i. e.*, six distinct pairs of them if permission be granted to put them in any order one pleases, viz., *ab*, *ba*, *ac*, *ca*, *bc*, *cb*.

In chemistry, the act of uniting by means of chemical affinity; the state of being so united. There are two kinds of chemical combination, that by weight and that by volume. In a large number of instances the law relating to Combination by weight is as follows: When two bodies, *A* and *B*, are capable of uniting, the several quantities of *B* which combine with a given or constant quantity of *A* stand to one another in very simple ratios. With regard to gases combining by volume, the law is that the combining volumes of all elementary gases are equal, excepting those of phosphorus and arsenic, which are only half those of the other elements in the gaseous state, and those of mercury and cadmium, which are double those of the other elements.

Combretaceæ, in botany, *Myrobalans*, an order of exogens, alliance *Myrtales*. It consists of trees or shrubs with alternate or opposite entire dotless leaves, destitute of stipules. The flowers are on axillary or terminal spikes. The calyx is adherent, with a 4-5 lobed deciduous limb. The petals, where they exist, rise from the orifice of the calyx. The stamens are generally twice as many as the segments of the calyx; the ovary one-celled, 2-4 pendulous ovules, style 1, stigma simple. The order is divided into three tribes: *terminalææ*, *combretææ*, and *gyrocarpeææ*. The *myrobalans* are found within the tropics of Asia, Africa, and America.

Combustion, the act of burning, the state of being burned. Spontaneous Combustion is Combustion occurring without any means taken on the part of man to produce it. A Combustion of the human body produced by occult internal causes, which is alleged to have occurred several times, most of the cases being females given to indulging largely in alcohol, besides being advanced in life, and either very fat or very lean. Set on fire accidentally by a coal or candle, or even a spark, their trunk is stated to have burnt with great rapidity, leaving behind a residuum of fat, oily, fetid ashes, smelling unpleasantly, and containing a very penetrating soot. The alcohol with which it is assumed that their organs were saturated, electricity, phosphuretted hydrogen, or other inflammable gas set free by the decomposition of the structures have been assigned as possible causes, but the subject requires well-ascertained modern facts and fresh scientific elucidation. Most chemists believe the Combustion of the human body in the way described an impossibility.

Comedie Francaise, the national subsidized theater of France, formed in 1680 by the fusion of the two bodies into which Molière's company of actors had split. It

Comedietta

is at present managed by regulations made in 1812, modified by subsequent resolutions.

Comedietta, a dramatic composition of the comedy class, but not so much elaborated as a regular comedy, and generally consisting of one or at most two acts.

Comedones, a name applied to the little cylinders of sebaceous and epithelial substance which are apt to accumulate in the follicles of the skin and to appear on the surface as small round black spots. When squeezed out they have the appearance of minute maggots or grubs, with black heads, and thence have derived their name. They are generally associated with a weak state of the skin as well as of the individual. Generous diet and tonic treatment with soap-and-water cleansing and friction will be useful; as an astringent to invigorate a debilitated skin, a lotion of corrosive sublimate (two grains) in emulsion of bitter almonds (one ounce) and dilute alcohol will be effective.

Comedy, a dramatic representation of a light and amusing nature, in which are satirized pleasantly the weaknesses or manners of society and the ludicrous incidents of life. Comedy took its origin in the Dionysian festivals, with those who led the phallic songs of the band of revelers (Gr., *kōmos*) who, at the vintage festivals, gave expression to the exuberant joy and merriment by parading about, dressed up, and singing jovial songs in honor of Dionysus. These songs were frequently interspersed with extemporized jokes at the expense of the bystanders. Comedy first assumed a regular shape among the Dorians. The first attempts at it among the Athenians were made by Susarion, a native of Megara, about B. C. 578. Epicharmus first gave comedy a new form and introduced a regular plot. That branch of the Attic drama known as the Old Comedy begins properly with Cratinus. It lasted from B. C. 458 to B. C. 404. The later pieces of Aristophanes belong to Middle Comedy. The chorus in a Comedy consisted of 24. Middle Comedy lasted from B. C. 404 to B. C. 340, and the New Comedy till B. C. 260. Middle Comedy found its materials in satirizing classes of people instead of individuals. New Comedy answers to the Comedy of the present day. The most distinguished of Roman comic writers were Plautus and Terence, whose plots were mainly derived from their Greek predecessors.

Comenius, Johann Amos (ko-mē'ni-us) a Czech theologian, one of the world's great educators; born at Nivnitz (?), Moravia, March 28, 1592. In the "Gate of Languages Unlocked," the "World of Sense Depicted," and "Great Didactics, or the Whole Art of Teaching Everything," he shows the prodigious scope of his learning and his no less prodigious skill in the ap-

Comet

plication of it. He died in Amsterdam, Nov. 15, 1670.

Comet. Of natural appearances, there are few that have been regarded with more superstition than those bodies which occasionally appear in the sky, luminous, like the stars, but generally distinguished from these by a tail, or train of fainter light, bearing some resemblance to a tuft or lock of hair. Of this the Latin name is *coma*, and in consequence these bodies are called comets, to distinguish them from the other luminaries, which, whether near or remote, apparently fixed or movable, have not this train-like accompaniment. Comets are one of the three classes into which astronomers divide those celestial bodies that adorn the sky during the night. The stars, which retain their relative positions with regard to each other, and are at so great distances from the earth that the most perfect instruments measure only a few of them, are one class—and a class not apparently connected with our sun, or deriving light or heat from that luminary. The planets, which change their relative positions among the stars, and of which our earth is one, form the second class. They are solid bodies, and not luminous in themselves, but shine merely by reflecting the light of the sun. The masses of the planets, their magnitudes, and their motions, have been all determined with the greatest accuracy; and the place that any one of them will occupy at any proposed point of time can be calculated with ease by any one acquainted with practical astronomy. The planets are, in their motions, governed by one uniform law. In the early ages the planets were held to have certain influences upon individuals and nations. The comets, which are more singular in their form, and more varied in the times of their appearance, were still better adapted for superstitious purposes; and accordingly, we find that their visits have been connected with the great, especially the calamitous, events of nations, but their appearance is no more a prodigy than the appearance of the moon, or of a leaf on a tree in spring. They are so distant, and either their motions are so rapid, or their substance is so rare, that none of them have been found to have any material action on such of the planets as they have come near, though the planets have had a considerable influence on them.

Tycho Brahe was the first who expressed a decided rational opinion on the subject of comets. Finding, by careful observation, that the comet of 1577 had no diurnal parallax which he could detect—that is, that its place, when viewed from the surface of the earth, was not different from what it would have been if viewed from the center; he properly concluded that its distance from the earth must be greater than that of the

moon, in which this parallax was apparent to him. This was one step; and it was an important one: it removed comets to such a distance from the earth, that their use could not well be supposed to be for it, or their influence upon it very great. The general law of the motion of bodies in free space, as well as his own particular observations on the comet of 1680, led Newton to conclude that the orbits of the comets must, like those of the planets, be ellipses, having the sun in one focus, but far more eccentric; and having their aphelions, or greatest distances from the sun, far remote in the regions of space. The idea of Newton was taken up by Dr. Halley, who collated the observations made on the 24 comets of which notice had been taken previous to 1680. The results were very curious; with but few exceptions, they had passed within less than the earth's shortest distance from the sun; some of them within less than one-third of it; and the average about one-half. Out of the number, too, nearly two-thirds had had their motions retrograde, or moved in the opposite way to the planets. While Halley was engaged on these comparisons and deductions, the comet of 1682 made its appearance, and he set about observing it with great care, in order to determine the elements of its orbit. Having done so, he found that there was a wonderful resemblance between it and three other comets that he found recorded—the comets of 1456, of 1531, and of 1607. The times of the appearance of these comets had been at very nearly regular intervals—at least, the differences had been only fractional parts of a year—the average period being between 75 and 76 years. Their distances from the sun, when in perihelion, or when nearest to that luminary, had been nearly the same, being nearly six-tenths of that of the earth, and not varying more than one-sixtieth from each other. The inclination of their orbits to that of the earth had also been nearly the same, between 17° and 18° ; and their motions had all been retrograde. Putting them together, Dr. Halley concluded that the comets of 1456, 1531, 1607, and 1682, were re-appearances of one and the same comet, which revolved in an elliptic orbit round the sun, performing its circuit in a period varying from a little more than 76 years to a little less than 75; or having, as far as the observations had been carried, a variation of about 15 months in the absolute duration of its year, measured by terrestrial time. For this variation Dr. Halley accounted by the supposition that the form of its orbit had been altered by the attraction of the remote planets Jupiter and Saturn, as it passed near to them; and thence he concluded that the period of its next appearance would be lengthened, but that it would certainly reappear in 1758 or early in 1759.

Its doing so was, of course, the fact that was to be decisive of the orbits of comets, and that they were regular and permanent bodies, obeying the general laws of matter. Halley did not live to see the verification of his prediction; he died in 1742.

Soon after his death, Clairaut, D'Alembert, and Euler, three of the most eminent mathematicians of Europe, set about the solution of what is called "the problem of the three bodies"; that is to determine the paths described by three bodies, projected from three given points, in given directions and with given velocities, their gravitating forces being directly as their quantities of matter, and inversely as the squares of their distances. The object of this problem is to find the disturbing effects that the bodies composing the solar system have on each other; and it applies to comets when within the limits of planetary action, as well as the planets themselves. After some errors, into which all the three had been led, and which gave a result that seemed to overturn the whole doctrine of gravitation, Clairaut succeeded in obtaining an approximate solution, which agreed with and confirmed that theory. Having done so, he applied it to the calculation of the disturbing influence of Jupiter and Saturn, which Halley had predicted would retard the comet of 1682, in its reappearance about 1758. The results of Clairaut's calculations were that the comet would be retarded 100 days by the attraction of Saturn, and 518 by that of Jupiter, so that it would not come to the perihelion, or point of its orbit nearest the sun, till April 13, 1759. Clairaut, however, fixed certain limits, within which his calculations might probably be erroneous. It was eventually found that the difference between calculation and observation was less than that which he assigned. Clairaut read his investigations to the Academy of Sciences in November, 1758; and in little more than a month afterward the comet made its appearance; and it reached its perihelion on March 13 in the following year, being 30 days earlier than he had calculated. Subsequent calculations enabled him to reduce the error to 19 days; and though the calculations of the disturbing forces were only approximations, enough had been done to prove the return, and determine the orbit of one comet, and give every reason for concluding that all comets are subject to the same general laws as the planets, and only vary from each other in the proportion and magnitude of their orbits.

There was one further confirmation. Clairaut had calculated that the node of the comet's orbit, or the point in which it cut the plane of the orbit of the earth, would advance $2^{\circ} 33'$ in absolute space, or $1^{\circ} 29'$ more than the equinoctial points, the precession of which, in the time of the comet's

revolution, was $1^{\circ} 4'$; and observation gave exactly the same result; so that the only difficulty that remained in the doctrine of comets was in the estimation of the disturbances to which they are exposed from the other bodies of the system, more especially in the parts of their orbits most remote from the sun, where their motions are comparatively slow. Along with the period of this comet and its perihelion distance, the magnitude and form of its path were known. Estimating the mean distance of the earth from the sun at 95,000,000 miles (the number which was at that time considered as the true one), the mean distance of the comet was calculated to be 1,705,250,000 miles; its greatest distance from the sun, 3,355,400,000; its least distance, 55,100,000; and the transverse or largest diameter of its orbit, 3,410,500,000. Therefore though its aphelion distance be great, its mean distance is less than that of Uranus; and great as is the aphelion distance, it is but a very trifling fraction less than one five-thousandth part of that distance from the sun, nearer than which the very nearest of the fixed stars cannot be situated; and as, with few exceptions, their distance is negative and not positive—a distance within which they cannot be, and not one at which they actually are—the nearest of them necessarily far exceeded that distance. The comet of 1759 is, therefore, a body belonging to the solar system, and quite without the attraction of any body which does not belong to that system; and as this is determined of one comet, analogy points it out as being the case with them all. The "Nautical Almanac" for 1835 gave three computations of the time of the latest reappearance of this comet; by Messrs. Pontécoulant, Damoiseau, and Lubbock; who predicted that it would come into view on Nov. 4 or 7, 1835. It was first seen by M. Dumouchel at Rome, Aug. 5, and from that time continued to be observed till the end of the year in Europe, and through a great part of spring 1836, in the Southern Hemisphere.

Besides the comet of 1759, of which there have been four authenticated returns, there are two others of which something like a return has been traced at long intervals. One of these passed its perihelion at about eight o'clock on the morning of July 6, 1264, reckoning mean time at Greenwich; and again at a little past eight o'clock on the evening of April 21, 1556. Thus its period is about 292 years, and it was again expected in 1848. The perihelion distance, however, of this comet which was more than half that of the earth in 1264, had diminished an eighth part by 1556; and as this must have caused a great elongation of its orbit, and as, from the length of its period, it must go far into the regions of

space, there is no knowing how both the time of its revolution and the form and position of its orbit may have been altered.

The other comet, in the element of whose orbit there is a similarity, from which its identity might be with probability inferred, appeared in 1532, and again in 1661, having thus a period of about 129 years. The return of that comet should therefore have been about 1790. In that year three comets made their appearance; but none of them resembled the one of 1661. Two of them moved in the opposite direction; and the remaining one was more than twice the distance from the sun in its perihelion, and its orbit at nearly double the angle with that of the earth.

The comet denominated Encke's comet, which has engrossed the public mind generally, and the scientific world in particular, has justly claimed and received the careful attention of astronomers, since its appearance in 1818 engaged Professor Encke to consider the elements of its orbit. He was enabled to identify it with a comet described by Messrs. Mechain and Messier in 1789, in the constellation Aquarius; also with a comet discovered in 1795 by Miss Herschel in the constellation Cygnus; and with the comet in 1805. The investigation of this diligent professor enabled him, from his observations on its appearance in 1818, to foretell its reappearance in 1822, and to state the probability of its not being observable in our climate. This anticipation was realized by its discovery in New South Wales, in the observatory of the governor, Sir Thomas Brisbane, June 2, 1822; and the accurate observations of Mr. Runkler, who discovered it, afforded Encke the means of reconsidering the true elements of its orbit, and with additional confidence computing its return for 1825. This occurred as was expected. The fresh data afforded by that return were carefully collated by the professor. It was observed again on Oct. 30, 1828. This comet affords particular interest to the mind of the astronomer, though it does not offer a splendid object to his eye. Its orbit is an ellipse of comparatively small dimensions, wholly within the orbit of Jupiter: its period is 1,260 days, or about three years and three-tenths—a much shorter period than has hitherto appeared to comprise the revolution of any other comet, with the exception of one seen in 1770, which did not satisfy, as far as observation has been able to show, the prediction of the period of five years and a half which was attributed to it. In the opinion of Encke and other astronomers, this comet has afforded an opportunity of proving that the heavens oppose a resisting medium to the motion of bodies, as otherwise certain irregularities in its movements could not be accounted for.

Another comet which gave rise to much

interest was one which Biela discovered Feb. 27, 1826, and which was soon afterward seen by others. It was ascertained to revolve about the sun in about six years and three-fourths, and to be the same as the comet, which appeared in 1772 and again in 1805. It subsequently appeared as a double comet, but since 1852 has been lost to observation.

Several other comets remain to be noticed, the elements of which have been calculated, and in regard to some have been confirmed by returns. The orbit of one was calculated by Newton from its appearance in 1680, and he estimated the periodic time to be 575 years. It may therefore be expected in 2255. The magnificent appearance presented by Donati's comet in the autumn of 1858 will still be fresh in the recollection of many.

The comet of 1770, to which allusion has been made, would lead us to conclude that we are still ignorant of many of the causes by which the form of the orbits of comets, and the times of their revolution and return, may be disturbed. That comet moved almost in the plane of the earth's orbit, having an inclination of only about a degree and a half; it had been observed with great care; and the result of the observations was that it should return about every five years and a half. Instead of going out of the system, as may be presumed to be the case with those comets that have long periods and eccentric orbits, its greatest distance could not be much greater than that of Jupiter, while its mean distance from the sun was not much more than three times the perihelion distance of the earth. No comet at all answering to that one has, however, been again discovered; and therefore the conclusion is that there are within the system itself causes which can completely alter the motions of these bodies.

One remarkable difference between the comets and the planets is in the angles which their orbits make with that of the earth. Leaving out the small planets that have recently been discovered, all the others are contained within a zone extending only 7° on each side of the earth's orbit; and, with the exception of Mercury (by far the smallest of the old planets), they are within half that space. But the orbits of the comets are at all possible angles; and the number increases with the angle, so that they approximate to an equal distribution in all directions round the sun as a center. Taking all the orbits of which the inclinations have been ascertained, it has been found that of every 100 the inclinations are as follows: from 0° to 30° , 26; 30° to 50° , 27; 50° to 89° , 39; and 80° to 90° , 8. Thus we see by far the greater number of the comets have their paths out of the direction of those of the planets; and hence, though they be bodies

of such consistency that their collision with the planets would produce serious consequences, there is but little chance that such collision can take place. The comets that have been observed have made their passages through very different parts of the solar system: 24 have passed within the orbit of Mercury; 47 within that of Venus; 58 within that of the Earth; 73 within that of Mars; and the whole within that of Jupiter. Of 100 or thereabouts, mentioned by Lalande, about one-half have moved from W. to E., in the same direction as the planets, and the other half in the opposite direction. The direct and retrograde ones do not appear to follow each other according to any law that has been discovered. From 1299 to 1532 all that are mentioned were retrograde; and five that were observed from 1771 to 1780 were all direct.

Being quite ignorant both of the size of the comets and their quantities of matter, we can form no conclusion as to their effects, even on the positions of the planets. Hitherto their influence, if anything, has been very small; for within the limits that must be allowed for error, even in the best tables that are calculated upon an approximation, the whole of the irregularities are explainable upon the hypothesis of planetary disturbance alone; and the system appears to have gone on just as if there had been no comets in it. That the comets are formed of matter of some sort or other we know from the dense and opaque appearance of their nucleus, as well as from the action of the planets upon them; but as their action upon the planets has not been great, or even perceptible, we are led to the conclusion that they are not bodies of the same density or magnitude as even the smallest and rarest of the planets. When a comet is viewed through a telescope of considerable power, there appears a dense nucleus in the center of the luminous and apparently vaporous matter of which the external parts are composed; and the opacity of this nucleus varies in different comets. On its first appearance, and again when it recedes, the luminous part of the comet is faint and does not extend far from the nucleus; but as it moves on toward the perihelion, the brightness increases, and the luminous matter lengthens into a train, which, in some cases, has extended across a fourth of the entire circumference of the heavens. But though the general fact of the increased brightness of comets, and length of their tails, with their approach to the sun, and the consequent inclination of their motion, has been established, the observations have not been uniform or minute enough for proving what proportion the increase of brightness bears to the increase of the velocity and the diminution of the distance from the sun. No doubt all the comets of which there are

well authenticated accounts of great brightness and length of tail have passed near the sun in their perihelion. Thus the comet of 1769, which was not a fifth of the earth's perihelion distance from the sun had a tail of 60° in length, as seen at Paris; while that of 1759, which was distant more than half the earth's perihelion distance, had a train of only 2° or 3° . The length of the tail varies however not only with the time at which it is observed, but with the place of observation—a difference probably depending on the difference of clearness and purity in the air. The tail of the comet of 1759 was 25° long, as measured at Montpellier, in the S. of France, and considerably more than that as measured at the Isle of Bourbon, in the Indian Ocean. That of 1769 was 60° at Paris, 70° at Boulogne, 90° between Teneriffe and Cadiz, and 97° at Bourbon. When the superstitious fear of comets, as portending harm to the inhabitants of the earth, had vanished before the light of philosophy, that light was in some danger of giving rise to fear of another sort—fear of physical harm to the earth itself, by the collision of some comet that might cross its path. We have no evidence, however, that such a collision ever did happen, either with the earth or with any other planet; and we have not absolutely correct means of so calculating the place of a comet as to be able to say with certainty that on a given day during a given month, or even during a given year, it shall cross the orbit of a planet. The motion of the earth in its orbit is in round numbers more than 1,500,000 miles in a day; and as Clairaut with all his care did not come nearer the truth than 19 days, though the collision of a comet and the earth should be calculated from any known data, the earth might in fact be at the time far enough from the comet. Indeed, though the fact of the return of at least two comets be established, Halley's and Encke's, and the return of every one, if not affected by physical causes that lie beyond the limits of our present knowledge, has been rendered exceedingly probable, yet we can observe them for so short a portion of their courses, and these seem so very apt to be altered, that we ought not to speak of them with anything like the certainty with which we speak of the planets. As far as we have been able to examine them, they appear to obey the same laws as the other distinct masses that make up the known system of the universe. Beyond this we know nothing of their nature. In the plate at EARTH some comets that have from time to time come within the range of human vision are represented.

Within recent times great advances have been made in our knowledge of the nature of comets, advances which somewhat qualify portions of what has been said above,

and confirm the hypothesis that comets consist of groups of meteoric stones. At particular times we see brilliant displays of falling meteors, and it has long been considered that these bodies form belts circulating round the sun, and that the reason why we see such large numbers at particular times is that the earth's orbit cuts through the belt, the earth during its passage receiving great numbers of the stones. In 1866 Schiaparelli calculated, from observations on the August meteors, as the star shower that we see annually about Aug. 9–10 is called, an orbit for the belt, and on examination he found that it agrees precisely with the orbit of the great comet of 1862.

But a still more splendid discovery followed soon after. Annually about Nov. 14 another star shower is seen. Professor Newton of Yale College, examining old records, found that from the year A. D. 902 there have been observed exceptionally brilliant displays of the November meteors, occurring in periods of about 33 years. From this he concluded that there is a denser portion of the supposed meteoric belt above referred to, and that the displays of extraordinary brilliancy take place when it is through this part of the belt that the earth passes in her orbit. He calculated that this dense portion of the belt must occupy a 10th to a 15th part of the whole, and he predicted that on Nov. 14, 1866, we should pass through a part greatly denser than the average. Those who witnessed the magnificent display that fulfilled his prediction will not readily forget it. Professor Newton gave a choice of five different periods of revolution of this meteoric stream round the sun, any one of which would satisfy his statistics; and he found that the line of nodes, that is, the line in which the plane of the meteoric belt cuts the plane of the earth's orbit, has an advancing motion of about $52.4''$ annually. Adams, taking up the problem, showed by applying a method invented by Gauss, that, taking one of the periods given by Newton, and only one, this motion of the nodal line was completely accounted for by the disturbance of the planets Uranus, Jupiter, and Saturn. No doubt remained that this one period, $33\frac{1}{4}$ years, must be admitted as the period of revolution of the star stream in question. On examining the orbits of the various comets that have been observed, one of them was found to agree exactly with that determined for the meteoric stream. This was Tempel's comet (Comet I. 1866), a small telescopic comet that was detected only a few months before Adams finished his labors. The evidence for the meteoric hypothesis was thus absolutely complete. An apparent verification of it was obtained in the case of Biela's comet, which in the autumn of 1872 was re-

placed by a star shower excelling in numbers, though not in brightness, the famous one of November, 1866.

A theory put forward by Professor Tait possibly goes far to explain cometary phenomena. The heads of comets shine, as the spectroscope shows, partly by their own light; while the light of the tail is chiefly, if not altogether, reflected sunlight. Probably in the densest part of the meteoric stream the collisions of the meteors give rise to heat enough to dissipate parts of them in vapor; and these ignited gaseous exhalations give out the light observed. The tail is merely a portion of the less dense train illuminated by sunlight, and the visibility of it depends not only on nearness and the degree of illumination, but also on the arrangement. Thus is explained the way in which the tail of the comet appears to project out from the sun while the comet is passing its perihelion position, apparently in direct violation of the laws of gravity. A modern view is that the light of comets is due not primarily to heat but to the action of electrical forces set up in consequence of near approach to the sun.

The much discussed problem of the nature and origin of comets' tails seems still far from solution, but a theory based on electrical repulsion has found wide acceptance. First propounded by Olbers as far back as 1812, it was supported by Bessel some years later, and several astronomers have since devoted their attention to it. In 1871 Zöllner systematized the theory, his view being somewhat as follows: The smaller a particle of matter is, the greater is the effect on it of electrical attraction or repulsion compared with that of gravity; and cometary particles may be conceived small enough to be practically unaffected by solar gravitation in comparison with the much greater repulsive force exerted in consequence of the sun and the particles being similarly electrified. Thus those portions of a cometary mass which are more firmly aggregated will be affected mainly by the attractive force of the sun's gravitation, while the finer particles, being subject mainly to his electrical repulsion, will scatter and form tails. Professor Bredichin has further elaborated this theory by referring comets to three types in accordance with the relative strength of the repulsive and attractive forces, each type having its own kind of tail; and he conjectured that each type was composed mainly of one kind of matter, hydrogen for those most under the influence of repulsion, iron for those chiefly influenced by attraction, and hydrocarbons for the intermediate group. It is also known that two comets may traverse the same orbit, or orbits almost exactly coincident; and several of them have been so near the sun at their perihelion as

to pass through the corona, and that, too, without perceptible retardation.

Some further particulars of comets may be here given. Brorsen's comet was first seen in 1846, and returned at intervals thereafter till 1890, when it failed to appear. Faye's comet of 1843 has a period of $7\frac{1}{2}$ years, and traverses a nearly circular path. Donati's fine comet, so long visible in 1858, has a period of over 2,000 years. In 1861 the earth passed through the tail of a great comet, whose period has been calculated to be 409 years. Coggia's comet of 1874 was the first one of considerable brilliance which received thorough spectroscopic observation. The Great Southern Comet seen by observers in the Southern Hemisphere in 1880 was by some supposed to be identical with a comet of 1843. In the following year Tebbutt's comet made a stately progress across the sky, and this is notable as the first comet which has been properly photographed. Schaeberle's comet appeared later in the same year, and Comet Wells became visible in the following year. In September, 1882, a comet became visible to the naked eye throughout Europe and other parts of the world, and remained so till March of the following year. Its period was computed to be from 700 to 1,000 years. Professor Swift of Rochester, N. Y., discovered, on March 7, 1892, a comet of great brilliancy, and in that year no less than six others were observed. Halley's comet and what were called Comets A and B appeared in 1910.

Comfrey, the *Symphytum officinale*. Its stem is winged above, the leaves, which are ovate-lanceolate, very decurrent. The stem is 2-3 feet high, branched above. The flowers are in pairs, secund, and drooping. The corolla is large, yellowish-white, often purple. The plant is frequently found on the banks of rivers or in watery places generally. It flowers in May and June. It was formerly regarded as a vulnerary. Its roots are highly mucilaginous, their taste sweetish with some astringency. The leaves gathered while young may be used as a substitute for spinach, and some people of unrefined taste eat the young shoots after blanching them by forcing them to grow through heaps of earth. Comfrey stewed in sugar, with a small amount of paregoric added, makes a highly-prized domestic remedy for coughs and bronchial irritation.

Comines, Philippe de (kō-mēn'), a French chronicler; born in Comines, about 1445; was the trusted counselor of Philip the Good, Duke of Burgundy, of his son and successor Charles the Bold, of Louis XI., King of France, and his successor Charles VIII. His "Memoirs" supply the most trustworthy material we have for the history of his age, and the fullest: accord-

Comitia

ing to Hallam, they "almost make an epoch in historical literature." He analyzes the motives of kings and statesmen, and notes the manners of the time. He had a conception of a philosophy of history. In the current of events he sees problems working out; and his study is to trace their solution through the tangle of intrigue and personal ambitions. The first six books of "Memoirs" were written between 1488 and 1494, and the last two between 1497 and 1501; they were first printed in 1524-1525. He died at the château of Argenton, Oct. 17, 1510.

Comitia, with the Romans, the assemblies of the people in which the public business was transacted and measures taken in conformity with the will of the majority. They existed even under the kings. In the time of the republic they were convoked by the consuls; in their absence often by the dictator, the tribunes, and in extraordinary cases even by the *pontifex maximus*. There were three comitia among the Romans, which were called *comitia curiata*, *comitia centuriata*, and *comitia tributa*. The oldest of these was the *comitia curiata*, so called because in it the people voted by *curiæ* or wards. It consisted exclusively of the patricians, the original ruling class at Rome, and the class to which the name of *populus* was at first restricted. They were divided into three tribes, the Luceres, Ramnes, and Tities, each of which was divided into 10 *curiæ*, so that there were 30 *curiæ* who voted in the *comitia curiata*. The *comitia centuriata* was a mixed assembly of the patricians and plebeians, in which the people voted by centuries, as these had been formed by Servius Tullius. On the institution of this comitia the principal privileges of the *comitia curiata* were transferred to it, and in course of time the functions of the latter became a mere formality, so that even before the time of Cicero these were not performed by the *curiæ* themselves, but by 30 lictors representing them. The rights of the *comitia centuriata* were thus very important, comprising the right to elect the higher magistrates, the right of passing or rejecting laws proposed to them, the right of deciding on war on the ground of a *senatus consultum* or decree of the senate, and the highest judicial power. This comitia could be held only on certain days, and it must be summoned 17 days before the day of meeting. On the day of the comitia itself the presiding magistrate, with an augur, went into a tent before the city in order to observe the auspices. If the augur declared them unexceptionable, the comitia was held; if not, it was postponed to another day. As their power increased, the tribunes of the people formed the 30 or more tribes into a political union known as the *comitia tributa*, the functions of the body being so similar in many respects to those of the

Commandery

comitia curiata that it was often difficult to determine what questions were to be submitted to the respective bodies. Apparently an ultimate combination of the two assemblies took place.

Comity of Nations (more frequently mentioned by its Latin equivalent, *comitas gentium*), the international courtesy by which effect is given to the laws of one State within the territory and against the citizens of another State. "In the silence of any positive rule," says Story, "affirming, or denying, or restraining the operation of foreign laws, courts of justice presume the tacit adoption of them by their own government, unless they are repugnant to its policy or prejudicial to its interests." See Story's "Conflict of Laws."

Commander-in-Chief, the supreme commander of the united forces of any country. In the United States the President for the time being is commander-in-chief of the army and navy, and of the militia of the several States when the latter is in the National service and formed part of the National provisional army. In all other cases the governor of each State is the commander-in-chief of the State troops. In England he is officially called the Officer Commanding-in-Chief. He is the head of a department of the military administration. He acts, under the Secretary of State for War, as the head of the army, and when military operations are undertaken on a sufficiently large scale to require his presence, is charged with the duty of commanding the army in the field, though, as a matter of fact, this very rarely occurs.

Commandery, among the Knights Templar, Hospitallers, etc., a district under the administration and control of a member of the order, called the commander or preceptor, who received the income of the estates within that district, expending part for his own use, and accounting for the rest. In England more especially applied to a manor belonging to the Knights Hospitallers or Knights of St. John of Jerusalem.

"These establishments formed at the same time branches. . . . On the first creation of these (branch) establishments, they were denominated Preceptories; the superior being called the preceptor; but eventually the name became changed to that of commandery, by which they were always afterward known. The council reserved to themselves the power of at any time recalling a commander from his post, and substituting another in his place, at their pleasure; he being merely considered as the steward of their property. Time, however, gradually wrought a great change in the relative position which the commanders held to the council; and, eventually, a nomination to a commandery came

to be considered in the light of a legal acquisition, subject only to the payment of a certain amount of annual tribute to the public treasury, which tribute received the name of Responsions.” (“History Knights of Malta,” vol. i, ch. ii.)

Commandite (kom-män-dēt), a term used in France, a partnership *en commandite* being one in which a person may advance capital without taking an active part in the management of the business, and be exempt from responsibility for more than he put into it; much the same as limited liability.

Commencement, in American educational institutions, the exercises at the close of the academic year, when degrees are conferred. The term is also in use at the English University of Cambridge, whence it was derived. In mediæval times an “inceptor” or “commencer” was one qualified to begin teaching, and at “commencement” he received his credentials.

Commendam, the administrative or provisional management of a benefice during a vacancy. The person intrusted with the management was called *commendator*. The grant of ecclesiastical livings in this way gave rise to great abuses. In England the term was applied to a living retained by a bishop after he had ceased to be an incumbent. By 6 and 7 William IV. the holding of livings *in commendam* was abolished.

Commensal, a messmate; applied in zoölogy to animals which live on or in other animals for part or the whole of their life, simply sharing the food of their host without being parasitic on him; thus the pea-crabs live in the cavity of shell-fish.

Commensurable, an appellation given to such quantities or magnitudes as can be measured by one and the same common measure. Commensurable numbers are such as can be measured or divided by some other number without any remainder.

Commerce. While the term commerce means primarily the interchange of goods, merchandise, or property of any kind, it is chiefly used in relation to trading on a large scale carried on between different countries or different cities or sections of a given country. Applied to a given country, it includes both imports and exports of merchandise, bullion, and specie, and might, in its broadest application, apply to any articles of value brought into, or sent out of, a country in exchange for other articles of value. Its usual application, however, is to imports and exports of merchandise of a given country, the interchange of merchandise between countries, or the interchange of merchandise between sections or trade centers of a given country.

The commerce of the world, both interna-

tional and other, showed remarkable growth in the nineteenth century and especially in the second half and even the last quarter of the century, owing to the fact that multiplied facilities for transportation and reduction in cost thereof have made possible the transportation from place to place and from country to country of many articles not of sufficient value to justify the cost of transportation under former conditions. Another cause of the apparent increase in international commerce is the fact that statistics of trade are now available for many countries which formerly made no reports, their trade, therefore, having been either omitted from statistical statements or merely estimated; while advance in prices of certain articles or groups of articles has, in recent years, increased the stated value more rapidly than the increase in quantity, though in other cases reductions in prices have, in some degree, offset these advances in the grand total of values of merchandise interchanged.

The earliest estimate of international commerce available is for the year 1700, for which year the value of merchandise entering international commerce is stated at approximately \$400,000,000. For 1750 the total is estimated at approximately \$700,000,000; for 1800, at \$1,500,000,000; for 1850, at \$4,000,000,000; for 1900, \$21,000,000,000; and for 1905, \$26,000,000,000, these figures being in round terms only. Thus during the eighteenth century, before the introduction of steam for transportation on land or ocean, the international commerce of the world as measured by these figures, which are the estimates of the most careful statisticians devoting attention to this subject, showed a growth of less than 300 per cent., while in the nineteenth century, with the aid of steam and electricity in production and transportation, the growth was about 1,300 per cent. The actual increase in the eighteenth century was but little more than \$1,000,000,000, while in the nineteenth century the increase was \$19,000,000,000, of which over \$16,000,000,000 occurred in the second half of the century, while in the brief period from 1900 to 1905 the increase was fully \$5,000,000,000. The table which follows presents, in more nearly exact terms, the best available figures of the international commerce of the world at intervals from the year 1700 to 1905.

Year	Total International Commerce	Year	Total International Commerce
1700	\$400,000,000	1850	\$4,049,000,000
1720	428,000,000	1860	7,246,000,000
1750	681,000,000	1870	10,663,000,000
1780	905,000,000	1880	14,761,000,000
1800	1,479,000,000	1890	17,519,000,000
1820	1,660,000,000	1900	20,715,000,000
1830	1,981,000,000	1905	26,000,000,000
1840	2,789,000,000		

Taking up the principal countries of the world and their relation to international commerce, it may be said that the United Kingdom, Germany, France, and the United States of America are the principal participants in the world's international trade, and that practically one-half of that entire trade is conducted by them. Considering only the net imports, or imports for consumption, and domestic exports of the countries named, the United Kingdom imported in 1906 merchandise valued at \$2,544,000,000 and exported merchandise valued at \$1,828,000,000. Germany's imports in that year were reported at \$1,868,000,000, and her exports at \$1,458,000,000. France imported merchandise valued at \$1,009,000,000 and exported merchandise to the value of \$973,000,000. The United States imported merchandise to the value of \$1,295,000,000 and exported merchandise valued at \$1,773,000,000. The Netherlands, whose ports are important points of transshipment for merchandise originating in, or consigned to, the interior countries of northern Europe, reports for 1905 \$1,031,000,000 of imports and \$800,000,000 of exports; Belgium reports for 1906 \$594,000,000 of imports and \$471,000,000 of exports; Austria-Hungary, \$457,000,000 of imports and \$470,000,000 of exports; British India, \$339,000,000 of imports and \$513,000,000 of exports; China, for 1905, reports \$339,000,000 of imports and \$168,000,000 of exports; and Japan, for 1906, \$209,000,000 of imports and \$209,000,000 of exports.

The countries whose growth of commerce in recent years is most strongly marked are the United States, Germany, Japan, Argentina, and Australia. In the case of the United States the growth has occurred in both imports and exports, the net imports having increased from \$663,000,000 in 1896 to \$1,295,000,000 in 1906, and the exports from \$987,000,000 in 1896 to \$1,773,000,000 in 1906. Germany's imports increased from \$1,025,000,000 in 1896 to \$1,868,000,000 in 1906, and her exports from \$839,000,000 in 1896 to \$1,458,000,000 in 1906. In the case of Japan, the imports increased from \$91,000,000 in 1896 to \$209,000,000 in 1906, and the exports from \$62,000,000 in 1896 to \$209,000,000 in 1906. In the case of the United Kingdom, while her trade is larger than that of any other country of the world, the growth has been less rapid proportionately, the imports of 1896 having been \$1,876,000,000 and in 1906 \$2,544,000,000; and the exports in 1896 \$1,167,000,000, and in 1906 \$1,828,000,000. In the decade from 1895 to 1905, the United States increased its imports 47 per cent. and its exports 98 per cent.; Germany increased its imports 73 per cent. and its exports 73 per cent.; Japan increased its imports 274 per cent. and its exports 133 per cent.; Argentina increased

its imports 115 per cent. and its exports 169 per cent.; Australia increased its imports 65 per cent. and its exports 70 per cent.; France increased its imports 29 per cent. and its exports 44 per cent.; while in the case of the United Kingdom the increase in imports was 37 per cent. and in exports 46 per cent.

The table on the following page shows the total imports and total exports of the principal countries of the world, the percentage of their imports drawn from the United States and the percentage of their exports sent to the United States, the figures being in most cases for the year 1905. This rapid growth of commerce during recent years is due chiefly to the increase in transportation facilities, in facilities for prompt intercommunication, and in currency. At the beginning of the nineteenth century there were no steamships on the ocean, no railways on land. The shipping of the world, then exclusively sail vessels, had at that time a carrying power estimated at 4,000,000 tons, speaking in round terms. The steam vessel when developed was able in a given time to make four times as many trips over a given distance as the sail vessel; and in comparing its carrying power with that of the sail vessel, the unit at the beginning of the century, its tonnage must be multiplied by 4 to bring it to the sail tonnage unit, by which all ocean transportation was measured at the beginning of that period. Adopting this method, generally accepted in measurements of the growth of carrying power on the ocean, the total ocean carrying power stands as follows: in 1800, 4,026,000 tons; in 1830, 7,528,000 tons; in 1850, 14,902,000 tons; in 1870, 25,100,000 tons; in 1900, 66,800,000 tons; and in 1905, 80,400,000 tons, being thus twenty times as much in 1905 as in 1800, while the world's population in 1905 was but $2\frac{1}{2}$ times as great as in 1800. Meantime transportation facilities on land had correspondingly increased. In 1800 there were no railways; in 1830, 210 miles; in 1850, 24,000 miles; in 1870, 67,000 miles; in 1880, 225,000 miles; in 1900, 500,000 miles; in 1905, 550,000 miles, and in 1906, nearly 600,000 miles. Facilities for intercommunication have also greatly increased. Postal facilities at the beginning of the century were poor and there were no telegraphs or ocean cables. It was not until about the middle of the nineteenth century that telegraphs began their service to commerce, the total length of telegraphs in 1850 having been about 5,000 miles; in 1860, 100,000; in 1880, 440,000; in 1900, 1,180,000, and in 1905, 1,300,000 miles; while cables, which had only begun their service at the beginning of the century, had by 1880 a total of 49,000 miles and in 1905 over 200,000 miles in length. The money of the world

also increased with equal rapidity. The gold in the world in 1800 is estimated at less than \$2,000,000,000. By 1850 it had increased to about \$2,500,000,000; by 1880, to over \$5,000,000,000; by 1890, to over \$6,000,000,000; and in 1906, \$10,000,000,000, stated in round terms; while other media of exchange, including bank currency, checks, drafts, and bills of exchange transmitted by mail or telegraph, correspondingly increased. The application of power to production from the soil, the forest, and the mine, and to manufacturing, increased with like rapidity the output of articles required by man, and as a consequence of all these contributions to production, transportation, and currency with which to buy and sell these articles, the international commerce of the world grew from \$1,500,000,000 value in 1800 to \$26,000,000,000 in 1905, and the per capita of commerce from an average of \$2 $\frac{1}{3}$ in 1800 for the population of the entire world to over \$15 in 1905.

The number and variety of articles which now enter commerce have greatly increased with these multiplied facilities for transportation, intercommunication, and purchase of the requirements of life. Many articles which at the beginning, or middle, or even the last quarter of the nineteenth century were not considered available for international commerce now pass from country to country and from continent to continent. Fertilizers from the United States render fruitful the soils of the European and Asiatic countries. The fruits of Australia and South Africa, eggs from China, onions from Bermuda and Spain and Egypt and Australia and the South American countries are now sold in the markets of the United States, and the cane fields of Java on the opposite side of the globe now contribute hundreds of millions of pounds and millions of dollars' value to the sugar supply of the United States each year. Manufactures have multiplied and through application of machinery and ingenious devices, combined with reduced cost through production in large quantities and with vast sums of capital, have been greatly cheapened. Their distribution under reduced cost of transportation has also been greatly enlarged, so that manufactures form probably one-fifth or possibly one-fourth of the world's total international commerce at the present time. Locomotives and railway cars, sewing machines, cash registers, typewriters, electrical machinery, scientific apparatus, clocks and watches, and other complicated and delicate machinery produced in the United States now find markets in the most distant parts of the world, many of which a few years ago were considered inaccessible to commerce and unexplored fields for the sale of the higher grades of manufactures. The cost of transportation of the actual requirements of

man has fallen, while his earning power has increased, and it has been estimated that a single day's labor by a British workman will pay the cost of transporting his year's supply of meat and flour from the great agricultural fields of the United States to the markets of Liverpool or London.

The great articles or groups of articles forming the international commerce of the world are breadstuffs, meats, sugar, coffee, and tea for food; wool, cotton, and other fibers for clothing; coal, timber, iron and steel, copper, tin, rubber, and other articles of this class for manufacturing; while manufactured articles in great variety aggregate probably over \$5,000,000,000 in the annual international trade of the world. Of these great groups of articles, the breadstuffs entering international commerce are chiefly wheat, corn, and oats; the wheat produced in and shipped from the United States and Canada, in North America, Argentina in South America, Australia, India, and Russia; while the corn entering international markets is chiefly that from the United States, with some additions, in recent years, from Argentina. The meat supply entering international commerce is chiefly from the United States, Argentina, and Australia. The cotton is chiefly the product of the United States, which produces about three-fourths of the commercial cotton of the world. The commercial fibers, including in this term hemp, jute, sisal, and flax, are, with the exception of the latter, chiefly the product of tropical or subtropical countries: manila hemp from the Philippine Islands, jute from India, and sisal, a fiber similar to hemp, chiefly from Mexico. The sugar supply of the world has greatly increased and forms a constantly enlarging element of international commerce. The world's sugar production grew with such rapidity as to develop from a little over 1,000,000 tons in 1840 to over 12,000,000 tons in 1906. The increasing use of sugar among the people of the world is illustrated by the fact that the consumption of sugar in the United States has grown from 14 pounds per capita in 1840 to 76 pounds per capita in 1906. In this increase of the sugar supply of the world, beets and cane have both participated, though the share supplied by beets greatly increased between 1840 and 1900. The share of the world's sugar supplied by beets was in 1840 less than 5 per cent. of the total, in 1850 about 15 per cent., in 1870 nearly 35 per cent., in 1880 43 per cent., in 1890 63 per cent., and in 1900 nearly 68 per cent. This increasing share which beets supplied of the world's sugar consumption was due to the encouragement given to that industry by the European nations, while the small percentage which cane sugar formed of the total world's product from 1890 to 1900 was due in part to the

falling off in production in Cuba during the period of hostilities between that island and Spain. Since the resumption of cane sugar production in Cuba and the improvement in facilities in Hawaii and the Dutch East Indies the share supplied by cane has again increased to over 40 per cent., the relative share of the world's sugar product supplied in 1906 being: cane, 40½ per cent., and beets, 59½ per cent.

Of the more than \$5,000,000,000 worth of manufactures entering international commerce, the larger proportion is produced in the United Kingdom, Germany, France, Belgium, Switzerland, Italy, and the United States; the value of manufactures exported from the United States having grown from \$179,000,000 in the fiscal year 1893 to over \$700,000,000 in the fiscal year 1907, the exports of manufactures from the United States thus forming approximately 15 per cent. of those entering the international commerce of the world. The foreign commerce of the United States has shown a marked change in its leading characteristics in recent years. Naturally in its earlier history, when the chief materials available for exportation were the natural products of the soil, the forest, or the mine, the share which foodstuffs and crude materials for manufacturing formed in the export trade was large. As a consequence also of these general conditions, in which the attention of man was given chiefly to production of articles in the natural state rather than to their development through a process of manufacture, the manufactures required for the population were largely brought from abroad, and articles in a manufactured state formed a large percentage of the imports, while those in the natural state formed a large proportion of the exports. With the growth of the manufacturing system in the United States, a growth which has been phenomenally rapid, the character of both imports and exports gradually changed. On the import side the proportion which manufactures bore to the total steadily decreased and the proportion which raw materials for manufacturing bore to the total steadily increased. On the export side, however, the share which manufactures bore to the total increased and the share which articles in a crude condition formed of the exports steadily decreased. American manufactures began to find ready markets in foreign countries, and with the development of new manufacturing industries, and especially those of the higher grades, in the United States, the home demand was supplied by home manufactures and the importation of these articles declined, at least in its proportion to the total import trade. The share which articles which have undergone a process of manufacture formed of the imports in 1850 was

82.4 per cent.; by 1870 it had fallen to 74.6 per cent.; in 1890, 60.9 per cent.; and in 1906, 54.5 per cent. Meantime the demand of the manufacturers for raw materials of a class which are not or cannot be produced in the United States, such as india rubber, hemp, jute, sisal, tin, cabinet woods, goat skins, and certain grades of wool, so increased the importation of articles in a crude condition that this class, which formed only 17.6 per cent. of the imports in 1850, formed 45.5 per cent. of the imports in 1906. In the export trade, under the rapid development of our manufacturing industries and the growing share of their products which could be spared for exportation, conditions were reversed, and the share which manufactures formed of the total grew from 32 per cent. in 1850 to 60.2 per cent. in 1906; while the disposition to turn the crude article into a finished or partly finished state before sending it out of the country was apparent in the fact that the share which articles in a crude condition formed of the total exports fell from 68 per cent. in 1850 to 39.8 per cent. in 1906, showing a tendency, therefore, to give to American labor the profit of putting into a finished or partially finished state a steadily increasing share of our products before their exportation, and also a disposition to give to American labor an opportunity to put into the finished state a steadily increasing proportion of the articles of foreign production required as a part of the manufactures consumed by our people.

EXPORTS AND IMPORTS OF ARTICLES WHICH HAVE UNDERGONE A PROCESS OF MANUFACTURE AND OF CRUDE ARTICLES, RESPECTIVELY, AND SHARE WHICH EACH SUPPLIED OF THE TOTAL, CENSUS YEARS 1850 TO 1900, AND IN 1905 AND 1906

EXPORTS				
Fiscal Year	Articles which have Undergone a Process of Manufacture ¹		Articles in a Crude Condition	
	Value	Per cent. of Total	Value	Per cent. of Total
	<i>Million dollars</i>		<i>Million dollars</i>	
1850	43.2	32.0	91.7	68.0
1860	87.1	27.5	229.2	72.5
1870	121.0	32.2	255.7	67.8
1880	315.2	38.3	508.8	61.7
1890	403.7	47.8	441.6	52.2
1900	803.0	58.6	567.8	41.4
1905	894.5	60.0	597.3	40.0
1906	1,033.4	60.2	684.5	39.8
IMPORTS				
1850	142.9	82.4	30.6	17.6
1860	266.9	75.5	86.8	24.5
1870	325.3	74.6	110.7	25.4
1880	425.5	63.7	242.5	36.3
1890	480.9	60.9	308.4	39.1
1900	470.4	55.3	379.6	44.7
1905	575.6	51.5	542.0	48.5
1906	668.5	54.5	558.1	45.5

¹ Includes foodstuffs partly or wholly manufactured.

Commerce

Commerce

COMMERCE OF THE PRINCIPAL COUNTRIES OF THE WORLD AND SHARE THEREOF
WITH THE UNITED STATES IN 1905, OR IN THE LATEST AVAILABLE YEAR.

Country	Year	Imports of Merchandise	Per cent. Imports from United States	Exports of Merchandise	Per cent. Exports to United States
		<i>Dollars</i>		<i>Dollars</i>	
Argentina.....	1905	197,974,000	14.10	311,544,000	4.87
Australasia.. } Commonwealth of Australia.	1905	¹ 186,614,000	11.70	¹ 276,617,000	1.85
} New Zealand.....	1905	² 62,432,000	11.21	² 76,190,000	4.58
Austria-Hungary.....	1905	435,665,000	9.49	455,487,000	2.36
Austria.....					
Hungary.....					
Belgium.....	1905	585,603,000	7.98	446,439,000	3.99
Bolivia.....	1905	8,952,000	8.45	13,024,000	.21
Brazil.....	1905	144,775,000	10.33	216,668,000	41.13
Bulgaria.....	1905	23,594,000	1.16	28,556,000	.95
Canada.....	1906	283,282,000	59.59	218,182,000	30.41
Central America.. }					
Costa Rica.....	1905	5,239,000	51.65	8,138,000	47.14
Guatemala.....	1905	6,844,000	39.55	8,238,000	34.90
Honduras.....	1905	2,293,000	73.70	5,564,000	83.09
Nicaragua.....	1904	3,202,000	52.09	3,926,000	53.21
Salvador.....	1905	4,346,000	31.18	5,640,000	21.72
Chile.....	1905	71,868,000	9.92	103,223,000	15.20
China.....	1905	339,439,000	16.68	167,726,000	11.86
Colombia.....	1904	³ 14,453,000	⁴ 34.15	³ 12,658,000	⁴ 54.01
Cuba.....	1905	94,807,000	45.34	110,168,000	86.53
Denmark.....	1905	⁵ 166,837,000	16.08	⁵ 142,991,000	3.87
Ecuador.....	1905	7,657,000	28.86	9,035,000	27.32
Egypt.....	1905	106,591,000	2.26	100,641,000	6.18
France.....	1905	922,329,000	10.72	939,305,000	6.06
Algeria.....	1905	74,090,000	.87	44,151,000	.71
Tunis.....	1905	17,554,000	1.52	11,247,000	.19
French East Indies.....	1904	36,792,000		36,073,000	
French colonies, not elsewhere specified....	1904	42,654,000	7.03	36,337,000	.84
German Empire.....	1905	1,695,660,000	13.91	1,364,131,000	9.46
German colonies.....	1904	8,666,000	2.00	5,837,000	.17
Greece.....	1904	26,441,000	1.11	17,480,000	4.63
Haiti.....	1901	5,500,000	35.56	12,760,000	8.84
India, British.....	1905	338,750,000	1.47	513,563,000	6.13
Italy.....	1904	369,351,000	12.48	308,263,000	11.95
Eritrea (Massoua).....	1904	1,501,000	1.93	543,000	
Japan.....	1905	243,292,000	21.35	158,508,000	29.48
Formosa.....	1905	12,175,000	4.71	12,097,000	14.17
Kongo Free State.....	1905	3,875,000	.16	10,235,000	
Korea.....	1905	15,916,000	6.19	3,438,000	
Mexico.....	1906	² 109,884,000	65.99	² 135,027,000	68.60
Netherlands.....	1905	1,030,918,000	9.38	799,694,000	4.08
Dutch East Indies.....	1904	77,973,000	1.66	117,635,000	8.25
Norway.....	1905	83,706,000	2.58	50,631,000	2.34
Paraguay.....	1904	3,566,000	3.51	3,179,000	
Persia.....	1904-5	26,943,000	.44	19,093,000	.15
Peru.....	1904	20,916,000	17.98	19,790,000	9.34
Portugal.....	1904	67,006,000	7.13	33,169,000	1.94
Portuguese colonies.....	1903	32,187,000	5.73	23,108,000	.01
Rumania.....	1905	65,145,000		88,221,000	
Russia.....	1904	335,472,000	9.66	518,288,000	.43
Finland.....	1905	51,770,000		47,824,000	
Santo Domingo.....	1905	2,737,000	71.65	6,881,000	65.16
Servia.....	1905	⁶ 10,731,000	2.34	⁶ 13,895,000	
Siam.....	1905	17,404,000	1.60	29,043,000	
Spain.....	1904	175,740,000	11.21	171,962,000	3.08
Sweden.....	1905	153,780,000	7.22	120,657,000	2.20
Switzerland.....	1905	266,311,000	4.13	187,079,000	12.90
Turkey.....	1900-1901	104,903,000	⁴ .25	65,582,000	⁴ 2.76
United Kingdom.....	1905	⁵ 2,749,669,000	20.45	1,605,053,000	7.25
British colonies, not elsewhere specified....	1904	² 501,956,000	7.52	² 440,692,000	8.33
United States.....	1906	⁵ 1,226,554,000		1,717,953,000	
Philippine Islands.....	1906	25,799,000	16.80	31,917,000	36.28
Porto Rico.....					
Uruguay.....	1904	21,938,000	9.67	39,793,000	5.37
Venezuela.....	1906	8,676,000	30.22	15,630,000	31.11
Total.....		13,739,697,000		12,496,419,000	
Total, exclusive of the commerce of the United States.....		12,513,143,000	14.37	10,778,466,000	9.57

¹ Exclusive of intercolonial commerce, but including bullion and specie.
² Including bullion and specie.
³ Exports from and imports into principal countries in their trade with Colombia.
⁴ Based on exports from the United States into and imports into the United States from the respective country.
⁵ General trade.
⁶ Trade of Bangkok only.

The growing tendency to transform the crude article into the manufactured, or at least partly manufactured, state before permitting it to go out of the country is shown not merely in the percentages just quoted, but more clearly by the figures of values. Exports of manufactures ready for consumption amounted in 1890 to but \$133,000,000 in value; in 1900, \$332,000,000, and in 1906 \$460,000,000, having formed in 1890 less than 16 per cent. of the total exports, while in 1906 they formed nearly 27 per cent. of the total. In articles partly manufactured and intended for further use in manufacturing, the growth has been equally striking, the value of their exports having been in 1890 but \$46,500,000, and in 1906 \$226,000,000; their value having formed in 1890 but 5½ per cent. of the total exports, and in 1906 over 13 per cent. of the total. The value of the manufactures of the United States was stated by the Census of 1850 at \$1,000,000,000, speaking in round terms; in 1880 it had only reached a little more than \$5,000,000,000; but in 1905 it was nearly \$15,000,000,000. Even this rapid growth has been, however, exceeded in rate of increase by the exportation of manufactures, the production of 1905 having been 14½ times as great as in 1850, while the exportation of the same class of articles was in 1905 20 times as great as in 1850. It is thus apparent that the percentage of manufactures exported must have increased meantime, and a careful calculation upon this subject, taking the net valuation of manufactures produced and comparing it with the exportation of the same class of articles, shows that the ratio of export to product grew from 6.37 per cent. in 1850 to 9.11 per cent. in 1905. This comparison of exportation with pro-

duction is made by placing in one group all of the exported articles classed by the Census as manufactures and comparing their total value with the net value of manufactures produced instead of the gross value, since the gross or total valuation as stated by the Census is merely the aggregation of the reports made by all manufacturers of the value of their product in the census year; while the net valuation subtracts from this total the value of all materials in a manufactured or partly manufactured state used by the various manufacturers, thus giving the true or net value of the manufactures produced in the United States in the year in question and a proper basis for comparison with the exports of the same class of articles. The table which follows shows the gross and net valuation of manufactures reported by the Census in each census year from 1850 to 1905, the value of the same class of articles exported, and the ratio of export to product:

PRODUCTION IN AND EXPORTATION FROM THE UNITED STATES OF ARTICLES WHICH HAVE UNDERGONE A PROCESS OF MANUFACTURE, CENSUS YEARS 1850 TO 1900, AND IN 1905

Year	Gross Value of Product	Net Value of Product	Value of Exports	Ratio of Export to Product
	<i>Million dollars</i>	<i>Million dollars</i>	<i>Million dollars</i>	<i>Per cent.</i>
1850	1,019	1679	43.2	6.37
1860	1,886	11,257	87.1	6.93
1870	4,332	12,822	2160.1	5.69
1880	5,370	13,580	315.2	8.80
1890	9,372	16,248	403.7	6.46
1900	13,014	8,371	803.0	9.59
1905	14,802	9,821	894.5	9.11

¹ Estimated at two-thirds of gross value of product.
² In paper currency, then below par value.
The table given herewith, showing the imports and exports of the principal commercial countries of the world in 1875 and

IMPORTS AND EXPORTS OF PRINCIPAL COMMERCIAL COUNTRIES 1875 AND 1905 (SPECIAL TRADE)

	IMPORTS		EXPORTS	
	1875	1905	1875	1905
	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>
Argentina	55,607,000	197,974,000	50,189,000	311,544,000
Austria-Hungary...	248,821,000	435,665,000	249,539,000	455,487,000
Belgium	252,272,000	585,603,000	212,640,000	446,439,000
Brazil.....	90,000,000	145,168,000	113,900,000	217,203,000
Canada ¹	117,409,000	251,617,000	65,442,000	173,548,000
Chile.....	38,138,000	71,868,000	35,928,000	108,223,000
China	100,281,000	329,066,000	101,922,000	167,726,000
France	682,600,000	922,329,000	747,400,000	939,305,000
Germany.....	839,590,000	1,696,660,000	593,052,000	1,364,131,000
India, British ²	162,637,000	313,657,000	252,053,000	500,086,000
Italy	232,935,000	398,463,000	197,302,000	334,066,000
Japan	29,047,000	243,292,000	18,034,000	158,508,000
Mexico ¹	18,793,000	82,865,000	328,314,000	96,962,000
Netherlands.....	276,597,000	1,030,918,000	215,519,000	799,694,000
Russia ⁴	⁵ 351,800,000	288,047,000	⁵ 253,700,000	524,206,000
United Kingdom ² ..	⁴ 1,536,811,000	2,749,669,000	1,087,497,000	1,605,053,000
United States ¹ , ⁴ ..	⁴ 533,005,000	1,179,145,000	499,284,000	1,599,423,000

¹ Fiscal year ending June 30.
² Fiscal year ending March 31.
³ Exports for 1877; no previous data available.
⁴ General imports.
⁵ Provisional figures for trade over the European frontier and the Caucasian-Black-Sea frontier.

1905, indicates the growth in both imports and exports of the principal countries. It will be seen that the increase in exports from the United States in the thirty-year period was greater than from any other country, while the gain in imports into the United Kingdom, Germany, and Netherlands, in each case, was greater than in those of the United States. The total exports of domestic products of the United States in 1905 were greater than from any other country of the world, except the United Kingdom.

The rapid growth in the foreign commerce of the United States, and especially in its export trade, in the period since 1875, has been due largely to the development of transportation facilities by which the great producing interior found methods for transporting to the seaboard and thence to other parts of the world the merchantable commodities which it could easily produce. In 1875 the railways of the United States were but 74,000 miles in length; in 1905, 217,000 miles; having thus practically trebled in length in the thirty-year period. With the extension of railways into the great producing country between the Allegheny and Rocky mountains came large exportations, first of natural products and later of manufactures. Wheat, corn, meats, and cotton became important factors in the export trade, and as a result of this increased purchasing power, imports also grew. With the development of coal, iron, copper mines, and supplies of timber in the interior, came an extension of manufacturing industries across the Alleghenies and into the Mississippi and lake regions, and also into the South, and with this came a rapid increase, especially in the decade 1896-1906, in the exportation of manufactures, which grew from \$258,000,000 in 1896, to \$686,000,000 in 1906. The table which follows shows the annual average of imports and exports into and from the United States by decennial periods since 1800, and the actual figures for the fiscal year 1907.

COMMERCE OF 1907 COMPARED WITH AVERAGE OF DECENNIAL PERIODS, 1790 TO 1900, AND THE SIX-YEAR PERIOD, 1901-1906

Periods	ANNUAL AVERAGE OF TEN-YEAR PERIODS OF—	
	Imports	Exports
	<i>Dollars</i>	<i>Dollars</i>
1790-1800	59,184,545	46,774,236
1801-1810	92,766,351	74,531,506
1811-1820	80,811,927	58,989,222
1821-1830	72,948,879	69,431,024
1831-1840	119,520,679	103,550,201
1841-1850	118,094,779	119,554,936
1851-1860	284,475,036	248,887,460
1861-1870	331,867,029	254,326,410
1871-1880	535,221,512	589,300,719
1881-1890	692,186,522	765,135,498
1891-1900	763,327,858	1,024,869,210
1901-1906	1,014,562,540	1,502,146,585
1907 ¹	1,434,401,092	1,880,851,024

¹ Preliminary figures ; subject to revision.

Turning to the internal commerce of the United States, it must be said, first, that there are no exact measurements such as those which exist with reference to the international commerce. The value of merchandise passing into and out of a given country may be measured with at least approximate accuracy by requiring a statement of the value of each article or shipment passing through its ports or custom houses at the border. In the internal commerce of the country, that passing from State to State, or city to city, or individual to individual, there is no such exact method of measurement. In the United States, however, it is possible to determine with a fair degree of approximation the value of the merchandise produced in those years in which the decennial census measures the values of the various articles and groups of articles produced. The Census of 1900 reported the value of manufactures produced in the United States at \$13,000,000,000, the value of farm products at a little less than \$4,000,000,000; and combining with these the value of the products of the mines, the forests, and the fisheries, and of imported merchandise, and adding to the grand total thus obtained the cost of transporting the article from its place of production or importation to the consumer, the selling value of the various articles forming the internal trade of the country for that year is estimated in round terms at \$20,000,000,000, and for the year 1906 is probably \$26,000,000,000, or a sum equal to the entire international commerce of the world, while the fact that in international commerce the value of all articles is twice counted, once when exported from the country of production, and again when imported into the country of consumption, justifies the further statement that the value of articles entering the internal commerce of the United States in 1906 was approximately twice as great as that of the articles forming the international commerce of the world.

O. P. AUSTIN.

Commerce, Chambers of. See CHAMBERS OF COMMERCE.

Commerce and Labor, Department of, an executive department of the United States Government, created by Congress in 1903. Its province and duty was stated to be "to foster, promote, and develop the foreign and domestic commerce, the mining, manufacturing, shipping, and fishery industries, the labor interests, and the transportation facilities of the United States." The secretary is a member of the Cabinet. Two new bureaus, those of corporations and of manufactures, were also established as branches of the department, which further includes the bureaus of the census, immigration, labor, navigation, standards, and statistics, the coast and geodetic survey, the

Commercial Traveler

fisheries commission, the lighthouse board, and the steamboat inspection service.

Commercial Traveler, a person whose occupation is to transact business as the accredited traveling representative of a trading house or wholesale commercial establishment to other trading houses or commercial establishments. The commercial traveler, or "drummer" (in England commonly called "bagman" and "rider"), is the successor to the "chapman," or traveling merchant, who carried with him not samples merely, but stock. The employment of commercial travelers for the distribution of goods was the direct result of the extension of possible markets for given products and of the localization of business interests in certain particular centers.

In the United States the number of commercial travelers has increased rapidly, till in 1899 it was computed that there were between 350,000 and 400,000. Among their benevolent associations are the Commercial Travelers' Association of New York (3,000 members), the Northwestern Traveling Men's Association of Chicago (5,000), one at St. Louis (3,000), an Order of Commercial Travelers, a secret society organized in 1888, also a Travelers' Protective Association (15,000 members), for providing against overcharges by railroads and hotels, etc.

Commercial Treaties, compacts between two countries for the purpose of improving and extending their commercial relations; each country engaging to abolish or to reduce to an agreed rate or otherwise modify the duties on articles of production and manufacture imported from the one country into the other. They are usually for a limited period, but may be renewed and modified according to altering conditions. In these treaties the phrase, "most favored nation," implies concessions equal to the most favorable ones granted under similar treaty. The first treaty of commerce made by England with any foreign nation was entered into with the Flemings in 1272; the second was with Portugal and Spain in 1308. The first commercial treaty made by the United States with China was entered into in 1844, and among other things provided that "If additional advantages and privileges of whatever description be conceded hereafter by China to any other nation, the United States and the citizens thereof shall be entitled thereupon to complete, equal, and impartial participation in the same." This provision has substantially been repeated in all subsequent treaties between the United States and China, and forms the basis on which the United States demanded of the Powers of Europe a recognition of the "open-door policy" in their spheres of influence in China.

Commissary

The commercial treaties of the United States have been based almost wholly upon the principle of reciprocity. Among the most noteworthy of recent years are the following:

COUNTRY.	DATE.	SUBJECT.
Brazil	1891	Manufactures.
San Domingo ...	1891	Foods, manufactures.
Salvador	1891	Foods, merchandise.
Germany	1892	Foods, raw materials.
Great Britain	1892	Manufactures, etc.
Nicaragua	1892	Foods, implements.
Guatemala	1892	Manufactures, etc.
Austria	1892	Cotton goods, etc.
Spain	1892	Miscellaneous.
France	1898	Miscellaneous.
Portugal	1899	
Italy	1900	Miscellaneous.
Germany	1900	Food products, etc.
Cuba.....	1903	Miscellaneous.

Commercial treaties have also been concluded with Colombia, Honduras, and Venezuela. The terms upon which the United States negotiates treaties of this character have been twice indicated in tariff bills (1890 and 1897), the last one being known as the Dingley Act; but under the Constitution the President and Senate have full right to make such treaties. Concessions to foreign governments in respect to duties are authorized by the Dingley Act upon certain specific conditions, of a reciprocal character, to be ascertained by diplomatic negotiation. The great expansion of the commerce of the United States in recent years has led the government to extend the application of commercial reciprocity wherever practicable. The last tariff bill provided certain commercial arrangements by the President alone, and for treaties under certain limitations which required approval by Congress. To execute this law the President appointed a special commission plenipotentiary, in whose charge the negotiation of such treaties was placed. John A. Kasson, eminent as a diplomatist and executive, was appointed the first Reciprocity Commissioner. As a further means of promoting the foreign trade of the country, a movement was inaugurated during the Congressional session of 1899-1900 for the creation of a separate executive department to have charge of the purely commercial affairs of the nation. JOHN A. KASSON.

Commiation, the act of threatening or denouncing vengeance; a threat; also a solemn recital of God's commandments and a "Denouncing of God's anger and judgments against sinners," appointed to be used in the Church of England on Ash-Wednesday and such other times as the ordinary may direct. It was introduced at the Reformation as a substitute for the ceremony of sprinkling the head and making the sign of the cross with ashes on Ash-Wednesday.

Commissary, an ecclesiastical term, an officer of a bishop who exercises spiritual

jurisdiction in remote parts of a diocese, or one intrusted with the performance of the duties of the bishop's absence. Also, in the army a term applied to officers charged with furnishing provisions, etc., for its use.

In the United States the army commissariat is administered by a commissary-general, assisted by over 40 officers of various ranks.

Commission Government, a form of municipal government that originated in Galveston, Tex., soon after the devastating storm of 1901, and attained such widespread popularity that by June, 1910, no less than 68 large cities in the country were being operated under it or a modification of it, and many others were seeking legislative authority for its adoption. The scheme became known by the names of the cities that early adopted it, as the "Galveston Plan," the "Denver Plan," and the later and largely varied "Des Moines Plan." The basic plan is the substitution of strict business methods for the partisan control of municipalities, the attainment of more effective service, and the elimination of bossism, graft, and official corruption. Under it wards, districts, and aldermanic councils are abolished, and the whole conduct of municipal affairs is vested in a mayor and a small commission, elected by the city at large for a given period, usually four years. The several executive departments are divided among the commissioners; all franchises must be submitted to popular vote; no ordinance passed by the commissioners can go into effect under 30 days; and within this period 10 per cent. of the voters can obtain a referendum to the entire body of voters if a proposed measure is deemed unwise.

Commissure, an anatomical term applied to nervous connections between adjacent parts of the nervous system. Though it is not always used in quite the same way, the general signification of the term, and the physiological import of the structure, is that of a uniting bridge.

Committee, one or more persons elected or deputed to examine, consider and report on any matter of business.

A Committee of a lunatic or idiot, a person to whom the care of an idiot or lunatic, or of an idiot's or lunatic's estate, is committed; also called a curator or guardian.

A Committee of the Whole House, a term used when a legislative body resolves itself into a committee to consider any bill or matter, in which case the speaker leaves the chair, which is taken by one of the members, called the Chairman of Committee. While in committee a member is allowed to speak more than once on any point.

The Committee of Public Safety; a rendering of the French term, *Comité de Salut public*, the name given to a committee of members of the French National Con-

vention during the first revolution. When the National Convention, about the end of 1792, abolished monarchy and proclaimed a republic, it divided the executive government among several committees, paramount over which was the Committee of Public Safety, appointed on April 6, 1793. When the Girondists were overthrown by the revolution of May 31, 1793, and the Jacobins, or the party of the Mountain, gained supreme power, the powers of the Committee of Public Safety were enlarged. It was the rule of this tyrannical and sanguinary committee which is known as the Reign of Terror. Robespierre was its animating spirit, next to whom stood Couthon and St. Just. The execution of these three men on the 10th Thermidor (July 28, 1794) was a lesson to the more extreme party in the committee, which did not again perpetrate the same excesses as before, and it is considered as having terminated the Reign of Terror. In March, 1871, the Communists established a similar committee in Paris, which fell in May of the same year.

National Committee, a body vested with control of a political party in the United States with special reference to a Presidential election.

Commodore, in the United States navy, formerly an officer ranking next above a captain and commanding a few ships when they were detached for any purpose from the rest of the fleet. The grade was abolished by Congress in 1899, when all commodores became rear-admirals.

The word is also a title given in courtesy to the president of a yachting club, or to the senior captain of a line of merchant vessels.

Commodus Antonius, Lucius Aurelius, a Roman Emperor; born in 161 A. D.; the son of Marcus Aurelius. He was most carefully educated, and accompanied his father on several military expeditions. He succeeded him in 180, and, after a short period of orderly government, he dismissed his wisest counselors, and gave himself up to the lowest society, and the most shameless habits. The administration was in the hands of a se-

ries of his favorites, and confiscations and murders were the ordinary occurrences of the day. He went so far in defiance of de-



COMMODUS ANTONIUS.

cency as to fight in the circus like a gladiator, and then gave himself out to be a god, and would be worshipped as Hercules. He was at last poisoned by Marcia (one of his concubines, whose life he had intended to take), and then strangled by an athlete. The vices and misgovernment of Commodus contributed powerfully to hasten the fall of the empire. He died Dec. 31, 192.

Common, that which belongs as a privilege or right equally to more than one, to many, or to the public at large; free to all; general; universal; public; having no separate owner; as, the common weal.

In logic the word is applied to terms or names, in opposition to individual, singular, or proper. "Common terms, therefore, are called 'predicables' (viz., affirmatively-predicable), from their capability of being affirmed of others; a singular-term, on the contrary, may be the subject of a proposition, but never the predicate unless it be of a negative proposition (as, *e. g.*, the first-born of Isaac was not Jacob); or, unless the subject and predicate be only two expressions for the same individual object, as in some of the above instances."

The word is also applied to an open and (generally) uninclosed space, the use of which is not restricted to any individual, but is free to the public or to a certain number. In most of the cities and towns in the United States there are considerable tracts of land appropriated to public use. These commons were generally laid out with the cities or towns where they are found, either by the original proprietors or by the early inhabitants.

Common Council, the council of a city or corporate town, empowered to make by-laws for the government of the citizens. The common councils sometimes consist of two houses, chambers, or courts, and sometimes form only one. In American cities the city council is generally composed of two branches, called, respectively, select and common. They are elected by the people.

Commoner, in Great Britain, a term applied to all citizens except the hereditary nobility.

Common Law, the unwritten law, the law that receives its binding force from immemorial usage and universal reception, in distinction from the written or statute law; sometimes from the civil or canon law; and occasionally from the *lex mercatoria*, or commercial and maritime jurisprudence. It consists of that body of rules, principles, and customs which have been received from former times, and by which courts have been guided in their judicial decisions. The evidence of this

law is to be found in the reports of those decisions and the records of the courts. Some of these rules may have originated in edicts or statutes which are now lost, or in the terms and conditions of particular grants or charters; but it is quite certain that many of them originated in judicial decisions founded on natural justice and equity, or on local customs. It is contrasted with the statute law contained in acts of Parliament; equity, which is also an accretion of judicial decisions, but formed by a new tribunal, which first appeared when the common law had reached its full growth; and the civil law inherited by modern Europe from the Roman Empire. Wherever statute law, however, runs counter to common law, the latter is entirely overruled; but common law, on the other hand, asserts its preëminence where equity is opposed to it.

Common Pleas, in law, pleas brought by private persons against private persons, or by the government, when the cause of action is of a civil nature. In many States of the United States it is a court having jurisdiction generally in civil actions. In England the old Court of Common Pleas is now merged in the High Court of Justice.

Common Prayer, Book of, the public form of prayer prescribed by the Church of England to be used in all churches and chapels, and which the clergy are to use under a certain penalty. The Book of Common Prayer is used also by the English-speaking Episcopal Churches in Scotland, Ireland, America, and the colonies, as well as by some non-Episcopal bodies, with or without certain alterations. It dates from the reign of Edward VI.; was published in 1549, and again with some changes in 1552. Some slight alterations were made upon it when it was adopted in the reign of Elizabeth. In the reign of James I., and finally soon after the Restoration, it underwent new revisions.

Commons, the people who have a right to sit or a right to vote for representatives in the English House of Commons, and all who in England are under the rank of peers without reference to their voting privileges.

English House of Commons is that one of the two Houses of the English Parliament which consists of representatives duly elected according to law in prescribed numbers by the burgh, county, and university constituencies of the United Kingdom. The name Commons is given to its members to distinguish them from the Peers of the United Kingdom who sit in the House of Lords.

History.—The earliest traces of the English House of Commons are in A. D. 1265. The year previously (on May 12, 1264),

Simon de Montfort, Earl of Leicester, who was of French origin, but brother-in-law to King Henry III., defeated his sovereign at the Battle of Lewes, and made him prisoner. In 1265 the victor issued writs in the King's name requiring each sheriff of a county to return to a Parliament which he proposed to hold, two knights for the shire under his jurisdiction, two citizens for each city within its limits, and two burgesses for each borough. A Parliament of lords and other dignitaries had existed previously; county representatives may occasionally have sat almost from the commencement of the 13th century, and an assembly of knights and burgesses, nicknamed the Mad Parliament, had met in A. D. 1258, but no writs are extant before De Montfort's, summoning the representatives of cities and boroughs to attend. The Parliament thus called together met in London on Jan. 22, 1265, but on Aug. 4, De Montfort was slain at the battle of Evesham, and the royal government restored. The victory was obtained for the king mainly through the military ability of Prince Edward, afterward King Edward I., who, at least as early as 1294, *i. e.*, the 22d year of his reign, himself called together a parliament of the De Montfort type. The borough representatives were 246, those from the counties or shires 74. Under Edward III. these members had altered to 282 and 74. Each place represented sent two members, without reference to its population. There was universal suffrage; members required no property qualification, and were paid. In the eighth year of Henry VI., the county franchise was narrowed in its operation, no one now being allowed to vote unless he possessed freehold worth 40 shillings, a sum the purchasing power of which would have been about the equivalent of £12 (\$60) at the beginning of the 18th century, and £20 (\$100) at the beginning of the 19th. The Act 23 Henry VI. c. 14, made it an indispensable qualification for election as a member of Parliament that the person should be a knight, or eligible to be one, by which was meant that he should have a freehold of £40 (\$200) a year. James I., by his royal prerogative, conferred two members on the University at Oxford and the same number on that of Cambridge. All along till the revolution of 1688, efforts were made insidiously to reduce, or, if not, then at least to damage, the burgh representation. But in 1694 the 6 and 7 William and Mary, c. 2, enacted that Parliaments in future should be triennial, an alteration which much tended to render the House of Commons independent of the royal authority. A similar act had been passed in 1641, but repealed in 1664. The Act 9 Queen Anne, c. 5, established a landed property qualification for members,

whether for counties or boroughs, and by the first George I., passed in 1716, the Septennial Act was established which made the legal duration of a Parliament seven instead of three years. It is still in force. At the beginning of the 18th century, England and Wales had 513 members of Parliament. The union with Scotland in 1707 added 30 county and 15 borough members to the House of Commons, that with Ireland on Jan. 1, 1801, 64 for counties, 35 for cities, and one for Dublin University. This made up the entire representation of the United Kingdom to 658, a number which was nominally preserved until 1885, though the suspension of writs in individual constituencies for proven flagrant bribery occasionally slightly reduced the number. The Act of 1885 made radical reforms, placing the basis of representation at about one member for every 9,000+ electors. The number of members for the entire realm of Great Britain and Ireland is now (1894) 671, divided as follows: England, 461; Wales, 34; Scotland, 72; Ireland, 103. The method of election of these representatives, and the qualifications of the voters have been radically changed, though the system as at present carried out is yet in some confusion, theory and practice in a few instances proving incompatible.

Present state.—A Parliament cannot spring into life by any effort of its own; it requires to be summoned by the sovereign. During an interregnum a Convention Parliament, sometimes called simply a Convention, can do so, and has done it twice in English history, once in 1660, the other time in 1688. The persons entitled to appear as members of the House of Commons and of Parliament are those who have been elected by the registered electors of the several parliamentary constituencies, and have taken an oath or made an affirmation of loyalty, etc., in the normal way.

The House of Commons is presided over by a Speaker. The first one, called Peter de la Mere, was elected in A. D. 1377. Most of the important legislation which emanates from the Imperial Parliament has its origin in the House of Commons. By the Septennial Act a Parliament which has escaped what may be termed a violent end, dies a natural death in seven years. A general election of representatives to serve in the new House of Commons then takes place, and when a new Parliament assembles, the House of Lords, as an essential part of the complex machinery, is also summoned to meet. Few Parliaments, however, die a natural death. When the Ministry is defeated on what they deem a vital point, and they are of opinion that the country agrees with them and not with their adversaries, the sovereign generally receives and acts upon the advice to dissolve

Common Schools

Parliament, an act which formally submits to the judgment of the constituencies the disputed point which caused the ministerial crisis. When a Parliament only adjourns, on resuming its sittings it takes up its business where it was left off, but when prorogued the session is held to be at an end, and most of the business has to begin anew.

Common Schools, a term used in the United States as equivalent to primary or elementary schools. The term is officially used to include public schools of the elementary grades, the first eight years of the course of study, and the secondary grade, which includes the 9th to the 12th years of course of study. At the close of the school-year 1901-1902 compulsory laws had been adopted by 32 States, the majority making these laws apply during the period between 8 and 14 years, although the legal school age was from 6 to 21 in 22 states, and 5 to 21 in 11 states. The average length of the school term reached 143.1 days. The following summary of official reports gives a clear idea of the extent and operation of the common school system, as reported by the United States Commissioner of Education in 1909 for the previous year:

Estimated population	86,874,990
Number of persons 5 to 18 years of age	24,613,763
Number of pupils enrolled	17,061,962
Per cent. of population enrolled.....	19.64
Per cent. of persons 5 to 18 years enrolled	69.32
Number of pupils in average daily attendance	12,154,172
Number of male teachers.....	104,495
Number of female teachers.....	390,968
Number of school houses.....	262,170
Value of public school property.....	\$945,395,162
Total receipts of the year.....	\$381,919,526
Total expenditures.....	\$371,344,410
Expenditures per capita of population.	\$4.27
Total expenditure per pupil.....	\$30.55

The system which has produced the foregoing results in the United States has been extended to Cuba, Porto Rico, Hawaii, and the Philippine Islands.

Common Sense, the philosophy of the so-called Scotch school of philosophy founded by Thomas Reid (1710-1796), who aimed to establish a series of fundamental truths indisputable as primitive facts of consciousness. He taught that the general consent of mankind as to the existence of an external world, as to the difference between substance and qualities, between thought and the mind that thinks, is sufficient to establish the reality of a permanent world apart from ourselves; and he maintains that sensations are not the objects of our perception, but signs which introduce us to the knowledge of real objects.

Common-time, time with two beats in a bar or any multiple of two beats in a bar. The beats may be of the value of any note or rest or compound of notes and rests, pro-

Commune

viding the sum required by the time sign be exactly contained in each bar. Common-time is of two kinds, simple and compound. Simple common-time is that which includes four beats in a bar, or any division of that number, or square of the number of its divisions. The signs used to express simple common-time are the following: $\frac{2}{1}$, $\frac{2}{2}$, $\frac{2}{4}$, $\frac{4}{4}$, $\frac{4}{8}$, and the characters C and C . In these signs the upper figure denotes the quantity of notes required in the bar, and the lower figure the quality of the notes. Compound common-time is expressed by the signs $\frac{6}{4}$, $\frac{6}{8}$, $\frac{12}{8}$, such signs meaning two or four beats of three crotchets or quavers to each beat.

Commonwealth, the state or prosperity of a country without any reference to the form of government under which it may be at the time. Owing to the semi-independent position of the States of the American Union the term commonwealth is of frequent application to the various members of the great Federal Government, which itself is spoken of as the National or Federal Commonwealth in contradistinction from its constituent autonomies. In many of the States the legal proceedings against criminals, etc., are instituted in the name of the (*e. g.*) "Commonwealth of — vs. John Doe."

The word is also applied to the period in the history of England during which the Parliamentary army and the Protector Oliver Cromwell exercised the power of government. King Charles I. was beheaded on Jan. 30, 1649; but if the beginning of the commonwealth be deferred to the time when Oliver Cromwell became Protector, then its beginning was not till Dec. 16, 1653. It received an all but fatal blow by the death of its great chief, Sept. 3, 1658. On April 22, 1659, Richard Cromwell, his incompetent son and successor, resigned, and on May 29, 1660, Charles II. was restored to the throne.

Commonwealth, Heart of the. See HEART OF THE COMMONWEALTH.

Commonwealth, Right Arm of the. See RIGHT ARM OF THE COMMONWEALTH.

Commune, the unit or lowest division in the administration of France, corresponding in the rural districts to the English parish or township, and in towns to the English municipality. In France there are about 36,000 communes, with a considerable measure of self-government, with the power of holding property, etc. Each commune has a council elected by universal suffrage, and the council is presided over by a *maire* and one or more *adjoints* or assistants. In the larger communes the *maire* is selected by the central government out of the members of the council; in others he is appointed by the prefect of the depart-

ment. The central government through its officials exercises generally a very large control over the affairs of the commune.

The rising of the Commune of Paris in 1871 should not be confounded with *Communism* (q. v.). It was a revolutionary assertion of the autonomy of Paris, that is, of the right of self-government through its commune or municipality. The theory of the rising was that every commune should have a real autonomy, the central government being merely a federation of communes. The movement was based on discontent at Paris, where the people found themselves in possession of arms after the siege of the Germans. The rising began on March 18, 1871, and was only suppressed 10 weeks later after long and bloody fighting between the forces of the commune and a large army of the central government; 6,500 Communists having fallen during May 20-30, and 38,578 been taken prisoners.

Communion, the appropriate rendering of the word *koinōnia* in I Cor. x: 16. The revisers retain the word communion, but place in the margin, "participation in." It seems to have a double reference: (1) Participation in "The cup of blessing which we bless, is it not a communion of (participation in) the blood of Christ: the bread which we break, is it not a communion of (participation in) the body of Christ." (2) The unity of those who participate: ". . . seeing that we who are many are one bread, one body, for we all partake of the one bread." In the margin: "Seeing that there is one bread, we, who are many, are one body."

In theology, the act of partaking with others of the sacramental symbols in the Lord's Supper. For the first three centuries the communion was administered every Lord's Day; then it became more infrequent, and before long was limited to Easter, Whitsunday, and Christmas. Many neglecting it even on these days, the Council of Lateran, in 1215, ordered all Catholics to commune at least once a year, naming Easter as the time, an injunction which the Council of Trent confirmed. For the first seven centuries the practice was somewhat general of mixing water with the wine to symbolize the mystic union between Christ and the communicant's soul. Originally both bread and wine were administered, but in 1096, Pope Urban II. sanctioned the practice of omitting the wine when the communicant was a layman. This method the Council of Constance enjoined in 1414. It has since remained in force in the Church of Rome, but at the Reformation communion in both kinds, as it is often termed, was restored to the laity.

The word applies also to the community of belief, and theoretically at least, of

Christian affection, existing among those who partake together of the Lord's Supper. *Communio* is used in this sense in the Canons of the Council of Elvira, A. D. 313. From this use of the Latin word is derived the practice of calling the several denominations Communions, as the Lutheran Communion, the Wesleyan Methodist Communion, the Congregational Communion, etc.

Communism, a system of society in which common property is the recognized form. In later times it is an attempt to prevent or remedy the evils arising out of the inequalities of private property by holding property in common. But in primitive societies, in the hunting and pastoral stages of civilization, communism was universal. It was only when the transition was made to a settled life and to agriculture that private ownership in land began to appear, and even then it was slowly introduced. Long after the private use of land had been established, the common ownership of it by the tribe or clan was still recognized and enforced, and the arable land of the community was subject to periodical redistribution with the view to cultivation. Survivals of this system still exist in various countries of the world, notably in Russia under the Mir.

In the ancient world a partial communism prevailed in Crete and Sparta. During the decline of Greece more systematic speculations and experiments in communism appeared. The most eminent example of the former was the Republic of Plato, in which a community of goods and also of wives was taught, as the form of society among the ruling and military class. These were to be supported by the industrial classes, whose form of life is not indicated. In Palestine, about the Christian era, the Essenes were a society of recluses with celibacy and the community of goods.

A most remarkable instance of community of goods is that of the early Christians at Jerusalem, recorded in Acts iv: 32. Under the influence of Christianity the rigorous and often merciless ideas and rights of private property developed in the ancient world, especially among the Romans, were greatly modified. Denunciations of wealth tending to communism are not infrequent in the church fathers. Not to mention the corporate property of the church itself, which in medieval times embraced about one-third of the land in the countries where it was established, many of the monastic institutions were based on the community of goods. During the middle ages, sects holding the community both of goods and women appeared, like the sect of the Giovannali in Corsica.

At times of social and spiritual change or fermentation communistic ideas usually

Comnenus

grow up with special vigor. Such was the case at the Reformation, when the anabaptists Münzer and Bockholt set up communism in Germany, and similar notions had a wide diffusion in other countries. The most eminent literary form of it, combined with the noblest humanitarian ideals and practical suggestions for reform, which even yet have not been realized, was the *Utopia* of Sir Thomas More (1516). In that great work, besides the institution of common property, we have the most advanced views on toleration, universal education, a mild criminal code, sanitation, and a working-day of six hours. Campanella's "*Civitas Solis*" (1623) has a similar community of goods under the despotic rule of the wise men, with a working-day of four hours.

At the discovery of America the Spanish conquerors found a system of agricultural communism under a central despotism both in Mexico and Peru. Like the partial communism of Crete and Sparta it may have been a survival or continuation of the primitive communism. In the earliest English settlements in America, both Virginia and New England, a system of common property was attempted, but soon abandoned. During the fermentation which preceded and accompanied the French Revolution communistic ideas again emerged in the writings of Morelly and Mably. They are also found vaguely expressed in the works of Rousseau, and through him they to some degree affected the principles of Robespierre and St. Just; but the general tendency of the Revolution was to consolidate individual rights and private property. The conspiracy of Babeuf was intended to establish a systematic communism by revolution.

Socialism is a vague phenomenon which must not be identified with communism. Yet the movement is largely colored with communistic conceptions, and in some of its schools a thoroughgoing communism is taught with lax notions as to the relation of the sexes. In the anarchist, as also in the Marx school to a considerable degree, socialism takes the form of a systematic community of property, associated with vague theories of the emancipation of women. Different both from socialism and this aggressive communism are the communistic societies still existing in the United States. The latter are simply quiet efforts to realize for their members a happier state of things by community of property, but without a revolutionary propaganda and remote from the main current of modern social development.

Comnenus, the name of a family, originally Italian, of which many members occupied the throne of the Byzantine empire from 1057 to 1204, and that of Trebi-

Comoro Islands

zond from 1204 to 1461. See BYZANTINE EMPIRE, TREBIZOND ALEXIUS, ISAAC.—ANNA COMNENA (*q. v.*), who lived in the first half of the 12th century, was a high literary as well as historical celebrity.—DAVID COMNENUS, the last representative of the imperial race in Trebizond, was executed at Adrianople in 1462, with all his family, by command of Mohammed II. The attempt to trace the descent of the Bonaparte family from a branch of the Comneni settled in Corsica is not supported by valid evidence.

Como, a city of Lombardy, Northern Italy; at the S. W. extremity of the Lake of Como, 30 miles N. of Milan by rail. It lies in a valley, surrounded by hills, clad with luxuriant gardens, olive plantations, and orange groves, with here and there an old ruin cropping out. The city is surrounded by old walls flanked with towers, the gateways by which the walls are pierced being fine specimens of medieval military architecture. Among the principal buildings of Como are the cathedral (1396–1732), and the town hall, built of marble, dating from the beginning of the 13th century. The chief articles of manufacture are silk, satin, gloves and soap. By means of its port, Como carries on extensive trade in the produce of the district with Switzerland. Como, the ancient *Comum*, was the birthplace of Cæcilius Statius, the two Plinys, of several popes, and of the physicist Volta. In 1107 it began to war with Milan, and in the course of 20 years was utterly destroyed by its antagonist. As an important headquarters of the Ghibelline party, it was rebuilt in 1158 by Frederick Barbarossa, and remained a republic for two centuries, when it fell into the hands of the Viscontis, its history since that time being bound up with that of Milan. Pop. (1901) 38,895.

Como, Lake (anciently *Lacus Larius*), a lake in the N. of Italy, at the foot of the Alps; fed and drained by the river Adda, which carries its surplus waters to the Po. It extends from S. W. to N. E., 30 miles, giving off toward the middle, at the promontory where stands Bellaggio, a branch running for about 13 miles S. E. to Lecco, called the Lake of Lecco; greatest width two and a half miles, greatest depth 1929 feet. It is celebrated for the beautiful scenery of its shores, which are covered with handsome villas, gardens, and vineyards, mountains rising behind to the height of 7,000 feet. Trout and other fish abound in the lake.

Comoro Islands, a volcanic group in the Indian Ocean, between the N. extremity of Madagascar and the continent of Africa. They are four in number: Great Comoro, Mohilla, Johanna, and Mayotta; total area,

1,050 square miles; pop. 65,000. The people are nominally Mohammedans, and are akin to the mixed races of Zanzibar. They have large flocks and herds; and the coast lands are very fertile, abounding in tropical grains and fruits. Mayotta belonged to France since 1843, and in 1886 the others became a French possession.

Company, a word of various applications, including:

(1) A number of persons legally associated for the performance of any duty or the carrying on of any business. The profits are divided among the members or shareholders in proportion to the amount of capital invested.

(2) The partners in any firm whose names do not appear in the title or style of the firm; in this use the word is generally contracted to Co.

(3) A society, corporation, or guild for the promotion and protection of the interests of any trade. When companies are authorized by the State or Government, they are termed corporations.

In military language, the smallest command of a captain of infantry. In the United States a company of infantry (full strength) numbers 100 men. In Europe it varies in strength from 48 rank and file (peace strength) to 120 (as in England), which is the limit of a dismounted officer's command, to 250 (as with the Continental armies), where the captain is mounted. It is formed in three ranks in Germany, in two ranks in other countries, with a supernumerary rank containing the captain, a lieutenant, and the sergeants. In England it forms one-eighth of a war battalion, and has little independent action; on the Continent the company, which is one-fourth of the war battalion, acts almost independently. War strength (English): 3 officers (captain and 2 subalterns), 5 sergeants, 2 drummers, 5 corporals, 113 privates, 1 driver.

Comparative Anatomy, as distinguished from special anatomy; the science which examines and compares the structure of two or more different kinds of animals, so as to discover their points of resemblance and unlikeness; and as such it is a most important department of the science of biology. In this work the articles in the various groups of animals deal with the resemblance and contrasted features of these groups. "Comparative" is used in an analogous sense in connection with philology and physiology.

Compass, an instrument used to indicate the magnetic meridian or the position of objects with respect to that meridian, and employed especially on ships and by surveyors and travelers. Its origin is unknown, but it is supposed to have been brought from

China to Europe about the middle of the 13th century. As now generally used it consists of three parts: namely, the box, the card or fly, and the needle—the latter being the really essential part, and consisting of a small magnet so suspended that it may be able to move freely in a horizontal direction. The box, which contains the card and needle, is, in the case of the common mariner's compass, a circular brass receptacle hung within a wooden one by two concentric rings called gimbals, so fixed by the cross centers to the box that the inner one, or compass-box, shall retain a horizontal position in all motions of the ship. The circular card is divided into 32 equal parts by lines drawn from the center to the circumference, called points or rhumbs; the intervals between the points are also divided into halves and quarters, and the whole circumference into equal parts or degrees, 360 of which complete the circle; and consequently the distance or angle comprehended between any two rhumbs is equal to $11\frac{1}{4}^\circ$.

The four principal are called cardinal points: viz., North, South, East and West. The names of the rest are compounded of these. The needle is a small bar of magnetized steel. It is fixed on the under side of the card, and in the center is placed a conical socket, which is poised on an upright pointed pin fixed in the bottom of the box; so that the card, hanging on the pin, turns freely round its center, and one of the points, by the property of the needle, will always be directed toward the North Pole. The needle, however, is liable to a certain deviation owing to the magnetism of the ship itself, and this is especially strong in iron ships. To obviate this defect Sir William Thomson invented a compass having a number of needles arranged in a particular manner instead of one. In this compass quadrantal errors are corrected by means of two iron globes fixed on opposite sides of the binnacle; while the various components of the ship's magnetic force are neutralized by a series of bar-magnets so arranged as to act as correctors. In the compass used by land-surveyors and others the needle is not fixed to the card, but plays alone, the card being drawn on the bottom of the box.

Compasses, a mathematical instrument used for describing circles, measuring lines, etc. They consist simply of two pointed legs movable on a point or pivot. For describing circles the lower end of one of the legs is removed and its place supplied by a holder for a pencil or pen.—*Hair Compasses* are compasses having a spring tending to keep the legs apart, and a finely-threaded screw by which the spring can be compressed or relaxed with the utmost nicety, and the distance of the legs regulated to a hair's-breadth.—*Bow Compasses* are compasses having the two legs united

Compass Plant

by a bow passing through one of them, the distance between the legs being adjusted by means of a screw and nut.—*Proportional Compasses* are compasses used for reducing or enlarging drawings, having the legs crossing so as to present a pair on each side of a common pivot. By means of a slit in the legs, and the movable pivot, the relative distances between the points at the respective ends may be adjusted at pleasure in the required proportion.

Compass Plant (*Silphium laciniatum*), a plant of the order *Compositæ*. It is called compass-plant because it is said that it presents the edges of its leaves N. and S., while their faces are turned E. and W. It grows freely on our western prairies, where travelers on dark nights are said to feel the edges of the leaves to ascertain the points of the compass when no other means are available for helping them on their way.

Compensation, that which is given or received as an equivalent for services rendered, losses sustained, sufferings endured, or in payment of a debt; amends, remuneration, payment, recompense. When one is sued for a debt, it is competent for him, partially or wholly, to bar the claim by alleging that he is the plaintiff's creditor for services rendered or money lent. If the sum claimed from the plaintiff is found to be the exact equivalent of that for which he sues, the two are held to compensate or balance each other; if, on the contrary, it be less, it diminishes by so much the prosecutor's claim. If, however, the defendant feels that he owes the plaintiff more than that individual is indebted to him, he is required at the outset to pay into court the smaller sum for which he admits himself to be responsible.

Compensation Balance, a balance-wheel for a watch or chronometer, so constructed as to make isochronal (equal time) beats, notwithstanding changes of temperature. This effect is usually attained by having the balance-wheel cut into two segments, the arcs being fixed at one end each. This allows space for the expansion and contraction with no variation in size of the wheel.

Compensation Pendulum, a pendulum constructed of two different metals, as brass and iron, which so work against each other, that the expansion of the one downward is counteracted by that of the other upward. By this arrangement the pendulum does not vary in length, and consequently in frequency of vibration, whatever the temperature may be. Arnold's compensation balance-wheel for chronometers and watches is constructed on a similar principle.

Competition, the act of endeavoring to gain what another endeavors to gain at the same time. In political economy it is simply the form taken by the struggle for ex-

Competition

istence as applied to industry. Formerly, prices and generally the economic relations of men to each other were regulated by custom or authority. The growth of freedom has now brought it about that these relations are determined by individual effort. The general rule is that each man must be responsible for his own economic well-being. The workman brings his labor to the market and gets what he can for it. The capitalist engages labor on the terms most favorable to himself, and sells his produce at such price as it can bring. The owner of land generally takes the highest rent he can obtain. In short, the industrial world is a world of conflicting or competing interests.

As before said, this system of competition is an outcome of modern freedom, and the rise of it may be historically traced. In medieval times the relations of men were fixed by custom or authority. But the restraints of custom and authority were felt to be vexatious, oppressive, and injurious, and in the various spheres of human activity, in religion, politics, and economics, the free individuality of men sought and found wider room to develop itself. This great movement began with the revival of learning, the discovery of America, and the Protestant Reformation and has been continued through the revolutions of the 17th, 18th, and 19th centuries. In the industrial sphere it means that whereas in former times a man's calling, place of residence, and the remuneration of his industry were fixed for him, he is now at liberty to decide them for himself as best he can. Each man is free to do the best he can for himself, but as he finds numerous individuals who exercised the same freedom within a limited field, there arises the prevailing system of competition.

No one conversant with the facts will deny that the system of free competition has been attended with enormous progress, and that it has acted as a powerful stimulus to human energy and the spirit of improvement. But the development of the system has brought with it most important limitations, some of which may be noted. While such a system must always be limited by law and justice and the necessities of political union, legislation has been obliged to provide special safeguards against the evils of competition, notably in the English Factory Acts. The English trades-unions are an attempt to regulate competition in the interest of labor. Employers' combinations have a like object in the interests of the capitalist. In the United States especially the development of "trusts" tends to make competition a dead letter. These trusts are combinations of capitalists with a view to regulating prices. The protective system of countries like

France, Germany, and the United States is intended to maintain native industries against British competition. Lately France and Germany have imposed duties on cereals in order to protect their agriculture against American competition. It should be noted also that even yet custom is largely influential in many spheres, and that not a few of the evils of competition are mitigated by the kindly feeling which prevails in all the relations of life. Employers do not generally bring wages down to the lowest level attainable by competition. Thus in actual experience the competitive system is modified by a great variety of influences. On the other hand, the "sweating system," by which starvation wages are given for long hours of hard work, is rendered possible by the keen competition of many, otherwise unemployed, for such unremunerative labor.

Competition for situations in the public service is very different from the system above described. Competition as applied to the public service is regulated by the state. The salaries in the various grades, and the conditions of employment, are fixed by authority. The chief material stimulus is the hope of promotion.

Compiègne (kōmp-yān'), a quiet and old-fashioned but picturesque town in the French Department of Oise, on the Oise river, a little below its junction with the Aisne, 52 miles N. N. E. of Paris. Of its churches three deserve notice, St. Germain (15th century), St. Antoine (12th century), and St. Jacques (13th century). The hôtel-de-ville is a late Gothic edifice with a fine central belfry. But the chief pride of Compiègne is its palace, built anew by Louis XV., and splendidly fitted up by Napoleon, who often occupied it. Its façade toward the forest is 624 feet long. From the gardens an arbor walk, 1,600 yards long, leads toward the beautiful forest of Compiègne, which was a favorite hunting-ground of many kings of France. It extends to over 30,000 acres, and contains some fine oak timber. The inhabitants of Compiègne manufacture canvas, cordage, and sugar. Compiègne is mentioned in the times of Clovis under the name of *Compendium*. It was at the siege of this town, in 1430, that the Maid of Orleans was captured; and here, in 1810, Napoleon first met Maria Louisa of Austria, on occasion of their marriage. Pop. (1901) 16,503.

Complexion, the term generally used to signify the special color or hue of a person's skin. The human skin, till the time of Malpighi, was supposed to consist only of two parts—the epidermis or outer skin, and the cutis or true skin; but that anatomist, about the middle of the 17th century, discovered between these a cellular texture,

soft and gelatinous, to which the names of rete mucosum, rete Malpighi, or Malpighian tissue, have been given. He demonstrated the existence of this membrane, at first in the tongue and in the inner parts of the hands and feet; but by his subsequent labors, and also by those of Ruysch and other anatomists, it was proved to exist between the epidermis and cutis, in all parts of the human body. Malpighi, on the discovery of this membrane, offered a conjecture respecting the cause of the color of negroes.

Malpighi supposed that this membrane contained a juice or fluid of a black color, from which their blackness arose. The actual existence of a black pigment has been since ascertained. The rete mucosum is of very different colors in different nations; and the difference of its color so completely agrees with the difference of their complexions, that there can be no doubt that it is the sole, or, at least, the principal seat of the color of the human complexion. Its thickness varies in different parts of the body; and the depth of its color for the most part, is in proportion to its thickness. It is now, however, not regarded as altogether a distinct tissue, being considered rather as the innermost and newest layer of the epidermis or cuticle. The black color of the negroes is destroyed by whatever destroys the rete mucosum, as wounds, burns, etc.; the scar remaining white ever afterward.

The greatest contrast in complexion is between the fair white peoples of Northern Europe and the ebony-colored negro of Africa. There are several remarkable instances of the color both of whites and of negroes being either entirely or partially changed, from the operation of causes which cannot be detected or explained. An American girl, whose father was of English, her mother of American birth, and both persons of light complexion, began to change color about the age of puberty, and at the age of 16 presented the appearance as regards color, of a dark mulatto. Latterly she presented the appearance of "a white person whose skin had been covered with a thin coating of lampblack, through which some appearance of the hue of the surface was apparent, with here and there spots from a few lines to a fourth of an inch in diameter which were as black as the skin of an African." A boy who was born in Virginia of black parents continued of his native color till he was three years old; at that period a change of color began to take place, though the health of the boy continued good, and there was no assignable cause for the alteration in his food or mode of life. At first white specks made their appearance on his neck and breast, which soon increased in number and size; from the upper part of his neck down to his knees he was

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completely dappled; his hair was also changed, but not to the same degree, since, though some parts of it were white, in general it retained the black color and crispature of the negro.

The nature and color of the hair seem closely connected with the complexion. In proportion to the thinness of the skin and the fairness of the complexion the hair is soft, fine, and of a white color; this observation holds good not only in the great varieties of the human race, but also in albinos. Next to them in fairness of complexion is the Teutonic race, the *rutilæ comæ* (fair locks) of whom were a distinguishing characteristic even in the time of the Romans. The Celtic peoples are not so fair as the Teutonic, and their hair is darker and less inclined to curl; but it is perhaps more difficult than in the case of the Teutons to be sure of unmixed blood. But though the color of the hair is evidently connected with the complexion, yet its tendency to curl does not appear to be so. Many brown-complexioned Celts have curled hair; the Mongolian and American races, of a much darker complexion, have hair of a darker color, but long and straight. Among that portion of the Malay race which inhabits some of the South Sea Islands, soft and curled hair is said to be met with. The color of the eye is also connected with the complexion. In Africans, Professor Sommering remarks that the white of the eye is not so resplendently white as in Europeans, but rather of a yellowish brown, something similar to what occurs in the jaundice. The iris in the negroes, in general, is of a very dark color; but the iris in the Kongo negro is said to be frequently of a bluish tinge. The Teutonic tribes are not more distinguished by their fair complexion than by their blue eyes (*cærulei oculi*), while the iris of the darker colored Finn is brown and that of the still darker Laplander black. The color of the eyes also follows, in a great degree, in its changes, the variations produced by age in the complexion. Newly born children in Germany, it is stated, have generally blue eyes and light hair, both of which become gradually of a darker hue as the complexion of the individual grows darker; and similar changes are recorded of other peoples. The most singular class of people in point of complexion are the albinos, but albinism is not confined to the human race. An intermediate complexion is produced where children are born from parents of different races. If the offspring of the darkest African and the fairest European intermarry successively with Europeans, in the fourth generation they become white; when the circumstances are reversed, the result is reversed also. Along with the successive changes of complexion is also produced a change in the nature and color of the hair;

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though, in some instances, the woolly hair remains when the complexion has become nearly as fair as that of brown people in Europe. It does not, however, always happen that the offspring is the intermediate color between that of the respective races to which the father and mother belong; it sometimes resembles one parent only, while, perhaps, in the second or third generation, the color of the other parent makes its appearance. An instance has been given of a negress who had twins by an Englishman; one was perfectly black; its hair was short, woolly, and curled; the other was white, with hair resembling that of a European. In another case the child of a black man and an Englishwoman was quite black; and still more remarkable; a black married a white woman, who bore him a daughter, resembling the mother in features, and as fair in all respects, except that the right buttock and thigh were as black as the father's.

The generally received opinion concerning the varieties of complexion which are found in the different races of man throughout the globe is, that they are caused entirely by the influence of climate. Respecting the primary color of man the supporters of this opinion are not agreed. The opinion that climate alone will account for the various complexions of mankind is very plausible, and supported by the well-known facts that in Europe the complexion grows darker as the climate becomes warmer; that the complexion of the French is darker than that of the Germans, while the natives of the S. of France and Germany are darker than those of the N.; that the Italians and Spaniards are darker than the French, and the natives of the S. of Italy and Spain darker than those in the N. The complexion also of the people of Africa and the East Indies is brought forward in support of this opinion; and from these and similar facts the broad and general conclusion is drawn, that the complexion varies in darkness as the heat of the climate increases; and that, therefore, climate alone has produced this variety. But it can be shown that the exceptions to this general rule are very numerous; that people of dark complexions are found in the coldest climates, people of fair complexions in warm climates, people of the same complexion throughout a great diversity of climate, and races differing materially in complexion dwelling near together.

1. In the coldest climates of Europe, Asia, and America we find races of a very dark complexion. The Laplanders have short, black, coarse hair; their skins are swarthy, and the irises of their eyes are black. According to Crantz the Greenlanders have small, black eyes; their body is dark gray all over; their face brown or olive; and their hair coal-black.

The complexion of the Samoyedes and oth-

er tribes who inhabit the N. of Asia is very similar to that of the Laplanders and Greenlanders (who are Eskimos by race). Humboldt's observations on the South American Indians illustrate and confirm the same fact. If climate rendered the complexion of such of these Indians as live under the torrid zone, in the warm and sheltered valleys, of a dark hue, it ought also to render or preserve fair the complexion of such as inhabit the mountainous part of that country; for certainly in point of climate there must be as much difference between the heat of the valleys and of the mountains in South America as there is between the temperatures of Southern and Northern Europe; and yet this author expressly assures us "that the Indians of the torrid zone, who inhabit the most elevated plains of the Cordillera of the Andes, and those who, under the 45th degree of S. latitude, live by fishing among the islands of the archipelago of Chonos, have as coppery a complexion as those who, under a burning climate, cultivate bananas in the narrowest and deepest valley of the equinotial region" ("Political Essay on the Kingdom of New Spain"). He adds, indeed, that the Indians of the mountains are clothed, but he never could observe that those parts which were covered were less dark than those which were exposed to the air. The inhabitants also of Tierra del Fuego, one of the coldest climates in the world, have dark complexions and hair.

2. Fair complexioned races are found in hot climates. Ulloa informs us that the heat of Guayaquil is greater than at Carthage; and by experiment he ascertained the heat of the latter place to be greater than the heat of the hottest day in Paris; and yet in Guayaquil, "notwithstanding the heat of the climate, its natives are not tawny"; indeed they are "so fresh-colored, and so finely-featured, as justly to be styled the handsomest, both in the province of Quito and even in all Peru." According to a statement of Humboldt, in the forests of Guiana, especially near the sources of the Orinoco, "are several tribes of a whitish complexion of whom several robust individuals, exhibiting no symptom of the asthenical malady which characterizes albinos, have the appearance of true Mestizos. Yet these tribes have never mingled with Europeans, and are surrounded with other tribes of a dark brown hue." The inhabitants of Boroa, a tribe in the heart of Araucania, are white, and in their features and complexion very like Europeans. Even in Africa darkness of complexion does not increase with the heat of the climate, in all instances; the existence of comparatively fair races in this quarter of the globe is noticed by Ebn Haukal, an Arabian traveler of the 10th century, and has been confirmed by subsequent travelers.

3. The same complexion is found over immense tracts of country, comprehending all possible varieties of climate. The most striking and decisive instance of this is on the continent of America, all the inhabitants of which, with the exception of the Eskimos, exhibit the copper-colored skin and the long and straight black hair. Australia is an instance of a similar nature, though on a less extensive scale; over the whole of the island, even in the comparatively cool climate of the S. parts, the complexion of its inhabitants is of a deep black, and their hair is curled like that of negroes.

4. Different complexions are found under the same physical latitude, and among the same people. Illustrations and proofs of this have already been given. The physical latitude in which the Norwegians, the Icelanders, the Finns, and the Laplanders live scarcely differs; and yet their complexions, and the color of their eyes and hair, are widely different. There is a great diversity of color and features among the Morlachs, who inhabit Dalmatia. The inhabitants of Kotar, and of the plains of Seigu and Knin, have fair blue eyes, broad face, and flat nose. Those of Duare and Vergoraz on the contrary have dark colored hair; their face is long, their complexion tawny, and their stature tall. M. Sauchez, who traveled among the Tartars in the S. provinces of Russia, describes a race or tribe as having countenances as white and fresh as any in Europe, with large black eyes. In the S. of Africa we find the Kaffirs, who are of a brown or iron-gray color, and the Hottentots of a yellow color. In the island of Madagascar, according to Mr. Sibree, the observer "finds almost every shade of color from a very light olive, not darker than is seen in the peoples of Southern Europe, down through all gradations of brown to a tint, which although not black is certainly very dark. In the quality of the hair, too, there is considerable difference; the lighter colored people having usually long, black, and straight hair, while the darker tribes have, as a rule, shorter and more frizzly hair."

Besides a Malayan olive-colored race, people with the negro complexion and features are found in the Philippine Islands; and in Java the Hindu and Malay character may be clearly traced in the complexion and features of the two classes of inhabitants which are found in that island. In several of the Moluccas is a race of men who are blacker than the rest, with woolly hair, inhabiting the interior hilly parts of the country. The shores of these islands are peopled by another nation, whose individuals are swarthy, with curled long hair. In the interior hilly parts of Formosa the inhabitants are brown, frizzle-haired, and broad-faced; while Chinese occupy the shores.

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It is observed that there are two great varieties of people in the Pacific islands; the one more fair, the other blacker, with their hair just beginning to be woolly and crisp. The first race inhabits Otaheite and the Society Isles, the Marquesas, the Friendly Isles, Easter Island, and New Zealand; the second race peoples New Caledonia, Tanna, and the New Hebrides, especially Mallicolo.

If we should examine the relative situation and latitudes of these islands on a map, we shall be convinced not only that darker complexioned people are found where the climate is comparatively colder, but that the same complexion is found under very different latitudes. It is not meant to be denied that a burning climate will render the complexion very dark, and that a climate of less extreme heat will bronze the complexion of the fairest European; but there are some material points in which the dark complexion of the Caucasian, or naturally fair-skinned variety of mankind, caused by climate, differs from the dark complexion of all the other varieties of the human race.

1. The offspring of the Caucasian variety is born fair; the offspring of the other varieties is born of the respective complexion of their parents. Ulloa informs us that the children born in Guayaquil of Spanish parents are very fair. The same is the case in the West Indies. Long, in his history of Jamaica, expressly affirms "that the children born in England have not, in general, lovelier or more transparent skins than the offspring of white parents in Jamaica." But it may be urged that this is not the case with respect to the other nations of the Caucasian variety, who have been settled in warm climates from time immemorial, and that the question ought to be decided by the Moors, Arabians, etc. Their children, however, are also born fair complexioned, as fair as the children of Europeans who live under a cold climate. Russell informs us that the inhabitants of the country round Aleppo are naturally of a fair complexion, and that women of condition, with proper care, preserve their fair complexion to the last (Russell's "Aleppo"). The children of the Moors, according to Shaw, have the finest complexions of any nation whatsoever; and the testimony of Poirer is directly to the same effect: "The Moors are not naturally black, but are born fair, and when not exposed to the heat of the sun remain fair during their lives."

2. Individuals belonging to the Caucasian variety, that inhabit warm countries, preserve their native fairness of complexion if they are not exposed to the influence of the climate; while there is a uniform black color over all the parts of a negro's body. The hue which Europeans assume is the

Complutensian Polyglot

same, though the tinge may be lighter or darker, whether they settle in Africa, the East Indies, or South America. They do not become, like the natives of those countries, black, olive-colored, or copper-colored; their complexion merely resembles that of a tanned person in the United States, only of a darker tinge. The negroes that are settled in the West Indies or America do not assume the copper color of the Indians, even though a milder climate may have some effect on the darkness of their complexions. The children of Europeans, of negroes, and of Indians are all born, in America, of the same reddish hue; but in a few days those of the negro begin to assume the black complexion of their parents, those of the Indian the copper complexion, while those of the European either continue fair, if kept from the influence of the sun, or become tanned; not black like the negro, or copper-colored like the Indian, if exposed to its influence.

Those Europeans who settle in Canada, or in the N. parts of America, where the climate resembles that of their native country, do not assume the complexion of the Indians, but continue fair like their ancestors. The same observation may be made respecting the Russians who are settled among the Mongolian variety in those parts of the Russian empire in Asia the climate of which resembles the middle or N. parts of European Russia. Indeed the wide extent of country over which the Mongolian variety is spread, including the extreme cold of Lapland and the N. of Asia, the mild temperature of the middle parts of that continent, and the warmth of the S. parts of China, is in itself a proof that dark complexion does not arise either from the influence of heat or cold.

Lastly, radical varieties of complexion are always accompanied with radical varieties of features. We do not find the olive color of the Mongolian variety with the features of the Malay; nor the brown color of the Malay with the features of the Mongolian; nor the black skin of the Ethiopian variety, or the red color of the American Indian united with any set of features but those which characterize their respective varieties. It, however, by no means follows that the hypotheses of different races having been originally formed must be adopted, because climate is not adequate to the protection of the radical varieties of complexion which are found among mankind. Man, as well as animals, has a propensity to form natural varieties; and the variations may in process of time involve all the tissues so as to yield permanent differences in color and quality of hair, color of skin, size and form of bones, especially those of the skull and limbs.

Complutensian Polyglot, a polyglot made by seven scholars under the auspices

and at the expense of Cardinal Ximenes. It was begun in 1502, and finished in 1517, but was not actually published till 1522. It consists of six folio volumes. In the Old Testament, on the left hand page, are the Hebrew original, the Latin Vulgate, and the Greek Septuagint; and on the right hand page, the Vulgate, the Septuagint, with Latin translation above, and the Hebrew, with primitives belonging to that language on the outer margin. At the lower part of the page are two columns used for a Chaldee paraphrase, and a Latin translation. The Greek Testament, constituting part of the Complutensian Polyglott, was the first complete edition of that part of Scripture printed.

Compositæ, an order of plants, founded in 1751 by Linnæus, and adopted in 1763 by Adanson. It contains many plants separated from others by characters so obvious that it still stands with essentially the same limits as those assigned it in the infancy of botany. Lindley altered the name of the order to *Asteraceæ*. De Candolle, Lindley, etc., divided it thus — Sub-order 1, *Tubulifloræ*: Tribe (1) *Vernoniaceæ*, (2) *Eupatoriaceæ*, (3) *Asterioideæ*, (4) *Senecioideæ*, (5) *Cynareæ*. Sub-order 2, *Labiatifloræ*: Tribe (1) *Mutisiaceæ*, (2) *Nassauviaceæ*. Sub-order 3, *Ligulifloræ*: Tribe *Cichoraceæ*. The eight tribes now mentioned were first properly discriminated by Lessing, who showed that each had a different stigma.

Composite Order, a term denoting the last of the five orders of architecture. As its name implies, it is composed of two orders, the Corinthian and the Ionic. Its capital is a vase with two tiers of acanthus leaves, like the Corinthian; but, instead of stalks, the shoots appear small, and adhere to the vase, bending round toward the middle of the face of the capital; the vase is terminated by a fillet, over which is an astragal crowned by an ovolo. The volutes roll themselves over the ovolo, to meet the tops or the upper row of leaves, whereon they seem to rest. The corners of the abacus are supported by an acanthus leaf bent upward; and the abacus itself resembles that of the Corinthian capital. In detail, the Composite is richer than the Corinthian, but it is less light and delicate in its proportions. Its architrave has only two fasciæ, and the cornice varies from the Corinthian in having double modillions. The column is 10 diameters high. The principal ancient examples of this order are the temple of Bacchus at Rome, the arch of Septimius Severus, that of Titus, and the baths of Diocletian.

Composition, an arrangement which a bankrupt or person in pecuniary difficulties makes with his creditors, and by which he

arranges to pay them a certain proportion only of the debts due.

Composition of Forces and Motions, in mechanics, the union or assemblage of several forces or motions that are oblique to one another, into an equivalent force or motion in another direction. Thus two forces acting in the directions of the adjacent sides of a parallelogram, compose one force acting in the direction of the diagonal, and if the length of the adjacent sides represent also the magnitudes of the forces, the diagonal will represent the magnitude of the compound force or resultant.

Compostella, Order of St. James of, an order of Spanish knights formed in the 12th century to protect the Christian pilgrims who flocked in vast numbers to Santiago-de-Compostella, where the relics of St. James were preserved. In time they attained great wealth, thereby exciting the jealousy of the crown, which succeeded in securing the grand-mastership in 1522, whereupon the order rapidly declined.

Composts, in agriculture, are mixtures of various fertilizing substances.

Compound Animal, an animal which, originally simple, develops into a few or many others, which retain physical connection with the parent instead of being sooner or later detached in the normal way.

Compound Fracture, a fracture in which the bone is broken and the surrounding integuments have been pierced, making a wound from the external surface to the seat of the fracture. Thus where a gunshot breaks a bone the fracture is compound; or if the ends of the broken bones are forced through surrounding tissue to the surface, it is likewise a compound fracture.

Compounding of Felony, the accepting of a consideration for forbearing to prosecute; or the agreeing to receive one's goods again from a thief on condition of not prosecuting. This is an offence punishable by fine and imprisonment.

Compound Spirits, rectified spirits to which has been added one or more flavoring ingredients. They are called also compounds. The chief compounds are gin, British rum, British brandy, and some grades of American whisky. Cordials and liquors, such as curacoa, lovage, cherry brandy, Noyeau, rum shrub, etc., are also denominated compounds. These are prepared by adding to clean rectified spirits various essences or oils, and sweetening with sugar or syrup. Sweetened compounds usually contain from 20 to 35 per cent. of proof spirit.

Compound Steam-engine, a form of steam-engine originally patented by Hornblower in 1781, in which steam at a rela-

tively greater pressure was allowed to expand in a small cylinder, and then, escaping into a larger cylinder, to expand itself against a larger piston. Compound engines are of two classes, which may be called compound and independent compound engines. The former are those in which the cylinders are near each other, and the pistons commence their respective strokes simultaneously or nearly so, the steam expanding from one cylinder direct to the other through as small a passage as convenient. To this class belong most land engines, and the compound marine with cranks at about 130°.

Compressed Air, atmospheric air compressed by means of pumps, etc., and used in driving stationary and locomotive engines and excavating machines; as also in working pneumatic dispatch-tubes, railway-brakes, etc. The use of compressed air by railroads began with the introduction of the Westinghouse air brake on passenger trains, about 1869. See BRAKE, AIR.

A few years later the Denver & Rio Grande, the Union Pacific and the Central Pacific railroads began equipping freight cars with the air brake. For some time sleeping cars have used compressed air to force water from a tank under the car to the wash bowls in the toilet rooms. The train signal is operated by compressed air; pulling the bell cord in any of the cars blows a small whistle in the locomotive cab. Automatic bell ringers on the locomotives are run by compressed air. It has also been applied to shake the grates in the fire-box of a locomotive, and to open and close the furnace door.

For some years railroad crossing gates have been raised and lowered by it, the air being supplied by a hand pump operated by the crossing watchman. Previous to 1890 it was used to a very limited extent about railroad shops. At some of the shops of railroads having freight cars equipped with air brakes, the repair yards had a pipe line to convey air to be used in testing air brakes in the freight cars. It had been used to force couplings into the air brake hose. A few shops had air jacks for raising freight and passenger cars. Air was furnished by locomotive air pumps, and the limited amount supplied by each pump prevented a very rapid increase in the use of compressed air appliances.

In 1891 its first application to car work was in cleaning the dust from the window sashes and blinds in coaches, and such parts of the inside that a duster could not reach. A round nozzle with a small opening was first used. This led to the use of a flat nozzle about two inches wide for cleaning cushions, seat backs, carpets, blankets and bedding. The sleeping car companies recognized its superiority for cleaning cars, and are using it very exten-

sively. As its value in shops began to be appreciated, and the demand made by increased use exceeded that which air pumps could supply without an extravagant waste of fuel, air compressors were added to give an increased supply of air. This opened a new field for the use of compressed air. Pneumatic hoists began to replace chain hoists at all the heavy machines in the shops, driving wheel lathes were equipped to handle drivers in and out of the lathe, cranes were located in the yards for loading and unloading material, and in each instance a large saving of labor and time was effected.

The introduction of compressed air in shop practice has brought out by the shops themselves and by tool manufacturers a number of very useful and valuable tools, — pneumatic drills, hammers, riveters, punches, and machines especially designed for boiler work. The pneumatic drill performs a very important part in the construction of new or the repair of old boilers. All the stay bolt holes in the fire-box are tapped out with it, the same machine screws in the stay bolts, another machine cuts off the end, and you can rivet them over with a pneumatic hammer. The pneumatic drill has almost entirely displaced the flexible shaft, and in some shops a ratchet drill is rarely seen about a locomotive undergoing repairs. It is now considered an indispensable tool for fastening the flues in a locomotive boiler. Air can be led to and run a number of machines where light power is required. The pneumatic hammer is used for chipping and caulking the seams of a boiler, beading over the ends of flues, chipping castings and driving rivets. The pneumatic riveter is made either stationary or portable, and for all varieties of work, such as riveting locomotive boilers or locomotive tanks. Portable riveters are used for riveting locomotive mud rings, or car and tender trucks. Tools for doing special kinds of work have been invented in a number of railroad shops. Jacks for raising passenger and freight cars, and raising locomotives; machines for pulling down draft timbers from the car sills; shears for cutting off bolts, hammers for straightening bolts (the latter machine is usually located at the scrap pile); the sand blast for taking old paint from locomotive tanks; a machine for sandpapering the outside surface of a passenger car; a machine for driving emery wheels on the principle of the Pelton water wheel; small engines which can be used for a great variety of purposes, and which can run almost any machine in the shop when the stationary engine is not running. Also a small portable forge for heating rivets or light blacksmith work; a machine for cutting out and stamping galvanized

Compressed Air

iron and tinware; and a press for forcing brasses into driving boxes.

Aside from the number of useful tools compressed air has brought into service, it has been used in a number of ways in place of hand and steam power. A whitewashing machine run by air does better work than a man with a brush, and can do as much work in 10 hours as 30 men can do. It is also used for painting buildings and freight cars. Also for elevating sand from the ground through a pipe to the top of a sand house, where the sand is delivered to the sand box of a locomotive through a spout, like water is delivered from a tank to the locomotive tender. Compressed air is also used in connection with gas for burning paint off coaches. It is sometimes introduced into a barrel or a tank through a coil of gas pipe, for the purpose of mixing paint. It is used for kindling fires in locomotives with oil fuel; elevating oil from tanks; elevating water; running transfer tables; copying letters; blowing out the steam passages in locomotive cylinders. Also, by filling a locomotive boiler with air at 100 pounds pressure, the engine can be run out of the machine shop with the compressed air, instead of firing up the engine and using steam. It is used in connection with shears for cutting sheet iron; and for operating hammers in blacksmith shops for straightening rods and bolts. A number of railway shops are well equipped with pneumatic tools, and it may be said the use of compressed air on railways will in the near future perform a large share of the work done by hand labor and steam.

The pneumatic mail-tube dispatch system is familiar to most readers, but the fact that previous to 1894 it was practically unknown in the United States, and that since then we have made swifter strides in that field than Europe, may not be generally known. When, in 1893, John Wanamaker, as Postmaster-General, opened the first pneumatic mail-tube line, extending from the postoffice to the house in Philadelphia, the start was made on entirely new lines. While to this day in Europe they are using little 2 and 3-inch tubes for telegrams only, in the United States the mail-tube industry has developed so fast that even 8-inch tubes, with cartridges carrying 600 letters, are in successful operation in our large cities. The longest circuit ever made in the world up to 1900 was the main line laid in New York city, from the terminal postoffice to the Grand Central branch postoffice, a distance of 3½ miles. This is an 8-inch tube circuit. The cartridges travel at tremendous speed, the time of transit consumed in dispatching in either direction being only 7 minutes. A total of 17 miles of 8-inch tubes was laid underground in the United States between Aug. 1, 1898, and Nov. 1, 1899,

Comstock Lode

which shows the rapid increase of the system.

Compressibility, the quality or condition of being compressible; capability of compression; the property in virtue of which the volume of a body may be diminished by pressure. It is produced by its porosity. The most compressible bodies are gases, which may be reduced in this way to 10, 20, or even 100 times as little space as they previously occupied. If, however, very great pressure be applied, the tendency is for the gas to become fluid. Liquids were long thought to be incompressible, which is not accurate. Solids vary greatly in compressibility; india-rubber, cork, ivory balls, etc., are very compressible.

Comptometer, a calculating machine that is operated by a key-board in the manner of a typewriter. It consists of a box entirely enclosing the mechanism, with the operating keys projecting from the box in typewriter fashion. Along the front edge of the box are openings in which numbers appear, and above these openings are pointers. The keys are 72 in number, and each has two figures painted on it. One is a large black figure and the other a small red one. The black ones indicate the keys that are to be struck in addition and multiplication, and the red ones those to be struck in division and subtraction. The successful operation of the machine depends upon the practice of the operator in the same manner that efficiency of the typewriter depends upon the amount of practice that the operator has had. No proficiency in mathematics is required on the part of the operator; anyone skilled in handling the keys can rattle away at the comptometer as confidently as if he were writing letters on a typewriter, and all the time be adding up large sums or dividing millions by thousands without any of the laborious thinking usually required of the mathematician, the bookkeeper and the accountant.

Compurgation, a mode of defense allowed by the Anglo-Saxon law in England, and common to most of the Teutonic tribes. The accused was permitted to call a certain number (usually 12) of men, called compurgators, who joined their oaths to his in testimony to his innocence. They were persons taken from the neighborhood, or otherwise known to the accused, and acted rather in the character of jurymen than that of witnesses, for they swore to their belief, not to what they knew; that is, on the accused making oath of his innocence they swore that they believed he was speaking the truth. Compurgation in the ecclesiastical courts was not abolished till the reign of Elizabeth.

Comstock Lode, a large and extremely rich metallic lode in the W. part of Nevada,

on the E. slope of the Virginia mountains. To it belong the Big Bonanza and other mines, which have yielded gold and silver to the value of over \$300,000,000.

Comte, Isidore Auguste Marie François Xavier, a French philosopher; born in Montpellier Jan. 12, 1798. He was educated at the École Polytechnique, and embraced enthusiastically the socialist tenets of St. Simon, which became greatly in vogue in France after the restoration. As one of his most distinguished pupils, he was employed in 1820 to draw up a formula of the doctrines professed by the St. Simonian school, which he accordingly accomplished in his "*Système de Politique Positive*." This work did not, however, meet with the entire approbation of St. Simon, who asserted that Comte had made a very important omission by overlooking the religious or sentimental part of human nature. In 1826 he commenced a course of lectures on mathematics, and had for an audience such men as Humboldt, Blainville, Carnot, etc. In 1830 he commenced the publication of his "*Cours de Philosophie Positive*," which was completed in six volumes in 1842, and was freely translated into English and condensed by Harriet Martineau.

The following is an abstract of the philosophical system propounded by Comte in that work. It consists of three leading positions. The first is that the human mind in its progress, historically and individually, passes through three stages of development: (1) The theological, in which all the phenomena of nature are imputed to the active agency of the gods. (2) The metaphysical, in which the gods are supplanted by certain abstractions called "nature," "harmony," "number," etc. (3) The positive or scientific, in which it is discerned that man can know nothing of causes, and is only able to refer phenomena to their general laws of existence or succession. Arrived at this stage, science is born, and knowledge, no longer baffled by the inscrutable or misled by the imaginary, advances from one generalization to another, to a comprehensive perception of the universe as a whole. The second position is that in this advance the mind proceeds in a regular hierarchical order, from the simple to the complex, or from the most elementary relations of numbers to the highest and deepest complications of society and life. The hierarchical order of the sciences is arranged by Comte as follows: (1) The most general and simple of all, dealing only with numbers and magnitudes—mathematics. (2) The application of the principles of mathematics to the phenomena of the celestial sphere, or astronomy. (3) The application of mathematics and astronomy to the phenomena of the terrestrial sphere or general physics, including heat,

light, optics, electricity, etc. (4) The science of the phenomena of individual organized being, or vegetable and animal life, termed biology. (5) The science of the phenomena of corporate or social life, which he terms sociology, and which, as presupposing and containing all the former, he represents as the essence and perfection of all the sciences. The third position lays down the laws and principles which regulate social life, constituting order and liberty. The first element of order is the family; the second the community, composed not of individuals but of families, and co-operating, to a certain extent, in their employment; and the third, the government or State. Liberty is the effect of this harmonious organization, and progress the development of it, by the conquest—(1) of material nature; (2) of the lower propensities by the higher intellectual faculties; and lastly, of the selfish passions by the noblest social affections.

In 1832 he became one of the professors at the École Polytechnique. In 1848 he published a mathematical work, entitled "*Traité Élémentaire de Géométrie Analytique*"; and in 1848 a "*Discours sur l'Ensemble du Positivisme*," in which the doctrines laid down in his previous work are recapitulated. But some change had, in the interval, taken place in Comte's views. The religious tendencies of the heart had been hitherto wholly overlooked by him, and he now perceived the necessity of presenting some object to supply this want. He invented a religion which consists in referring the whole harmony of existence to, and concentrating its essence in one great Being, whom he termed Humanity. This system is propounded by him in a book published in 1849, entitled "*Culte Systematique de l'Humanité; Calendrier Positiviste, ou Système Général de Commemoration Publique*," in which he has drawn up a regular calendar of demigods, presiding over the months, weeks, and days of the year, and having each their appropriate festivals. The thirteen months into which he divided the year he called Moses, Homer, Aristotle, Archimedes, Cæsar, St. Paul, Charlemagne, Dante, Gutenberg, Shakespeare, Descartes, Frederick, and Bichat. He himself assumed the office of high priest of this new religion, performing marriages and funeral rites on behalf of his disciples.

Some disagreements with his brother professors at the École Polytechnique led to his losing his chair there, and latterly he became entirely dependent on the generosity of sympathizers such as John Stuart Mill, Grote, Littré, and others. The last work published by him was entitled "*Système de Politique Positive, ou Traité de Sociologie, instituant la Religion de l'Humanité*," issued in 1851–1852. He died in Paris Sept. 5, 1857.

Conant, Thomas, a Canadian descriptive writer; born in Oshawa, Ont., April 15, 1842. He was educated in the public schools and at Eddystone Seminary in Geneva, N. Y., and has achieved distinction with brilliant sketches of scenery and articles on Canadian and other subjects. In 1896 he visited Australia, India, and the Orient.

Conaty, Thomas James, an American clergyman; born in Ireland, Aug. 1, 1847. He was graduated at Montreal Theological School and ordained a Roman Catholic priest in 1872, and from 1880 to 1897 was pastor of the Church of the Sacred Heart and from 1893 to 1897 president of the Catholic Summer School. In 1896 he was made rector of the Catholic University of America, in Washington, D. C., and on Nov. 24, 1901, he was consecrated titular bishop of Samos. He has written and lectured much on Roman Catholic education.

Conception, in physiology, the first formation of the embryo of an animal; the first animation of the ovum at the moment when it escapes from the ovarium, passing through the Fallopian tube to the uterus.

In mental philosophy:

(1) The cognition of classes, as distinguished from individuals; that special application of abstraction, comparison, and attention which elaborates what logicians call notions or concepts; the acts of the mind in producing concepts or notions.

(2) The notions or concepts so produced; the "general" or "abstract ideas" of Locke; the "abstract general notions" of Hamilton. These are properly expressed by common terms, and constitute the object of study in pure or formal logic. The number of attributes embraced in a concept or notion constitutes its intention, comprehension, or logical content, and this determines its area or sphere of applicability, that is, its extension or logical extent. These two quantities exist in an inverse ratio to one another. The maximum of the extent of a conception or notion is the minimum of the content, and the maximum of the content is the minimum of the extent. On this single maxim pure or formal logic has been based. Dugald Stewart used conception as equivalent to reproductive imagination, and Reid used it as convertible with imagining, understanding, or comprehending.

Conception, Immaculate, in the Roman Catholic Church, the doctrine that the Virgin Mary was born without the stain of original sin. This doctrine came into favor in the 12th century, when, however, it was opposed by St. Bernard, and it afterward became a subject of vehement controversy between the Scotists, who supported, and the Thomists, who opposed it. In 1708 Clement XI. appointed a festival to be celebrated throughout the Church in honor

of the immaculate conception. Since that time it was received in the Roman Church as an opinion, but not as an article of faith till 1854, when the Pope issued a bull which makes the immaculate conception a point of faith.

Conception of Our Lady, an order of nuns, founded in Portugal in 1484 by Beatrix de Sylva, in honor of the immaculate conception. It was confirmed in 1489 by Pope Innocent VIII. In 1489 Cardinal Ximenes put the nuns under the direction of the Franciscans, and imposed on them the rule of St. Clara. The order subsequently spread into Italy and France.

Conceptualism, the distinctive speculative opinion, or opinions, of the conceptualists.

Conceptualist, a metaphysical sect — if, indeed, it has coherence enough to be called a sect — which arose in the Middle Ages during the disputes between the Nominalists and the Realists. It sought to occupy an intermediate position between the two contending parties, but it approximated much more nearly to the Nominalists than to the Realists; perhaps, indeed, it was not really distinct from the former. The Realists held that general ideas, such as genus, species, etc., called in the language of the schoolmen universals, are real existences, at least in the Divine mind; the Nominalists, on the contrary, contended that they were mere names or words, while the Conceptualists held that they were not only names, but mental conceptions or ideas. The Conceptualists were not able to make their voice very audible in Mediæval times amid the din of battle between the greater combatants, but the eminent metaphysician, Locke, held views essentially conceptualist.

Concert, an entertainment in which a number of persons or instruments, or both, take part. A concert or consort of viols in the 15th and 16th centuries was a quartet or other number of stringed instruments performing in concert. Concerts of music to which the public are admitted by payment are of comparatively recent origin in the history of music. The advertisement of the first London concert runs as follows: "These are to give notice that at Mr. John Barrister's house (now called the Music School), over against the "George" Tavern, in White Fryers, this present Monday, will be music performed by excellent masters, beginning precisely at 4 of the clock in the afternoon, and every afternoon for the future, precisely at the same hour."—London "Gazette," Dec. 30, 1672. The first concerts known to have taken place were performed at Vicenza by the Filarmonici in 1565. There was a subscription concert at

Concertina

Oxford in 1665. The first in London was the one mentioned by Stainer and Barrett as taking place in 1672, but they did not become an institution of the metropolis till the rise of the Academy of Ancient Music in 1710. In modern times almost every city in the world has its musical associations, which at stated intervals entertain the public with concerts. The most noted in the United States are those given in Boston, New York, Chicago, Baltimore, Cincinnati, and St. Louis, by the associations for advanced musical culture in those cities, led by such men as Thomas, Damosch, DeKoven, Sousa, and others.

Concertina, a musical instrument invented by Professor Wheatstone, the principle of which is similar to that of the accordion. It is composed of a bellows, with two faces or ends, generally polygonal in shape, on which are placed the various stops or studs, by the action of which air is admitted to the free metallic reeds which produce the sounds. In the English concertina the compass is three octaves and three notes.

Concerto, a composition for the display of the qualities of some especial instrument, accompanied by others of a similar or dissimilar character. A concerto may be for a solo violin, or violoncello with an accompaniment for strings, or wind; or it may be for a pianoforte, violin, or any wind instrument, and a full band. The word is at the present time usually applied to a composition for a solo instrument accompanied by full orchestra, as opposed to a sonata, in which the soloist is unaccompanied by other instruments, or only supported by the pianoforte. In earlier times the term had a much wider application.

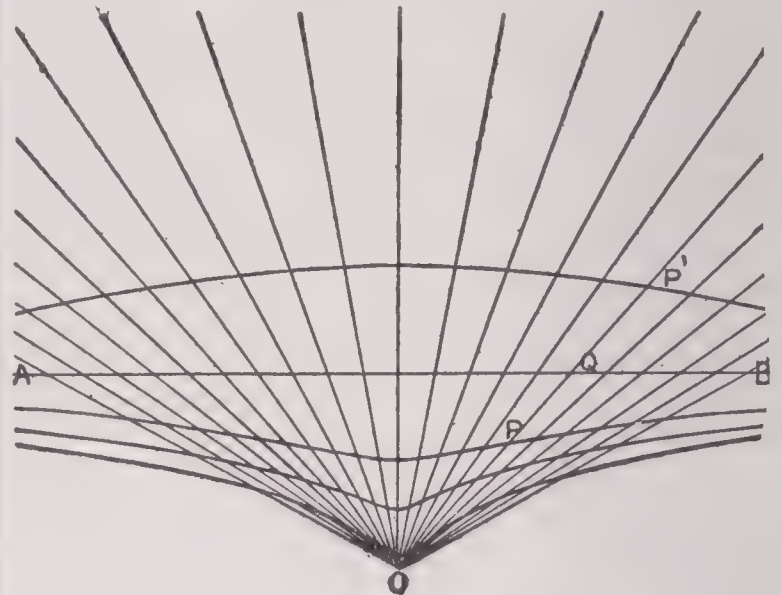
Conch, a marine shell, especially of the *Strombus gigas*; and, in art, a spiral shell used by the Tritons as a trumpet, and still used by some African people in war. The native whites of the Bahamas are called "Conchs" from the commonness of the shells on their coasts.

Conchifera (kōn-kif'e-ra), Lamarck's name for that large class of acephalous mollusks which have shells consisting of two pieces, commonly known as *bivalves* (oyster, mussel, etc.).

Conchoid, a curve invented by Nicomedes in the 2d century A. D., and used by him for finding two mean proportionals. If a straight line always passes through a fixed point *o*, and a point *Q*, fixed into the revolving line, always moves along the line *AB*, then any point *P* in the revolving line always at the same distance from *o* will trace out a conchoid. And, since the length *QP* can in any position of the revolving line be measured either toward or from *o*, it is evident that, corresponding to

Conchology

any given length assigned to *QP*, two conchoids can be described, one above and the other below the line *AB*. These are known as superior and inferior conchoids. Moreover, with a given point *o*, and a given straight line *AB*, any number of pairs of different conchoids can be described by varying the length *QP*. Moreover, the



CONCHOID.

shapes of all such curves will vary according to the length of *QP*. Thus, if *QP* is less than the perpendicular from *o* on *AB*, the shape is as given in the adjoining figure, and this isolated point *o* is also a point on the curve.

Conchology, the science of shells. Two well-marked stages in its development are traceable. At first shells were studied without any reference to the animals of which they constituted the hard framework or skeleton. Subsequently the study took a wider scope, and for the first time became worthy of being called a science, when the animals and their shells were viewed as parts of one common whole. When shells were looked upon as little more than ornamental objects, those who studied conchology were not generally of a high order of intellect; but since the rise of geology and the discovery that, of all fossils, shells are able to furnish the most definite information regarding the several strata, and consequently regarding the history of bygone times, scientific minds of the very first class have given keen attention to shells. Some of these belonging to land animals, others to those inhabiting fresh water, and the great majority to those which are marine, the fossil shells in a stratum constantly enable the geologist to ascertain whether a stratum is the remains of a land surface, or a deposit from fresh water, or the bed of a sea. Particular genera and species flourish at certain fixed depths, and when the geologist finds analogous fossil shells, he is

able, startling as it may appear, within certain limits to sound the depths at particular spots of a primeval and now long departed sea.

When shells, and they alone, were studied, conchology was a not unsuitable name, except that the termination -ology suggested that the investigation was more scientific than in most cases it really was. When the animals came to be carefully examined, M. de Blainville proposed for this deeper study the name malacozoölogy — *i. e.*, the study of the softer animals — *viz.*, mollusks; this has been since abbreviated into malacology. As each of the terms conchology and malacology refers to only half the inquiry, we have avoided both, and, unless in exceptional cases, described mollusks and their shells under the vague heading zoölogy.

Conciergerie, La (*kôn-syärzh-rě'*), a noted prison in Paris, which was a part of the Palais de Justice. Many royal prisoners were there confined, and during the Reign of Terror it was the scene of fearful butcheries, 328 prisoners being put to death in one week. Marie Antoinette went from her cell in this prison to her execution.

Concini, Concino. See ANCRE, BARON DE LUSSIGNY, MARQUIS D'.

Conclave, the place where the cardinals assemble for the election of the Pope; also the electoral assembly of the cardinals themselves. Pope Gregory X., whose election had been delayed for three years, established in the council at Lyons (1274) the regulations of the conclave. The cardinals are shut up together in a particular suite of apartments in the palace where the pontiff dies, and they are supposed to have no communication with the outside world during the period of the election. The companion, either lay or clerical, whom the cardinal is allowed to take with him into the conclave during the election of a Pope is called a conclavist. The office is one of great delicacy and trust.

Concord, in music, the combination of two or more sounds pleasing to the ear. Concords are the octave, the fifth, third, and sixth. The two first are called perfect, because as concords they are not liable to any alteration by sharps or flats. The two last are called imperfect, as being alterable.

Concord, a town of Middlesex county, Mass.; on the Concord river and the Boston and Maine railroad; 20 miles W. of Boston. It is situated in a beautiful rural district, and has several manufacturing establishments. It was for many years the seat of the famous Concord School of Philosophy, and is the site of the Concord State Reformatory. It has a public li-

brary, high school, a National bank, and an assessed property valuation of \$4,000,000. During the early part of the Revolution the Americans had a large stock of arms and military stores at Concord. Gen. Gage, the British Commander in Boston, hearing of this, sent a body of soldiers to destroy these stores, and on their way they fought the battle of Lexington, the first of the war. When they reached Concord they destroyed what stores they could find, but were soon driven off by the Americans (April 19, 1775). Concord is celebrated as the home of many famous writers, among them Emerson, Hawthorne, Thoreau, and Miss Alcott. Pop. (1890) 4,427; (1900) 5,652; (1910) 6,421.

Concord, a city, capital of the State of New Hampshire, and county-seat of Merrimac county; on the Merrimac river and several branches of the Boston and Maine railroad; 75 miles N. W. of Boston.

Business Interests.—Concord has an abundance of water power supplied by nearby streams, and extensive manufactories of carriages, shoes, twine, electrical apparatus, silverware, leather goods, machine shop products, etc., employing over 2,000 persons. Near the city are extensive quarries of a fine-grained white granite. There are three National banks with a combined capital of \$500,000, and a surplus of \$300,000, and several private banking houses. The assessed property valuation in 1900 exceeded \$20,000,000.

Public Interests.—The city is well laid out with finely shaded streets, is lighted by gas and electricity, and has an extensive waterworks plant. The noteworthy buildings include the State Capitol, a fine building of Concord granite, the City Hall and Court House, the State Prison, State Insane Asylum, and the United States Government buildings. At the end of the school year 1897-1898 there were 16 public schools, with 2,487 pupils and 55 teachers, and public school property valued at \$325,000. There were also a public high school, St. Mary's school, and St. Paul's school for higher instruction.

History.—Concord was settled by the whites in 1725, on the site of an Indian village, but till 1765 it was called Rumford. It became a city in 1853. It is noted as the place where Hannah Dustin, another woman, and a boy, who had been taken captive by Indians at Haverhill, Mass., killed the 10 Indians, when asleep, with hatchets, and so escaped. Pop. (1900) 19,632; (1910) 21,497.

Concord, The, a twin-screw, steel gunboat of the United States navy; 1,710 tons displacement; length, 230 feet; breadth, 36 feet; mean draft, 14 feet; horsepower, 3,405; armament, main battery, six 6-inch

breech-loading rifles; secondary battery, two 6-pounder and two 3-pounder rapid-fire guns, two 37-millimeter Hotchkiss revolving cannons and two Gatlings; speed, 16.8 knots; crew, 13 officers and 180 men, cost, \$490,000. The "Concord" was with Dewey's fleet in the engagement with the Spaniards at Manila, May 1, 1898.

Concordance, a book of reference in which all the words existing in a particular version of the Bible are arranged alphabetically — part of the verse being extracted with each, so that if one remember a notable word in any part of the Bible he may find, with scarcely any expenditure of time, where it occurs. A similar work may be constructed to enable students to find where each Hebrew word occurs in the Old Testament, or each Greek one in the New Testament or in the Septuagint. The first known Concordance of the Bible in any language was that of St. Anthony of Padua, who was born in 1195, and died in 1231. His work was called "*Concordantiæ Morales*," and was of the Latin Vulgate. It formed the basis of a more elaborate concordance, also of the Vulgate, that of Hugo de Santo Caro, better known as Cardinal Hugo. This was published in A. D. 1244. The first Hebrew Concordance was that of Rabbi Mordecai Nathan, commenced in 1438 and finished in 1448. The first Greek Concordance to the New Testament was that of Xystus Betuleius, whose real name was Birck; it came forth in A. D. 1546. The first English Concordance to the New Testament was that of Thomas Gybson, before A. D. 1540; the first to the whole English version of the Bible that of Marbeck, A. D. 1550. These, of course, preceded the appearance in A. D. 1611 of the authorized version of the Bible. The elaborate and well-known work of Cruden appeared first in 1737.

In the same sense the work is constructed to facilitate reference to some other book than the Bible. The first known Concordance to Shakespeare was that of Ayscough, in 1790. Mrs. Cowden Clarke's elaborate and most useful work first appeared in 1847. A Concordance to Milton was published in Madras in 1856 and 1857, and one to Tennyson in London in 1870.

Concordat, a compact, a convention, or an agreement entered into between the Pope and a sovereign prince or a government for regulating the affairs of the Church within the kingdom. A concordat between Pope Calixtus II. and the Emperor Henry V. of Germany was agreed on in 1122, which terminated the fierce controversy about investitures, and still to a certain extent regulates the affairs of the Roman Catholic Church in Germany. In 1516 a concordat took place between Pope

Leo X. and Francis I., King of France, by which the Chapters were deprived of the right which they had formerly enjoyed of electing the bishops of the several sees. After much delay and royal importunity the French Parliament reluctantly registered this surrender of privilege on March 15, 1518. Omitting less interesting concordats, a celebrated one took place on July 15, 1801, between Pope Pius VII., acting through Cardinal Consalvi, and Napoleon Bonaparte (abrogated, 1906). This engagement reestablished the Papal authority in France, but not within its former limits; for it placed the clergy, in temporal and even in some spiritual matters, under the jurisdiction of the civil power. Other concordats with the French government were on Jan. 25, 1813, and Nov. 22, 1817. On Aug. 18, 1835, a concordat concluded between Pope Pius IX. and the Emperor Francis Joseph I. of Austria considerably increased the legal power of the Papacy in that empire; but, exciting much dissatisfaction, it was virtually abolished in 1868. There have been concordats with various other Roman Catholic governments.

Concordia, a goddess, to whom many temples were built at Rome; she typified the good results of the compact between the patricians and the plebeian classes.

Concordia, a town of the Argentine State of Entre Rios, on the Uruguay, 302 miles N. of Buenos Ayres by river. It has a custom house and a river-trade exceeded only by that of Buenos Ayres and Rosario, exporting salted meat and Paraguay tea. It has railway connection with Paraná, Uruguay, and South Brazil.

Concordia, College, an educational institution in Fort Wayne, Ind.; organized in 1839, under the auspices of the Lutheran Church; reported at the end of 1899: Professors and instructors, 8; students, 169; volumes in the library, 4,310; grounds and buildings valued at \$100,000; income, \$12,400; number of graduates, 754; president, Joseph Schmidt, A. M.

Concrete, a technical term in logic, applied to an object as it exists in nature, invested with all its attributes, or to the notion of such an object. Concrete is opposite to abstract. The names of individuals are concrete; those of classes, abstract. A concrete name is a name which stands for a thing; an abstract name is a name which stands for the attribute of a thing.

Concrete, a composition used in building, consisting of hydraulic or other mortar mixed with gravel or stone chippings about the size of a nut. It is used extensively in building under water, for example, to form the bottom of a canal or sluice, or the foundation of any structure raised in the sea; and it is also frequently used to make

Concretion

a bed for asphalt pavements, or to form foundations for buildings of any kind. It is sometimes even used as the material with which the walls of houses are built, the concrete being firmly rammed into moulds of the requisite shape, and then allowed to set.

Concretion, in medicine, a formation of solid, unorganized masses within the body, either by chemical precipitation from the fluids, or by the accidental aggregation of solids introduced into the system from without. In the former case a concretion is termed a calculus; in the latter the concretion may be either wholly composed of solids foreign to the body, or these may be mingled with the elements of the secretions, as with mucus or calculous matter. Thus beans, peas, needles, introduced into the cavities of the body, have become the nuclei of concretions, by attracting around them mucus, or crystalline deposits from the urine. The most remarkable forms of concretion, however, are perhaps those formed in the stomach and intestines of man and the lower animals, from the more solid and indigestible parts of the food, or of substances improperly swallowed. Thus, young women have been known to acquire the habit of swallowing their own hair to a great extent; and very large concretions have been thus formed, which have proved fatal by obstructing the passage of food. The use of oatmeal in large amount has also been found to lead to concretions, especially when eaten coarsely ground and unboiled; such concretions have commonly been found in the intestines. The excessive domestic use of magnesia in the solid form as a laxative has been known to have a similar effect. In certain animals, intestinal concretions are not uncommon, and grow to an immense size; they used to be greatly prized as antidotes, and were used in medicine under the name of Bezoars. In certain forms of morbid deposits, such as fibrous tumors and in tubercle, concretions not unfrequently form; they are for the most part composed of phosphate of lime.

Concretionary Structure, a condition in rocks produced by molecular aggregation subsequent to the deposition of the strata, whereby the material of the rock is formed into spherules or balls, as in the concretions of magnesian limestone and the somewhat similar structures occasionally seen in certain tuffs and crystalline igneous rocks. Concretions are nodules, balls, or irregular masses of various kinds which occur scattered through the body of a rock, and consist of mineral matter which was formerly diffused through the material of the rock. Some of these concretions are crystalline, as gypsum in clay; others may be spherical, and have an internal radiating structure, as iron pyrites in shale. Fantastically

Concussion of the Brain

shaped concretions are not uncommon in certain fine clays; such are the "fairy-stones" of the country people here, and the "lösspuppen" of Germany.

Concubinage, the act or state of living with one of the opposite sex without being legally married. Concubinage was tolerated among the patriarchs (Gen. xxv: 6) and by the Mosaic law (Exod. xxi: 9-12; Deut. xx: 14), and was largely practiced by Solomon (I Kings xi: 3). It was tolerated also among most if not all other Oriental nations, as well as among the Greeks and the Romans to the time of Constantine. The last-named emperor, justly believing that Christianity allowed only marriage and not concubinage (Mark x: 4, 5; Cor. vii: 1; I Tim. iii: 2), rendered the practice illegal. The clergy of the 3d, 10th, 11th and other centuries were charged with what is often called concubinage, but in many cases the relations between celibate clergy and monks on the one hand and women living in their houses were not what is generally understood by concubinage. The laws of the various States of the United States generally sanction only proper marriage; but on the Continent of Europe morganatic or left-handed marriages sometimes contracted by royal personages are essentially the same as the concubinage of the old Romans.

Concurrent Jurisdiction, the jurisdiction of different courts authorized to take cognizance of the same kind of case. In criminal cases the court which first takes up a case has the right of prevention; that is, of deciding on that case exclusive of the other courts which but for that right would have been equally entitled to take cognizance of it. In civil cases it lies with the suitor to bring his cause before any court he pleases which is competent to take it up.

Concussion of the Brain, a shaking of the brain produced by a sudden shock or any similar cause, and generally resulting in at least temporary insensibility. Sometimes recovery takes place in a few minutes, the sufferer first seeing everything inky black, then dark red, then pink, after which the landscape returns. In severer cases insensibility may remain for days instead of minutes, coma at first being deep, then less profound, and finally passing away, inflammatory action in some cases supervening on the previous depression. In the worst cases the coma is never removed, but is succeeded by the yet deeper sleep of death. In many cases there is difficulty in distinguishing between concussion of the brain, in which the organ is congested but not permanently injured, and compression of the brain, produced by extravasation of blood on the surface.

Concussion of the Spinal Cord, due to similar causes acting on the vertebral column instead of the head. The symptoms vary much with the site and severity of the injury. In many cases they are altogether absent or quite trivial at first, and only attract attention after some hours or days have elapsed; yet, and probably for this very reason, the injury not being treated at first, serious after-effects are much more common than in cases of concussion of the brain. Here also, however, complete recovery is the rule. The treatment must be in the first instance the same as in concussion of the brain. Concussion of the spinal cord has attracted special attention in recent times owing to its frequent occurrence as a result of railway accidents. The slow and insidious nature of the symptoms presented by many such cases, and the difficulty of deciding whether those symptoms are real, and whether they have resulted from the alleged injury, have given rise to much litigation with respect to damages.

Conde (kôn-dā'), the name of a French family, the younger branch of the Bourbons, who took their name from the town of Condé, Department of Nord. One Godfrey de Condé, about 1200, was in possession of a part of the barony of Condé. His great-granddaughter, Jeanne de Condé, married in 1335, Jacques de Bourbon, Comte de la Marche, and the barony of Condé went to their second son, Louis de Bourbon, Comte de Vendôme, whose great-grandson, Louis de Bourbon, Prince of Condé, in virtue of his blood-relationship to the royal family, assumed the title of Prince, and is regarded as the founder of the new house of this name. Its more celebrated members in history are the following:

CONDE, LOUIS I. DE BOURBON, PRINCE DE, son of Charles, Duke of Vendôme; born in 1530. He married the grandniece of the Constable de Montmorenci. He served his early campaigns in Piedmont, but first distinguished himself at the defense of Metz, besieged by Charles V. in 1552. Affronted at court, and hated by the Guises, he joined his brother, the King of Navarre, at Nérac, and became a Protestant. In 1560 he was arrested and sentenced to death, but was discharged after the death of Francis I. He soon after appeared as head of the Protestants, and was defeated and captured at the battle of Dreux. He was again wronged and insulted by the refusal of the office of lieutenant-general of the kingdom, to which office he was entitled. In 1567 he fought the battle of St. Denis without decisive result. Two years later the Protestants were defeated, and Condé was slain at Jarnac.

CONDE, HENRI II., PRINCE DE, who at the request of Henry IV. became a Catholic; born in 1588. In 1616 he was sent to the

Bastille, where he remained for three years. After the death of Louis XIII. the prince was liberated, and was made Minister of State to the regent. He died in 1646.

CONDE, LOUIS II. DE BOURBON, PRINCE DE, called **THE GREAT**, son of the preceding; born in Paris in 1621. He married a niece of Cardinal Richelieu, and was at first known as the Duc d'Enghien. His first great achievement was the victory over the Spanish army at Rocroi, in 1643. The capture of Thionville soon followed. The following year was marked by the battle of Freiburg, which lasted three days, and the great victory over the Imperialists at Nordlingen. After taking Dunkirk, in 1646, Condé was, through envy, sent to Catalonia, where, with inferior troops, success forsook him. It was necessary soon to recall him to Flanders, where he won the victory of Lens over the Archduke Leopold, in 1648. Having offended the first minister, Cardinal Mazarin, he was imprisoned for more than a year, and after his liberation he led the army of the Fronde, began the siege of Paris, and encountered Turenne and the royalists in the Faubourg St. Antoine. Soon after he entered the service of Spain, and contended with varying success against his countrymen in Flanders. After the Peace of the Pyrenees he returned to Paris, and was employed in the conquest of Franche-Comté. In the war with Holland, in 1672, he was wounded at the passage of the Rhine, the only time he received a wound. His last great exploit was his victory over William, Prince of Orange (William III.), at Senef, in 1674. A martyr to the gout, he retired in the following year to his charming seat at Chantilly, enjoying there the society of some of the most eminent men of letters, among them Racine, Boileau, and Molière. He died in 1686. Bossuet delivered his funeral oration, which is considered a masterpiece of eloquence.

CONDE, LOUIS JOSEPH, PRINCE DE, born in Paris in 1736, was brought up by his uncle, the Count of Charolais, served in the Seven Years' War, and distinguished himself at the battles of Hastenbeck, Minden, and Johannisberg. He became the associate of the Dauphin, and occupied himself with literary and scientific pursuits. After the fall of the Bastille he emigrated, watching every opportunity for assisting the partisans of the monarchy. The murder of his young grandson, the Duc d'Enghien, by Napoleon, affected him profoundly. At the Restoration, he returned with Louis XVIII. to France, lived again at Chantilly, and was the author of an "*Essai sur la vie du grand Condé*." He died in 1818. The great family of Condé became extinct, Aug. 27, 1830, in the person of the **DUC DE BOURBON, LOUIS HENRI JOSEPH**.

Condensation

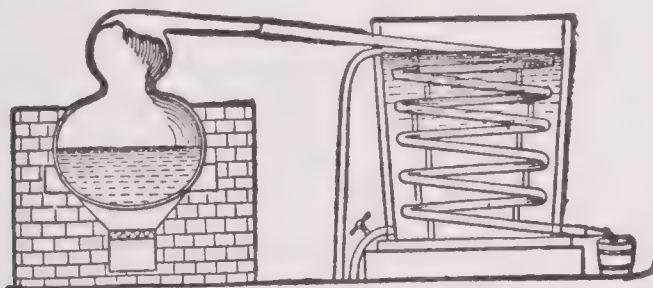
Condensation, the reduction of anything to another and denser form, as of a vapor or gas to a liquid, or a liquid to a solid; the passage of gases or vapors from the aëriform to the liquid state. It is sometimes called also the liquefaction of vapors.



PRINCE OF CONDE.

It may be due to one of three causes: cooling, compression, or chemical affinity. Before the first or second of these causes can operate, the vapor must be saturated. Various salts also condense vapors by means of chemical affinity. When vapors are condensed their latent heat becomes free. The condensation of liquids is the reduction of a liquid to smaller bulk, with a proportionate increase in the sp. gr.

Condensed Milk, milk reduced greatly in bulk and rendered proportionately denser. GAIL BORDEN (*q. v.*) in 1849 invented a process for the condensation of milk, which has since been carried out extensively in the United States and Europe.



WORM CONDENSER.

Condenser, one who or that which condenses.

Steam-engine.—An apparatus for reducing to a liquid form the steam in front of the piston, so as to obtain a partial vacuum at that point, and thus utilize the

Condillac

natural pressure of the atmosphere. Watt invented the injection condenser and the separate condenser. The surface condenser has a series of flat chambers or tubes, usually the latter, in which the steam is cooled by a body of water surrounding the tubes. Distilled water for ships' use is obtained by the condensation of steam in a surface condenser.

Distilling.—The still-condenser is an apparatus generally made of the worm-tub form; the coil containing the alcoholic vapor traversing a tub which receives a constant accession of cold water, condensing the vapor in the coil. The liquid escapes at a cock valve below.

Metal.—An apartment in which metallic or deleterious gaseous fumes are condensed to prevent their escape into, and contamination of, the atmosphere. The device consists of a prolonged duct for the fumes, with showers of water to condense the arsenical, sulphurous, and other fugitive volatile matters. It also serves an economical purpose in saving fugitive fumes of lead, zinc, mercury, sulphur, antimony, etc.

Electricity.—(1) An instrument for concentrating electricity by the effect of induction. It usually consists of a conformed sheet of tin-foil, whose layers are separated by a thin sheet having a non-conducting surface.

(2) With induction apparatus, a device for absorption or suppression of the extra current induced by the rapid breaks in the main current.

(3) An instrument in which an electric spark passes between the poles in a closed glass cylinder, so as to be employed in burning metals in an atmosphere of any given tenuity or specific chemical character, to obtain the spectra of metals or gases free from accidental characteristics of the general atmosphere for the time being.

Condillac, Etienne Bonnot de Mably de (*kôn-dē-yäk'*), a French philosopher; born in Grenoble, Sept. 30, 1715. He founded an international reputation on "The Essay on the Origin of Human Knowledge (or Sense Perceptions)" (1746); duly succeeded by the celebrated "Treatise on the Sensations" (1754), the central standpoint of these and other works being what is, philosophically speaking, sensationalism; a belief, that is, that what we know we know only through the senses, and hence our ideas of deity, love, the soul, etc., are largely modified forms of the objects that impress us in our daily material experience. These standpoints were practically those of French philosophy till the advent of Cousin. He died near Beaugency, Aug. 3, 1780.

Condiments

Condiments, or seasoning agents, are those substances which are employed at table for the purpose of imparting a flavor or seasoning to the ordinary solid or liquid food. The principal condiments are saline substances, such as common salt; acidulous bodies, such as acetic acid or vinegar; oily condiments, such as butter and olive-oil; saccharine substances, such as sugar and honey; and aromatic and pungent condiments, such as mustard, ginger, pepper, and pickles.

Conditional Immortality, a tenet held by a theological school which denies the inherent immortality of the soul, and the consequent doctrines both of eternal misery and of Universalism as contrary to the teachings both of nature and of revelation. Its advocates maintain that the Bible sets immortality before men as something to be sought after (Rom. ii: 7), as a divine gift offered on certain conditions (Rom. vi: 23; John iii: 15, 16), and as a matter of hope and promise in the present life (Titus i: 2); that this immortality is not a present possession (Mark x: 30), and is to be realized by the assumption of a spiritual body at the resurrection of regenerate men from the dead (Luke xx: 35, 36), an event synchronous with the second coming of Christ (I Cor. xv: 51, 52). Divine testimony, no less than experience, they say, declares unequivocally that man has the same natural life as all other animals (Eccles. iii: 19), and only those who by faith and obedience are united to Christ have the promise of immortality. The Calvinistic doctrine of eternal misery is untenable, the punishment of sin being death or everlasting destruction, to be inflicted subsequent to a judgment after the Lord returns (II Thess. i: 9, 10).

The dogma of Universalism, the only alternative to endless torment if the soul must live forever, is also, they maintain, unfounded, since the punishment of sin (death) is said to be everlasting, like the life which is the reward of the righteous (Matt. xxv: 46). It is claimed that a succession of eminent and pious men have upheld this doctrine from apostolic times, among whom may be mentioned Justin Martyr, Clement of Alexandria, Irenæus, etc.

Conditional immortality has received considerable impulse in recent years from many able and zealous advocates, notably the late William Leask, D.D., editor of the "Rainbow," and Rev. Edward White. The Conditional Immortality Mission started in Great Britain in 1878, has done much, by means of lectures, publications, and annual conferences held in various cities, to disseminate this view. It has an organ, "The Bible Standard," published

Condor

monthly by the secretary. Many churches have been organized in Great Britain and its colonies, as well as in the United States, having conditional immortality as part of their doctrinal basis. The best modern works on the subject are "Life in Christ," by Edward White; "The Life Everlasting" and "The Unspeakable Gift," by J. H. Pettingell; "Hades," by Henry Constable; "Duration and Nature of Future Punishment," by the same author.

Conditioned and Unconditioned, in philosophy, terms introduced by Sir William Hamilton. The unconditioned is regarded by Sir William Hamilton as a genus including two species: the infinite, or the unconditionally unlimited, and the absolute, or the unconditionally limited; and the thesis which he maintains and expounds, and which forms one of the leading doctrines of his philosophical system, is that the unconditioned, as thus explained, is entirely unthinkable. The mind is confined, in point of knowledge though not of faith, to the limited and conditioned—the conditioned being the mean between two unconditionates, mutually exclusive and equally inconceivable, but of which, on the principles of contradiction and excluded middle, one must be admitted as necessary. Thus infinite space is inconceivable by us, while at the same time it is equally impossible to us to conceive of space as finite; yet one of these must be admitted necessary, and our conception is in some sense a mean between the inconceivables. The doctrine was applied by Mansel to determine the limits of religious thought.

Condonation, in the legal phraseology both of Great Britain and the United States, means forgiveness granted by the injured party, and may be urged by the guilty party as a defense against an action of divorce on the ground of adultery.

Condor, the popular name of the great vulture of the Andes, formed by a mispronunciation of the Indian name *kunter*, which, according to Humboldt, is derived from another word in the language of the Incas, signifying to smell well. This species (*Vultur gryphus*, Linn., or *Sarcorampus gryphus*) belongs to the cathartide family of diurnal rapacious birds, which is distinguished by the following characters: The bill is elongated and straight at base; the upper mandible is covered to the middle by the cere; the nostrils are medial, approximate, oval pervious, and naked; the tongue is canaliculate, with serrated edges; the head is elongated, depressed, and rugous; the tarsus rather slender; the lateral toes equal; the middle toe is much the longest, the inner free, and the hind one short-

est; the first primary is rather short, the third and fourth are longest.

The natural history of the condor was in a fair way to rival the ancient fables of griffins, basilisks, and dragons, or even of exceeding the roc of Sinbad the Sailor, in extravagant exaggeration, until Humboldt placed it upon the basis of truth. His careful measurements established the fact that the wonderfully gigantic condor is not generally larger than the lämmergeyer, or bearded vulture of the Alps, which it closely resembles in various points of character. These birds prefer to dwell above all animal life, and at the extreme limit of even Alpine vegetation, inhaling an air too highly rarefied to be endured, unless by creatures expressly adapted thereto. From such immense elevations they soar upward into the dark blue heavens, until their great bulk diminishes to a scarcely perceptible speck, or is lost to the aching sight of the observer. In these pure fields of ether, unvisited even by the thunder-cloud—regions which may be regarded as his own exclusive domain—the condor delights to sail, and with piercing glance surveys the surface of the earth, toward which he never stoops his wing unless at the call of hunger. But although the condor is a lover of the clearest and purest air, it must be confessed that he is a carrion bird, and is quickly lured to the plains by the sight or scent of a carcass, especially of a sheep or ox. To such a feast considerable numbers repair, and commence their filthy banquet by first plucking out the eyes, and then tearing away the tongue of the animal, their favorite delicacies; next to these the bowels are the morsels most eagerly sought for, and devoured with that greedy gluttony which distinguishes the whole vulture tribe.

The appetite of these birds seems to be limited only by the quantity of food that can be gorged into their stomachs; and when thus overloaded they appear sluggish, oppressed, and unable to raise themselves into the air. The Indians profit by this condition to revenge themselves on the condors for the many robberies which they commit upon their flocks, and watching while they eat, until flight has become exceedingly difficult, attack and secure them by nooses, or knock them down with poles before they can get out of the way. If the condor, thus loaded, succeeds in rising a short distance from the ground, he makes a violent effort, kicking his feet toward his throat, and relieves himself by vomiting, when he soon ascends out of reach. Many, however, are surprised, and captured or killed before they are able to ascend. But the condor does not exclusively feed upon dead or putrefying flesh; he attacks and destroys deer, vicuñas, and other middling-sized or small quadrupeds; and when pinched by hunger a pair of these

birds will attack a bullock, and by repeated wounds from their beaks and claws harass him until from fatigue, he thrusts out his tongue, which they immediately seize and tear from his head; they also pluck out the eyes of the poor beast, which, if not speedily rescued, must soon fall a prey to their voracity. It is said to be very common to see the cattle of the Indians on the Andes suffering from the severe wounds inflicted by these rapacious birds. It does not appear that they have ever attacked man. When Humboldt, accompanied by his friend Bonpland, was collecting plants near the limits of perpetual snow, they were daily in company with several condors, which would suffer themselves to be quite closely approached without exhibiting signs of alarm, though they never showed any disposition to act offensively.

The nesting-time of the condor varies with the latitude, and the place selected for the nest is usually some inaccessible ledge of rock. It lays two white eggs from 3½ to 4 inches long, which are hatched in about seven weeks. The development of the young birds is very slow since they are not able to fly until they are a year old, and they have to remain with the parent birds for a year or two longer. They are occasionally seen even on the shores of the southern ocean, in the cold and temperate regions of Chile, where the Andes so closely approach the shores of the Pacific. Their sojourn, however, in such situations is but for a short time, as they seem to require a much cooler and more highly rarefied air, and prefer lofty solitudes from 10,000 to 15,000 feet above the level of the sea. When they descend to the plains they alight on the ground rather than upon trees or other projections, as the straightness of their toes renders the first-mentioned situation most eligible. Humboldt saw the condor only in New Granada, Quito, and Peru, but was informed that it follows the chain of the Andes from the equator to the seventh degree of N. latitude into the province of Antioquia. The king vulture (*S. papa*) is another bird of the same genus.

The head of the male condor is furnished with a sort of cartilaginous crest, of an oblong figure, wrinkled, and quite slender, resting upon the forehead and hinder part of the beak for about a fourth of its length; at the base of the bill it is free. The female is destitute of this crest. The skin of the head in the male forms folds behind the eye, which descend toward the neck, and terminate in a flabby, dilatable or erectile membrane. The structure of the crest is altogether peculiar, bearing very little resemblance to the cock's comb or the wattles of a turkey. The auricular orifice is of considerable size, but concealed by folds of the temporal membrane. The eye, which is peculiarly elongated, and farther distant from

Condor

the beak than the eagle's, is of a purple hue, and very brilliant. The neck is uniformly marked by parallel longitudinal wrinkles, though the membrane is not so flabby as that covering the throat, which appears to be caused by the frequent habit of drawing the neck downward to conceal or warm it within the collar or hood. The collar in both sexes is a fine silken down, forming a white band between the naked part of the neck and beginning of the true feathers, and is rather more than 2 inches broad, not entirely surrounding the neck, but leaving a very narrow naked space in front. The rest of the surface, the back, wings, and tail are of a slightly grayish black; the feathers are triangular, and placed over each other tile-wise.

Humboldt never saw male condors with white backs, though descriptions of such have been given by Molina and others. The primaries are black; the secondaries in both sexes are exteriorly edged with white. The wing coverts, however, offer the best distinction of the sexes, being grayish black in the female, while in the male their tips, and even half of the shafts, are white, so that his wings are ornamented with beautiful white spots. The tail is blackish, wedge-shaped, rather short, and contains 12 feathers. The feet are very robust, and of an ashen blue color, marked with white wrinkles. The claws are blackish, very long, and but slightly hooked. The four toes are united by an obvious but delicate membrane; the fourth is the smallest, and has the most crooked claw. The largest male condor described by Humboldt was 3 feet 3 inches long from the tip of the beak to the tip of the tail; height, when perched, with the neck moderately extended, 2 feet 8 inches; from the tip of one extended wing to the tip of the other, 8 feet 9 inches. Humboldt states that he never saw a condor which measured more than 9 feet across the wings; but a specimen described by Dr. Shaw measured 14 English feet. Notwithstanding, therefore, what is said by Humboldt of the general correspondence in size of the Alpine l  mmergeyer and the condor of the Andes, we cannot avoid believing that a full grown individual of the latter species would be much more than a match in every respect for any European species.

The condor is peculiarly tenacious of life, and has been observed, after having been hung for a considerable time by the neck in a noose, to rise and walk away quickly when taken down for dead, and to receive several pistol bullets in its body without appearing greatly injured.

Its plumage defends its body to a considerable degree from the effects of shot. It is easily killed when shot, or struck sufficiently hard, about the head. See Plate III, fig. 16, ORNITHOLOGY.

Condorcet

Condorcet (kon-dor-s  '), **Marie Jean Antoine Nicolas de Caritat, Marquis de**, a French writer; born near St. Quentin, Sept. 17, 1743. At the age of 21 he presented to the Academy of Sciences an "Essay on the Integral Calculus," and in 1767 his "Memoirs of the Problem of Three Points" appeared, both being afterward united under the title of "Essay on Analysis." The merit of this work gained for him in 1769 a seat in the Academy of Sciences, of which, after the publication of his "Eulogy on the Academicians having died before 1699" (1773), he was appointed perpetual secretary (1777). In 1777 his "Theory of Comets" gained the prize offered by the Academy of Berlin; he enriched the "Transactions" of many learned societies; and took an active part in the "Cyclopedia." During the troubles of the first French Revolution his sympathies were



MARQUIS DE CONDORCET.

strongly engaged on the side of the people. By the city of Paris he was elected deputy to the legislative assembly, of which he was soon appointed secretary, and in February, 1792, president. On the trial of Louis he was in favor of the severest sentence not capital; at the same time he proposed to abolish capital punishments, except in case of crimes against the State. The fall of the Girondist party, May 31, 1793, prevented the constitution which Condorcet had drawn up from being accepted, and as he freely criticised the constitution which took its place, he was denounced as being an accomplice of Brissot. Madame Verney, a woman of noble feelings, secreted him for eight months, during which he wrote his "Sketch of an Historic Tableau of the Progress of the Human Mind." Lest he should endanger her safety, however, he

Condottieri

left the house secretly in opposition to her wishes, fled from Paris, and wandered about till arrested and thrown into prison, where, March 28, 1794, he was found dead on the floor, having apparently swallowed poison.

Condottieri (kon-dōt-yā'rē), a class of mercenary adventurers in the 14th and 15th centuries, who commanded military bands, amounting to armies, on their own account, and sold their services for temporary engagements to sovereign princes and States. The bands under command of the Condottieri were well armed and equipped. Their leaders had in many instances considerable military skill; but, as they took no interest in national contests, except to receive pecuniary advantages, the wars between them became a sort of bloodless contests, in which the only object of each party was to take as many prisoners as possible for the sake of the ransom. This singular system of warfare was only put to an end by the more serious military operations of the French, who invaded Italy under Charles VIII. Though many Condottieri acquired much honor as well as emolument, one only attained to high rank and independent power; this was Francesco Sforza, originally a peasant, who in 1451 made himself Duke of Milan, and transmitted that sovereignty to his descendants.

Conductor, in railway traffic, the official who attends to the passengers in an omnibus, coach, street-car, passenger train, etc., receiving their fares and allowing them to enter and leave. In music, a director or leader of an orchestra or chorus. It is supposed that a leader or a fugleman was employed by the Assyrians, to regulate the rhythm of the songs or dances; he was armed with two sticks, one of which he beat against the other, and so marked the time or accent.

Conduit (kun'dit or kōn-dwē), a line of pipes or an underground channel of some kind for the conveyance of water.

Condyle, in anatomy, a protuberance on the end of a bone serving to form an articulation with another bone: more especially applied to the prominence of the occipital bone for articulation with the spine.

Condy's Fluid, a preparation of permanganate of potash, which is largely used as a deodorizer and disinfectant in fevers, etc. It is also employed as a gargle in diphtheria and other throat affections, and is especially valuable for cleansing ulcers and sores.

Cone, in geometry, a solid figure described by the revolution of a right-angled triangle about one of the sides containing the right angle, which side remains fixed. If the fixed side be equal to the other side containing the right angle, the cone is called a right-angled cone; if it be less than the

Cone-Shells

other side, an obtuse-angled, and, if greater, an acute-angled cone. The axis of the cone is the fixed straight line about which the triangle revolves. The base of a cone is the circle described by that side containing the right angle which revolves. Similar cones are those which have their axes and the diameters of their bases proportionals. (Euclid.)

In optics, a pencil of rays of light emanating from a point and diverging as they proceed on their course.

In astronomy, a conical-shaped shadow projected by a planet on the other side from that on which it is illuminated by the sun.

In geology, a conical mound or hill produced by the showering down around the orifice of eruption of scorix, dust, and the various other materials ejected. Many hundreds of such cones may be seen in France in the ancient provinces of Auvergne, Velay, and Vivarais, arranged in chains of hills. Sometimes such a cone becomes truncated by a portion of the volcano falling in during an eruption. Papandayang, in Java, did so in 1772 and a volcano in Alaska in 1786.

In zoölogy (1) the English name of any shell of the large tropical molluscous genus *Conus*. The name also of any animal of that genus.

(2) Pl. (cones), the English name of the *Conidæ*, a family of Gasteropodous mollusks. See CONE-SHELLS.

In botany, a kind of anthocarpous or collective fruit, called also *Strobilus*, shaped somewhat like a mathematical cone, and consisting of an ament, the carpella of which are (scale-like) spread open, and bear naked seeds. Sometimes these scales are thin with little cohesion, but frequently they are woody and cohere into a single tuberculated mass. A modification of it is the *Galbulus*, which is globular, and has the heads of the carpella much enlarged. The fruit of the Scotch Fir (*Pinus sylvestris*) is a genuine cone, while the Juniper is a *galbulus*, with fleshy coherent carpella. It used to be considered as a spike in which the rachis and bracts have become partially lignified, or in which the bracts are membranous. But more recent investigations have shown that it is not a collection of flowers, but an assemblage of seeds, fruit, or pseudo-carp resulting from a single flower. The top furnishes an instance of a true *strobilus* or cone with membranous bracts.

Cone-Shells, or *Conidæ*, a family so called on account of their form. All the cones have a similar external outline; the aperture is long and narrow, the head of the living animal is more or less lengthened, the foot is splay and abruptly cut off in front, the tentacles are rather widely separate and the eyes are placed on these organs. The textile cone-shells, brought from

Conessi Bark

Mauritius, are a handsome species. These mollusks occur chiefly in the tropics, though a few are found in the Mediterranean. They are carnivorous, and dwell in the mud of banks and shores.

Conessi Bark, the bark of *Wrightia anti-dysenterica*, an apocynaceous plant of India, used as a tonic, a febrifuge, and an astringent in diarrhœa.

Coney Island, a small island in the Borough of Brooklyn, about 10 miles S. E. of New York city. It is about 5 miles in length and from half to three-quarters of a mile in width; separated from the mainland by Coney Island creek. It is connected with New York and Brooklyn by steam and electric railroads and steamboat lines. It is a popular summer resort, and has numerous bathing houses, hotels, concert and other amusement halls, carousels, pavilions, electric lights, and a fine cycle path connecting it with Prospect Park, Brooklyn.

Confectionery, all edible preparations having sugar as a principal ingredient. The manufacture of confections was originally conducted chiefly by apothecaries and physicians, who disguised the native taste of their medicines by the use of honey and sugar. Eventually, however, it became a distinct industry, and during the nineteenth century it was greatly developed through the application of special machinery to various processes. The first machinery used in the United States was imported in 1845. In 1884 leading manufacturers organized the National Confectioners' Association of the United States, which did much to obtain laws in the different States prohibiting the manufacture or sale of confectionery containing hurtful ingredients or coloring-matter. These include especially such mineral substances as kaolin and terra alba (pipe-clay), and mineral colors. Statistics are not obtainable from small establishments. In 1900, according to the United States census, there were 4,297 manufactories, with a capital of \$35,155,361, employing 33,583 wage-earners, paying \$10,867,687 in wages and \$45,534,153 for materials used, and having an output valued at \$81,290,543.

Confederate States of America, The, the name adopted by the Southern States when they seceded from the Union and formed a government at Montgomery, Ala., Feb. 4, 1861. Delegates from the States of South Carolina, Mississippi, Florida, Alabama, Georgia, and Louisiana, adopted a Constitution and elected Jefferson Davis, of Mississippi, President, and Alexander E. Stephens, of Georgia, Vice-President. Texas, Arkansas, North Carolina, Tennessee, and Virginia afterward joined the Confederacy. Missouri and Kentucky were always in dispute and had representatives in both the United States Congress and the Confederate

Confederate States

States Congress. The States which entered into the formation of the Confederacy had all passed ordinances of secession, withdrawing from the Union in full confidence that they not only had the legal right to do so but were fully justified in their action by circumstances and the interests of their people. Historical precedent certainly seemed to give them the right of withdrawal. The only question was whether the grievances of the State justified that extreme. It is unquestionable that the people at the time felt that they were fully justified in taking this action.

In his message to the Confederate Congress, April 24, 1861, President Davis voiced the sentiments of his people when he said: "We protest solemnly in the face of mankind that we desire peace at any sacrifice save that of honor. In independence we seek no conquest, no aggrandizement, no concessions of any kind from the States with which we have lately been confederated. All we ask is to be let alone; that those who never held power over us shall not now attempt our subjugation by arms."

After the first gun had been fired by John Brown at Harper's Ferry and when Major Anderson marched out of Fort Sumter in Charleston harbor, both sections were wild with excitement and there seemed nothing left but to fight it out to the bitter end. The odds in numbers and resources were overwhelmingly in favor of the North. The States which adhered to the Federal Government (not counting Maryland, Kentucky, and Missouri, which furnished more troops to the Federal than to the Confederate armies) had a population of 20,000,000, while the white population of the Confederate States numbered only 5,000,000. The official reports of the Adjutant-General, United States army, show that there were actually mustered into the Federal armies during the war 2,778,304 men, while the Confederate Adjutant-General, Samuel Cooper, has shown that the Confederates mustered into service only 600,000 men in all.

The South had to depend upon scant resources and material, and had no cause to be ashamed of its leaders, but could proudly point to its soldier-President, Jefferson Davis, and its generals, such as Robert Edward Lee, Albert Sidney Johnston, Joseph E. Johnston, P. G. T. Beauregard, "Stonewall" Jackson, Bedford Forrest, J. E. B. Stuart, Stephen D. Lee, Richard Taylor, Fitzhugh Lee, Wade Hampton, Kirby Smith, W. J. Hardee, John B. Gordon, Jubal A. Early, and others, and claim that the "London Standard" did not put it too strongly when it said on the death of Gen. R. E. Lee: "A country which produced such a man and his great colleagues may look the chivalry of the world squarely in the face, for the fatherlands of Sidney and of Bay-

Confederate Veterans' Association

ard and never produced truer patriots, nobler soldiers, or more stainless gentlemen than these." And the world never saw more splendid "morale" than in the ragged, barefooted heroes of the rank and file, who followed their leaders on more than 2,000 battle-fields, and showed patience under hardships, splendid dash in the charge, stubborn courage in defense and Christian faith and fortitude in death such as has never been surpassed in the world's history.

The Constitution of the Confederate States was modeled after that of the Federal Constitution, and in some important differences has won the approval of even Northern statesmen. It recognized Almighty God and invoked His favor and guidance. It guarded carefully the doctrine of the "sovereignty of each State." It expressly forbade the slave trade, or the importation of slaves from any foreign country other than the slave-holding States and Territories of the United States. It forbade "bounties" or "trusts" of any kind, and provided a "tariff for revenue." It gave Cabinet officers the privileges of the floors of its Congress, allowed the President to veto any part of a bill and approve the remainder, giving his reasons for such action, and fixed the term of office of the President at six years and made him ineligible for a second term.

The "Confederate States of America" passed away, and became "a dream of the past"; but its survivors, their children and their children's children may proudly claim that in four short years the Confederacy made a name and a history which "the world will not willingly let die," and which no student of American history can afford to ignore. See CIVIL WAR, AMERICAN.

REV. J. WILLIAM JONES.

Confederate Veterans' Association, a federation of all organizations of survivors of the Civil War on the Southern side. This association was organized at New Orleans, June 10, 1889. Its avowed purpose is strictly social, literary, historical, and benevolent. Its constitution says that it "will endeavor to unite in a general federation all associations of Confederate veterans, soldiers, and sailors now in existence or hereafter to be formed; to gather authentic data for an impartial history of the war between the States; to preserve relics or mementoes of the same; to cherish the ties of friendship that should exist among men who have shared common dangers, common sufferings, and privations; to care for the disabled and extend a helping hand to the needy; to protect the widows and the orphans, and to make and preserve a record of the resources of every member, and, as far as possible, of those of our comrades who have preceded us in eternity." State

Conference

organizations are authorized, and are called Divisions.

Confederation, Articles of, a form of constitution adopted by the Continental Congress of the United States in 1777 and ratified by the colonies in the next four years. It provided for a Congress of one house only, in which each State should have one vote. This body was empowered to declare war and peace, make treaties with foreign powers, regulate the value of coin, etc., but as it had no power to enforce its laws upon the States, it soon fell into contempt and on March 4, 1798, expired by limitation under the provisions of the present Constitution.

Confederation of the Rhine, the league of Germanic States formed by Napoleon Bonaparte in 1806, and including Bavaria, Wurtemberg, Baden, Hesse-Darmstadt, the Kingdom of Westphalia, etc. It extended over 125,160 square miles, and comprised 14,608,877 inhabitants. The princes undertook to raise collectively a large body of troops in event of war, and established a diet at Frankfort; but the failure of Napoleon's Russian campaign of 1812 shook the structure, and the league soon after broke up. It was succeeded by a new league, the Germanic Confederation. See GERMANY.

Conference, in diplomacy, a meeting of the representatives of different powers for the purpose of adjusting differences; also, an annual gathering of the ministers, now with a certain number of lay representatives of the several Methodist congregations, to deliberate upon the affairs of the religious denomination to which they belong; also a meeting not held at stated intervals, but arranged to adjust some difference which may exist between Churches or sections of Churches.

Many conferences have taken place abroad between Churches or parties in Churches. Thus there were conferences between Lutherans and Roman Catholics at Ratisbon in A. D. 1601; one in 1685 between John Claude, of the French Reformed Church, and James Bénigne Bossuet, a Roman Catholic; and one at Thorn in 1645, with the view of reconciling the Lutherans and the Reformed Churches; but the conference to which the name is most frequently applied in England was that at Hampton Court.

The Hampton Court conference was a conference between King James I. of England, immediately after his accession to the English throne, and the representatives of the Anglican and the Puritan parties in the Church. In October, 1603, the king appointed the conference. Its first meeting was held at Hampton Court, Jan. 14, 1604, James on that day receiving the Anglicans.

Conferva

The second day, the Puritans were admitted to make their statement and discuss it with their opponents. The third day, the bishops and deans were called in to settle with the king what alterations should be made in the regulations of the Church. Then the Puritans were called in to have the decision intimated to them, and the conference closed.

Conferva, a genus of *algals*, the typical one of the sub-order *conferveæ* and the order *confervaceæ*. The species consist of unbranched filaments, composed of cylindrical or moniliform cells with starch granules. Most of the species are marine, though a few are fresh-water. Rabenhorst describes 30 in all.

Confervaceæ, an order of flowerless plants, alliance *algales*. They are vesicular, filamentary, or membranous bodies, multiplied by zoöspores generated in the interior at the expense of the green matter. They are water-plants, generally green, but occasionally olive, violet, and red; most of them are found in fresh-water, attached or floating, some in salt water, and a few in both. The confervaceæ bear the lichens *cænogonium* and *cystocoleus*.

Confession, act of confessing; that which is confessed; acknowledgment of a crime or fault; open declaration of guilt, failure, debt, accusation, etc.; avowal; profession; disclosure of sins or faults to a priest; a formulary of articles of faith; a creed.

In analogy, it is the verbal acknowledgment which a penitent makes of his sins to God or to a fellow-creature. Among the Jews it was the custom on the annual feast of expiation for the high-priest to make confession of sins to God, in the name of the whole people. Besides this general confession, the Jews were enjoined, if their sins were a breach of the first table of the law, to make confession of them to God; but violations of the second table were to be acknowledged to their brethren. Confession seems to have been early introduced into the Christian Church, but at first it took place openly, and was chiefly in the case of such as had apostatized themselves or been guilty of any flagrant offense, and were desirous of being re-admitted into the Church. The practice of private or auricular confession seems to have gradually crept in about the 5th century; and Innocent III., in the fourth Lateran council (1215), made it obligatory on every adult person to confess his sins to a priest at least once a year. The person confessing is allowed to conceal no sin, at least no mortal sin, that he remembers to have committed, and not to have already confessed, and the father confessor is bound to perpetual secrecy. Confession obtains also in the Lutheran Church, but with this difference, that, while in the former case it is obligatory, it is here only rec-

Confirmation

ommended as a means by which a contrite sinner may obtain advice and consolation.

In law, confession is where a prisoner indicted of an offense, and brought to the bar to be arraigned, upon the indictment being read to him, and the court demanding what he can say thereto, confesses the offense and indictment to be true. Confession, in civil cases, is where the defendant confesses the plaintiff's right; or, in prosecutions under penal statutes, by which confession there may be a mitigation of a fine against the penalty of a statute, though not after a verdict.

Confessional, in Roman Catholic churches and chapels, a kind of inclosed seat in which the priest sits to hear persons confess their sins. The confessional is often not unlike a sentry-box, the priest sitting within and the penitent kneeling without and speaking through an aperture. Many confessionals are in three divisions or compartments, the center, which is for the reception of the priest, being closed half-way up by a dwarf door, and having a seat within it. The side compartments, which communicate with the center by grated apertures, are for the penitents.

Confession of Faith, a statement of religious beliefs; a kind of elaborate creed. What is most distinctively known by this name is the document prepared by the Assembly of Divines which met at Westminster in obedience to an ordinance of Parliament issued June 12, 1643. The whole number of the assembly amounted to 174 members, mostly Puritans, 32 being members of Parliament. There were also six Scottish commissioners appointed to consult and deliberate, but not to vote. One of the chief results of the deliberations was the framing of the Confession of Faith, which, on the return of the Scottish commissioners, was adopted by the Assembly of the Church of Scotland, Aug. 27, 1647.

Confirmation, the act of confirming; that which confirms; additional evidence; proof; convincing testimony; assurance; establishment; ratification; as the confirmation of a treaty.

In theology, the laying on of hands by the bishop, for the conferring of the grace of the Holy Spirit; a rite by which a person arrived at years of discretion takes on himself the performance of the baptismal vow made for him by his sponsors. In the early ages this ceremony seems to have been accompanied very generally with the unction of the forehead. It is retained in the Christian Church generally, and is regarded as a sacrament by the Church of Rome.

In law, a deed of conveyance at common law, whereby an estate or right which is voidable is made sure and unvoidable,

or a particular estate is increased, or a possession made perfect; and, it is a strengthening of an estate formerly made which is voidable, though not presently void.

Confiscation, the act of condemning as forfeited, and adjudging to the public treasury, the goods of a criminal in part punishment of a crime. The subject of confiscating the property of those in rebellion was warmly discussed both in and out of the United States Congress, at the beginning of the Civil War. A bill "to confiscate property used for insurrectionary purposes," etc., approved Aug. 6, 1861, providing for the immediate confiscation of all property belonging to office-holders under the Confederate government, and confiscation within 60 days after the President's Amnesty Proclamation of all property belonging to disloyal citizens or privates in the Confederate army, was passed the House July 11, 1862, and the Senate the next day; and after a slight modification, suggested by the president in his veto of the same, on constitutional grounds, it was again passed by both houses on the 16th, and approved, becoming a law the next day. On July 22, the president issued an order that property needed for the support of the armies of the United States should be seized, an account being kept of the same.

Confluentes. See COBLENTZ.

Conformable Strata, beds which lie parallel to each other, the accumulation of the upper strata having followed the deposition of the underlying beds without any break or prolonged interruption. Conformity thus points to a continuity of the same physical conditions.

Confucius, or **Kongfutse**, that is, "the teacher, Kong," the famous Chinese sage; born about 550 B. C. in the province of Shan-tung, then belonging in part to the small vassal kingdom of Lu. His father, Shuh-liang-heih, who was of royal descent, died three years later, and the boy was reared in comparative poverty by his mother, Ching-tsai. At the age of 17 he was made inspector of corn-markets, at 19 he married, and after about four years of domesticity, in which a son and two daughters were born to him, he began his career as a teacher. In 517 B. C. he was induced by two members of one of the principal houses in Lu, who had joined his band of disciples, to visit the capital with them, where he had interviews with Lao-tze, the founder of Taoism. Though temporarily driven from Lu to Tsi by a revolution, he soon returned thither with an increasing following, and at the age of 52 was made chief magistrate of the city of Chung-too. So striking a reformation was

effected by him that he was chosen for higher posts, became minister of crime, and with the aid of two powerful disciples elevated the State of Lu to a leading position in the kingdom. Its marquis, however, soon after gave himself up to debauchery, and Confucius became a wanderer in many States for 13 years.

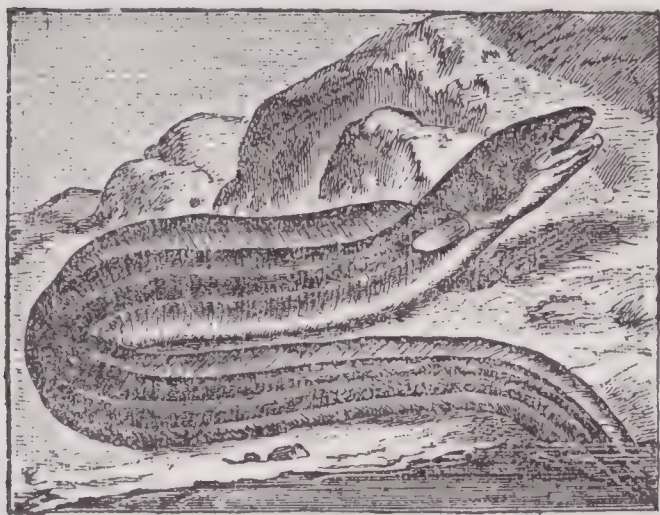
In 483 he returned to Lu, but would not take office. The deaths of his favorite disciples Yen Hwin and Tze-lu in 481 and 478 did much to further his own, which took place in the latter year. Confucius left no work detailing his moral and social system, but the five canonical books of Confucianism are the "Yih-king," the "Shu-king," the "Shi-king," the "Le-king," and the "Chun-tsien," with which are grouped the "Four Books," by disciples of Confucius, the "Ta-hëo or Great Study," the "Chung-Yung or Invariable Mean," the "Tun-yu or Philosophical Dialogues," and the "Hi-tse," written by Meng-tse or Mencius. The teaching of Confucius has had, and still has, an immense influence in China, though he can hardly be said to have founded either a religion or a philosophy. All his teaching was devoted to practical morality and to the duties of man in this world in relation to his fellowmen; in it was summed up the wisdom acquired by his own insight and experience, and that derived from the teaching of the sages of antiquity. It is doubtful if he had any real belief in a personal god.

Conge d'elire (kôn-zhâ'del-ër'), leave given by means of a writ or license to a dean and chapter to elect a bishop when the see to which they belong is vacant. The tendency in Churches has almost always been to claim the liberty to elect their pastors without interference from the civil power; that power, on the contrary, has always, when it could, desired to exercise a determining voice in such elections. During the Middle Ages a protracted struggle on the subject took place between the successive popes on the one hand and the civil rulers on the other for the right to nominate bishops. The contest broke out in the 11th century. In the 12th, the civil power being temporarily worsted in the contest, the dean and chapter, between A. D. 1125 and 1145, in most places gained the power of electing their bishop. In England the Constitutions of Clarendon in 1164 accorded them this right or privilege, but retained for the sovereign the liberty of confirming the election, and the right was confirmed by Magna Charta in 1215. By 25 Henry VIII., passed in A. D. 1535, when a vacancy arises in an archbishopric or in a bishopric the king sends the dean and chapter a *congé d'elire*, accompanied by a missive di-

Conger

recting them whom to choose. If they delay their choice more than 12 days, or select some one else than the individual named in the missive, they become liable to a *premunire*.

Conger, a large sea-eel, *Conger vulgaris* of Cuvier, *Muraena Conger* of Linnæus. It is of the family *Muraenidae*. It is 5, 6, or, in rare cases, even 10 feet long. Its



CONGER-EEL.

upper parts are brownish-white, and the lower dirty-white; the lateral line spotted with white, the dorsal and anal fins white margined with black. A smaller species, *C. myrus*, is found in the Mediterranean.

Conger, Edwin Hurd, an American diplomatist; born in Knox county, Illinois, March 7, 1843. He was graduated at Lombard University in 1862 and immediately enlisted in the Union army, attaining the brevet rank of major. At the close of the Civil War he studied law and was graduated at the Albany Law School in 1866, beginning the practice of his profession in Galesburg, Ill., and removing to Iowa in 1868. He was elected to Congress in 1884 and twice re-elected as a Republican. In 1890 he was appointed Minister to Brazil, serving four years. In 1897 he was again appointed to that post and in the following year was transferred to China. He was at his post throughout the Chinese crisis of 1900, in Peking, being imprisoned with his family and the entire diplomatic corps in the British legation compound from June 20 to Aug. 15. He narrowly escaped slaughter at the hands of the Boxers, false reports of a general massacre of the foreign ministers being repeatedly circulated. His rescue on Aug. 20 was effected by the Allied Powers barely in time to save him and his colleagues from a general massacre.

Congestion, an abnormal accumulation of blood in the capillary vessels, speedily producing a disordered function of the capillaries themselves. It is of two kinds—simple or passive, and active and pas-

Congregation

sive. In the former a current of blood greater than usual is determined toward the capillaries, which, not being able to give it proper vital resistance, yield to it, and become distended and weakened by its presence, no other morbid appearances, however, presenting themselves. In the latter the bloodvessels themselves are in an excited state, this excitement drawing to them the blood, with which they soon become engorged. The tendency of congestion unchecked for a time is to pass into inflammation of the organs affected, and active congestion presents all the essential features of that more formidable malady.

Conglomerate, in geology, pebbles, gravel, or any similar collection of rounded water-worn fragments of rocks, the whole bound together by a silicious, calcareous, or argillaceous cement. It is sometimes called also pudding-stone, from the similarity which it has to a pudding formed say of raisins or other fruit imbedded in a paste. The pebbles or gravel came originally from some previously-existing rock or rocks; they may have been derived from various sources, each of course having a history of its own before becoming fixed in the conglomerate. By reading that history the geologist is able to trace the direction of currents of water, etc., and recompose lost chapters, or parts of chapters, in the history of the earth. A conglomerate resembles a breccia, but in a breccia the imbedded fragments are angular, while in a conglomerate they are rounded. Conglomerates occur more or less in all the great formations. Most of the rivers between Toulon and Genoa, along the vale of the Maritime Alps, are now forming strata of conglomerate and sand.

In anatomy, the conglomerate glands are compound glands, chiefly of the racemose class. Examples—the pancreas, the salivary, lachrymal, and mammary glands, Brunner's glands, and most of the small glands that open into the mouth.

Congo. See KONGO.

Congregation, an assembly, generally a religious assembly; in its most ordinary use, an assembly of Christians met in one place for worship. In the Roman Catholic Church, it often designates a sort of board of cardinals, prelates, and divines, to which is intrusted the management of some important branch of the affairs of the Church. Thus the Congregation of the Index examines books and decides on their fitness for general perusal. The *Congregatio de Propaganda Fide* is instituted for the propagation of the Roman Catholic faith and the government of the Church in non-Catholic countries. The Congregation of Relics inquires into the genuineness of supposed

relics. The Congregation of the Holy Office takes cognizance of heresies, etc. The Congregation of Rites regulates the festivals and offices of new saints. There are numerous other Congregations. The word is also used in the Church of Rome to describe communities of ecclesiastics who live together under rule, but without being bound by vow, or at least by solemn vow. Such are the Congregation of the Oratory, the Congregation of the most Holy Redeemer, usually called Redemptorists, etc.

Congregationalism, or Independency, a form of evangelical Christianity which vests all ecclesiastical authority in the individual believers associated in a local church, complete in itself, but holding advisory coöperative relations with similar bodies. Congregationalism holds in common with other evangelical Christians the great facts of sin and of redemption through the incarnation and atonement of Christ as taught in the Bible, and that the Son of God so exalted man by becoming man and tasting death for every man that the value of the individual man and the sacredness of his rights are established and enforced by the evangelical system of truth; and that therefore the form of Church polity, which lodges all ecclesiastical authority in the individual believers and educates them for the intelligent exercise of such functions is the polity most in harmony with the New Testament, promoting civil and religious liberty and the democratic regulation of social life. Congregationalism denies that there is any authority in Scripture for uniting the churches of a nation or province into one Church or corporation, to be ruled by a bishop or bishops, superior to the bishop or pastor of particular congregations or by a presbytery or synod consisting of the pastors or elders of the several congregations of the nation or province. This principle of Church polity is the specialty which plainly distinguishes Congregationalism from Episcopacy, Presbyterianism, Methodism, and all denominations whose churches are organized into a body having over its members any authority other than advisory.

Congregational polity is based upon three ideas: the right of each individual to take part in the government of the community; the autonomy of the local church; and its independence of all external ecclesiastical authority. While complete in itself, the local church may voluntarily unite with other churches for consultation and common action; but no resolution of any such union binds the individual church without its own consent. Usually each church has one minister or pastor, who is chosen by the free suffrages of the membership, but there may be more than one. In addition to the pastor or pastors, home missionaries and evangelists are sometimes appointed. Home

missionaries and evangelists, if employed by a church for local service, are under the supervision of the church and not of the pastor, save as he is an agent of the church. Those commonly known as home missionaries and many evangelists, while members of some local church, are usually clergymen who have been formally inducted into the ministerial office according to the usages of the denomination.

Standing in the ministry is given (1) by the action of the church authorizing one of its members or any other person it may deem qualified to exercise ministerial functions; (2) by the action of a voluntary association of Congregational ministers approving a candidate after due examination, and commending him for a limited time as such to the churches; (3) by an action of a Council of Churches called by some local church or acting in its name, ordaining a man as pastor or evangelist or missionary, or installing a minister as pastor of the church calling the council. The secular affairs of the church are administered by trustees appointed by the church or by an ecclesiastical society called the parish, made up of members of the congregation, not all necessarily members of the church. In some matters, like calling and installing a pastor, the church and the society act conjointly. The principles of this polity are held also by the Baptists, Unitarians, Universalists, and other denominations.

The first Congregational Church in England, of which there was any record, was formed in London about 1571. Robert Fitz was the minister, and his "True Marks of Christes Church" is the first document relating to English Congregationalism known to be in existence. The most prominent name in connection with Congregationalism at this time is that of the Rev. Robert Browne, who left the Established Church, and, in conjunction with the Rev. Robert Harrison, formed a Congregational Church at Norwich in 1580. One of the most famous of the early churches in England was formed at Scrooby, in Lincolnshire. It met in the house of William Brewster, under the pastoral care, for a time, of Richard Clyfton (who had relinquished a living at Worksop). The famous John Robinson, M. A., succeeded him. He modified the Brownist tenets, making them less extreme, and many regard him as the true founder of Independency. To escape persecution, members of this Church fled to Holland, from whence, through the influence of John Robinson, after 12 years, they crossed the Atlantic and landed at New Plymouth, the Pilgrim Fathers of the "Mayflower." In the cabin of the "Mayflower" was signed the famous compact which might be called the magna charta of American Congregationalism. At this time the Con-

gregationalists were sometimes called "Brownists" (after the Rev. Robert Browne), sometimes "Separatists" (because they would keep the church separate from the world), and sometimes "Independents." This last designation Congregationalists themselves soon adopted, and have ever since retained, because it signifies that they hold "all particular churches of Christ to be of equal authority and none to have jurisdiction over another."

Congregationalism in England.—In the Westminster Assembly (appointed by Parliament in 1643 to draw up some order of public worship for the nation), there were five representatives of the Congregationalists. Under Cromwell the Independents became supreme. Their church meetings were held in Westminster Abbey. At the time of the Protector's death (Oct. 12, 1658), a general council of Congregationalists was meeting in the Savoy. The council issued a "Declaration of Faith and Order." The "Declaration" was not binding upon any particular church, but it is almost as important in the history of Congregationalism as the Westminster Confession is in the history of Presbyterianism. The Restoration placed Congregationalism in a different position from that which is enjoyed under the Protectorate. The denomination was greatly and permanently strengthened by the Act of Uniformity (Aug. 24th, 1662), which drove 2,000 ministers and many thousands of laymen out of the Established Church. Under the later Stuarts Congregationalists had their share of persecution. After passing the Act of Toleration (May 24, 1689), they took an active part in the extension of civil and religious liberty, and in forwarding movements of a philanthropic character. They were chief among the founders of the London Missionary Society (1795), and the first tract for the Religious Tract Society was written by Dr. Bogue in 1799. In 1831 the Congregational Union of England and Wales was formed, and an International Council of Congregationalists met in London in July, 1891.

Congregationalism in America.—In the United States the first Congregational Church was founded at Plymouth, New England, in 1620, by the party of pilgrims sent from Holland by John Robinson. In 1837 the spread of the Antinomian doctrine caused much discussion in the Church. By a synod convened in New England Antinomianism was unanimously condemned. In 1638 Harvard College was founded. In 1658 the Savoy Confession was adopted, and still remains. Unitarian principles spread, about 1800, widely in the Congregational churches of America, and though a separation took place between the Unitarians and the Trinitarians, both still retain

the Congregational form of church government. "Congregationalism," according to Dr. Schaff, is the ruling sect of the six Northeastern States, and has exerted, and still exerts, a beneficial influence upon the religious, social, and political life of the whole nation."

In addition to the Conference, or Association of Churches, by which they co-operate for common ends, a National Council meets triennially "for advisory and not juridical ends." Its declaration, like that of a council of local churches, "hath so much force as there is in the reason of it." In 1910 the number of churches in the United States was reported at over 6,000; members, 732,500. Besides such well-known colleges as Bowdoin, Amherst, Williams, and Oberlin, the American Congregationalists possess theological seminaries at Andover, Bangor, New Haven, Hartford, Oakland, Chicago, and elsewhere. There are six National Societies, through which the charities of Congregationalists mainly flow, the American Board of Foreign Missions, the Congregational Home Missionary Society, the American Missionary Association, laboring for the freedmen and the Indians, the Congregational College Education Society, the Congregational Church Building Society, etc.

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Congregationists, the Scotch reformers. The whole body was called the Congregation; but from 1638, when they bound themselves by oath to adhere to the Solemn League and Covenant, the reformers were called Covenanters. Not unfrequently the Congregationists are called Covenanters also, but this is not strictly correct. In the spring of 1562 Elizabeth became engaged to the support of the Huguenots against their government as she had supported the Covenanters of Scotland.

Congress, an assembly either of sovereign princes, or of the delegated representatives of sovereign States, for the purpose of considering matters of international interest. Even in the United States, though the term has now a different meaning, it had a similar origin, the first congress being that of the delegates from the various British colonies, who met on Oct. 7, 1765, for the purpose of considering their grievances. Previous to signing a treaty of peace, a meeting of plenipotentiaries usually takes place, to which the name of a congress is sometimes applied, though it seems more properly to be reserved for those more important meetings at which extensive schemes of future policy are determined on, and the balance of power among the various European states readjusted. To this class belonged the famous Congress of Vienna in 1815; that of Carlsbad in 1819,

for regulating the affairs of Germany; that of Paris at the end of the Russian war of 1854-1856; and that at Berlin after the Russo-Turkish war of 1877-1878. There is scarcely any difference between a Congress and a diplomatic conference.

Congress, Library of, an institution in Washington, D. C., which, despite its restricted name, is really the National Library of the United States. The Library of Congress was established in 1800, destroyed in 1814 by the burning of the Capitol, afterward replenished by the purchase by Congress of the library of ex-President Jefferson, 6,760 volumes (cost, \$23,950); in 1851, 35,000 volumes destroyed by fire; in 1852, partially replenished by an appropriation of \$75,000; increased (1) by regular appropriations by Congress; (2) by deposits under the copyright laws; (3) by gifts and exchanges; (4) by the exchanges of the Smithsonian Institution, the library of which (40,000 volumes) was, in 1866, deposited in the Library of Congress, with the stipulation that future accessions should follow it. Fifty sets of Government publications are placed at the service of the Library of Congress for international exchanges through the Smithsonian. Other special accessions have been: the Peter Force collection (22,529 volumes, 37,000 pamphlets), purchased 1867, cost \$100,000; the (Count de) Rochambeau collection (manuscript), purchased 1883, cost \$20,000; the Toner collection (24,484 volumes, numerous pamphlets), gifts in 1882 of Dr. Joseph M. Toner; the Hubbard collection (engravings), gift in 1898 of Mrs. Gardiner G. Hubbard.

The collection in the main library is now the largest single collection in the Western Hemisphere. It comprises 750,000 printed books, 250,000 pamphlets, 26,500 manuscripts, 52,000 maps and charts, 277,000 pieces of sheet music, and upward of 90,000 photographs, prints, engravings, and lithographs. Of the printed books, probably one-third are duplicates. The law library of 103,000 volumes (which remains at the Capitol) is not included in the above). The main collection is rich in Federal documents, history, political science, jurisprudence, and Americana in general, including important files of American newspapers and original manuscripts (colonial, revolutionary, and formative periods). The exhibition cases on the second floor contain many rare books, including the records of the Virginia Company. The Smithsonian deposit is strong in scientific works, and includes the largest assemblage of the transactions of learned societies which exists in this country.

In 1897 the main collection was removed from the Capitol to the building erected for it under the acts of Congress, approved

April 15, 1886; Oct. 2, 1888, and March 2, 1889, at a cost of \$6,347,000 (limit by law, \$6,500,000) exclusive of the land, which cost \$585,000. The building occupies three and three-quarter acres upon a site 10 acres in extent at a distance of 1,270 feet E. of the Capitol, and is the largest and most magnificent library building in the world. In the decorations, some 40 painters and sculptors are represented, all American citizens. The floor space is 326,195 square feet, or nearly 8 acres. The book stacks contain about 45 miles of shelving, affording space for 2,200,000 volumes. Were the long corridors, now used in part for exhibition purposes, completely shelved, the building would accommodate over 4,000,000 volumes. The library contains a reading room for the blind, open daily. The library is maintained by annual appropriations by Congress for various purposes, including the purchase of books. For the year 1899-1900 this amounted to \$213,452 for services (including the copyright department, and including, also, the care of the building); \$26,500 for fuel, supplies, miscellaneous purposes, including contingent expenses; \$25,000 for printing and binding; \$31,680 for books and periodicals.

Congressman-at-Large, in the United States, a member elected to the House of Representatives by the voters of the entire State instead of by districts in accordance with the ordinary plan. By Act of Congress (1872) it was provided that in each State entitled under the apportionment to more than one representative the number to which such State might be entitled in the 43d and each subsequent Congress should be elected by districts composed of contiguous territory and containing as nearly as possible an equal number of inhabitants, etc.; but on the election of members to the 43d Congress in any State to which an increased number of representatives was given by reapportionment, the additional representative or representatives might be elected by the State at large. In the 61st Congress (1909-1911) Colorado, Connecticut, Delaware, Idaho, Montana, Nevada, North Dakota, South Dakota, Utah, Washington, and Wyoming had such representatives under the 1900 census.

Congress of Religions, an assemblage of representatives of all the Christian denominations and other religious bodies of the world, held at Chicago during the World's Columbian Exposition of 1893. Among these were seen Buddhists, Mahomedans, and the followers of other Asiatic religions, and the tenets of the various faiths were expounded in many strange tongues. The greatest harmony prevailed, and the meeting was one of the most interesting events of the great exposition.

Congress of the United States, the legislative branch of the general Government. It consists of two Houses—a Senate and a House of Representatives, commonly designated as Upper and Lower Houses. By the Constitution the number of Senators is strictly limited to two from each State, and the membership of the Senate is therefore always twice the number of States. The Fifth Article of the Constitution was intended to secure for all time equal representation in the Senate for all the States. On the other hand, the composition of the House of Representatives is based upon population, and the Constitution ordains that the number of members shall not be more than one to every thirty thousand of the people. With the population of 1905 this would permit a House of seven or eight thousand. The actual ratio of Representatives to population is fixed by statute every ten years, a decennial census being taken for that purpose. The first national census was taken in 1790, and the statute following fixed the number composing the Lower House at 65. Ten years later the number was raised to 105, and by successive periods it has since been 141, 181, 213, 240, 223, 233, 243, 293, 325, 357, 386, the last number being determined by a statute of the year 1901, based upon the twelfth census. It will be observed that in only one instance has the membership been decreased. After the census of 1830 the law provided for a membership of 240; ten years later it was diminished to 223; after 1850 ten members were added, but the former higher number was not recovered until after the census of 1860, when the apportionment reached 243. The addition of a new State increases the number of Representatives by at least one. No provision is made in the Constitution for representation in Congress of the inhabitants of territory outside the boundaries of the States. Congress has, however, provided by statute for a Representative from each of the organized Territories and extends to him the privileges and duties of full membership, with the important exception of the right to vote.

The apportionment of members to the Lower House of Congress has been a subject of much controversy. Equal representation in the Senate gives to the small States an excess of power there, and since the small State must have at least one member in the Lower House, such a State as Nevada, with a population of about 50,000, has more than four times the Congressional representation of some of the more populous States. This excess of power extends also to the Presidential election, since each State has the same number of Electors as it has members of Congress. But a far more impor-

tant discussion connected with the apportionment of Representatives has arisen from the presence of slaves in the country before the Civil War and of freedmen since the war. The Constitution at first required the counting of all free persons, together with three-fifths of the slaves, in apportioning representation in the Lower House. In 1865 the Thirteenth Amendment abolished slavery. Had a census then been taken all of the freedmen would have been counted. The Fourteenth Amendment, of 1868, specifically requires the counting of the entire population, and provides, further, that in case any State shall restrict the right to vote for State and Federal officers for other than specified reasons, then that State shall be deprived in like proportion of its representation in the House of Representatives. Had a census been taken and an apportionment made in accord with this amendment, it would have been necessary for Congress to determine officially what proportion of the citizens of the various States had been deprived of the right to vote. But before the time for the enumeration of the people in 1870 had arrived, the Fifteenth Amendment had been enacted forbidding any abridgment by any State of the right of suffrage on account of race, color or previous condition of servitude, and the enumeration was in harmony with its terms, all the people being counted as the basis of apportionment. Since that date, although various States have passed laws greatly restricting the right to vote, yet in each census the whole population has been counted and the total used as the basis of representation, in apparent conflict with the Fourteenth Amendment, whose chief object was to induce the States to extend the franchise to the freedmen. So far as the freedmen are affected the later amendment is a substitute for the earlier, and this has given rise to the question whether the suffrage clause of the Fourteenth Amendment is still in force. In practice, it has been ignored; various States of the North and the South have limited the franchise for reasons other than those specified, while still retaining full representation.

The election of members of Congress was at first entirely in the hands of the States. The Constitution prescribed that Senators should be chosen by the State legislatures, and that those who vote for the most numerous branch of the State legislature should be entitled to vote for Representatives to Congress; but, except as affected by the Fifteenth Amendment, the States have always had full power to determine who shall vote for the members of their State legislatures. Congress has a constitutional right to make laws for controlling the election of its own members; this power, however, was not exercised until the year 1842, when a

law was passed prescribing that the election of Representatives should be by separate districts. In 1866 an Act of Congress provided for the election of Senators by a joint session of the two Houses of the State legislature. This was designed to prevent frequent deadlocks when the two Houses were controlled by opposite parties. A Federal law of 1871 ordained the use of the secret ballot in voting for members of the Lower House of Congress. Yet, in spite of Federal legislation upon the subject, the control of Congressional elections remains mainly in the hands of the States. Each House is judge of the validity of the elections of its own members. This power has been in many instances abused by partisan decisions.

The Constitution names the first Monday in December as the date for the annual meeting of Congress. Though Congress has the power to fix by law a different date, this has never yet been done. No limit for the length of a session is prescribed by the Constitution, but the Continental Congress in providing for the organization of the Government under the new Constitution, designated March 4, 1789, as the date of organization. This day thus became the date of the beginning of the first term of office for Senators and Representatives; and as two years is the constitutional term of office for members of the Lower House, the first Congress came to an end on the Fourth of March, 1791. To this merely accidental designation of a date certain inconveniences in the practical working of the scheme of Government are due. As one result, there appears what is known as the "short session" of Congress. On alternate years, the session of Congress which begins in December is obliged to adjourn on the fourth of the following March. Another consequence is the election of members of a new Congress more than a year before the organization of the House in which they serve. The election occurs in November of the previous year, and the short session is held after the new House is elected; and then, unless an extra session is called, the new House is not organized until the next December. The Senate is a continuous body, one-third of its members being chosen every two years.

In matters of general legislation the powers of the two Houses are coördinate, but to the Lower House pertains the sole power to originate money bills, though the Senate has full authority to amend. To the House belongs the right of impeachment, while all impeachments are tried by the Senate. Unless otherwise provided for by law, the advice and consent of the Senate is required for appointments to the civil service and to the Judiciary, and a two-thirds vote in the Senate is necessary

for the ratification of a treaty negotiated by the President. The Vice-President is the presiding officer of the Senate. He has no vote except in case of a tie. The Senate elects one of its own members to preside in the absence of the Vice-President, or in case of vacancy in the office. The House elects from its own membership a presiding officer, called the Speaker. The conduct of Congressional business has been in both Houses placed more and more in the hands of committees. Each House has about fifty standing committees. The Senate determines the membership of its committees in a party caucus. A majority of each committee and its chairman belong to the party of the majority in the Senate, though the minority party is represented on every committee. The Senate still maintains many of the characteristics of a deliberative body. Freedom of unlimited debate is preserved and the reports of its committees are publicly discussed. In the House the committees are appointed by the Speaker, who is the leader of the party which controls the House. The Speaker and the chairmen of committees whom he appoints control the conduct of business. The Lower House ceased long ago to be a deliberative body. Debate is limited and the Speaker and his party aides determine how the time shall be apportioned. No member may speak and no legislation may be promoted except by the permission of the Speaker. Yet the Speaker is not an absolute dictator; he must, after all, secure the acquiescence of a majority of the House.

It is a fundamental principle of the Constitution that law-making and administration shall be in separate hands. The President is responsible for the execution of the laws; Congress is responsible for the making of laws; yet it is the official duty of the President to recommend legislation, and in many ways he has a share in legislation. When he seeks to persuade members of Congress to support specific measures, he does not transcend his duties. Every act which passes the two Houses must be at once presented to the President for his signature. He may refuse to sign the bill, and may, within ten days, return it to the House in which it originated, with a statement of his objections. Then, unless each House can secure a two-thirds vote in favor of the measure, it is defeated. If the President retains the bill for more than ten days it becomes a law without his signature, unless Congress has in the meantime adjourned. In that case the bill is lost. In these and other ways the President exercises much influence over the making of laws. So likewise the Senate, through its control of appointments and the ratification of treaties, and the House, through its command of finances, both continually influence the ex-

Congreve

ecutive. Much debate has arisen as to whether on the whole political tendencies are in the direction of Presidential domination over Congress or of Congressional domination over the Executive; and further, whether the Senate tends to override both the House and the President, or the Lower House to dominate the Senate and the Executive. Each of these propositions finds earnest and more or less intelligent support. The encroachments of the President, the encroachments of the Senate, the encroachments of the House, and especially of the Speaker of the House, are topics to which a large body of the more recent political discussion has been devoted. The wide divergency in opinion thus displayed may be accepted as satisfactory evidence that the balance of the Constitution is still maintained. See CONSTITUTION OF THE UNITED STATES.

JESSE MACY.

Congreve, William, an English dramatist; born near Leeds in 1670. He entered himself as a student at the Middle Temple, but like many more, both before and since, abandoned the law for literature. His first piece, written at the age of 17, was a romance, entitled "Incognito, or Love and Duty Reconciled." In 1693, being then only 23 years old, he wrote his first comedy, "The Old Bachelor." This produced him not only great reputation, but also the substantial benefit of a commissionership in the hackney-coach office, which was given to him by the Earl of Halifax, who afterward still further patronized and favored him. He wrote also "Love for Love," "The Double Dealer," "The Mourning Bride," "The Way of the World," an opera, and some poems. He died in London, Jan. 19, 1729.

Congreve, Sir William, son of an English lieutenant-general, and the inventor of the Congreve rockets; born in Woolwich, May 20, 1772, and early entered the military service, in which he obtained the rank of lieutenant-colonel. He possessed much inventive talent, which he applied to the mechanic arts; and for several years the rocket which bears his name, and which was first used in the attack on Boulogne in 1806, was considered a grand auxiliary in warlike operations. It was made with a head carrying either a bursting-charge of canister or other missiles or an inflammable composition. Congreve died in Toulouse, France, May 16, 1828.

Coni, or **Cuneo**, the capital of the province of the name in northern Italy, at the junction of the rivers Stura and Gesso, 55 miles south of Turin, in lat. 44° 24' N., and long. 7° 32' E. It was once known as a fortified place of great strength and strate-

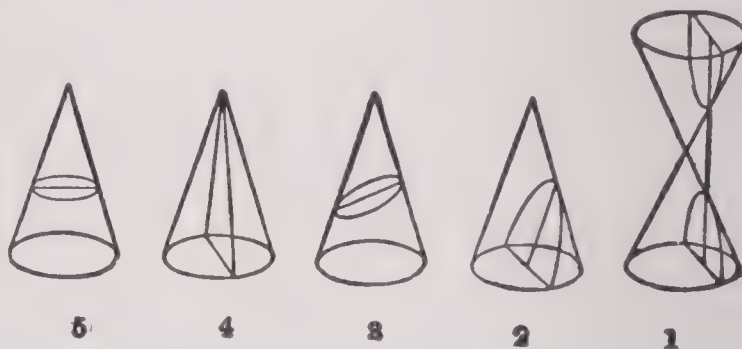
Conic Sections

gic value, and was on several occasions besieged. In 1801 the French dismantled it after the victory of Marengo (*q. v.*). Among the structures of interest are the cathedral and town-house, and a Franciscan church of the 12th century. There are manufactures of silks, woollen goods and paper, and grain, hemp and silk are exported. Pop. (1901), 27,065.

Conia, Coniine, or Cicutine ($C_8H_{17}N$), a volatile alkaloid, the active poisonous principle of hemlock. It exists in all parts of the plant, but especially in the not quite ripe seed. When pure it is a colorless, oily liquid, specific gravity 0.878, changing by exposure to air to a brown fluid, and ultimately to a resinous bitter mass, soluble to a moderate degree in water, readily so in oils, alcohol and ether, and when purified yielding a jelly with a butyric odor. Its boiling point is 167°C.

Conibos (kō-nē'bōs), a tribe of Indians in Eastern Peru, allied to the Ucayale tribe. The Spanish missionaries tried to convert them in 1683, but were driven out after 1695, when Father Ritchie was killed by the savages. They were an agricultural people and built villages. They are now partially civilized and are often employed as canoe men and rubber gatherers.

Conic Sections, three curves, the hyperbola, the parabola, and the ellipse; so called because these curves are formed by the in-



tersection of the surface of a cone with planes that cut the cone in various directions. If the cutting-plane be parallel to the axis of the cone (fig. 1), the curve formed is the hyperbola, which has two branches, as shown in the figure. If the cutting-plane be parallel to a straight line on the surface of the cone (fig. 2), the curve formed is a parabola. Any other section is an ellipse (fig. 3). In the case of a plane parallel to the axis of the cone, when that plane contains the axis, the section, instead of being a hyperbola, is in this limiting case a pair of straight lines meeting each other at an angle equal to that of the angle of the cone so as to form a triangle (fig. 4). When a plane, which would otherwise form a parabolic section, is a tangent

plane to the cone, the parabola degenerates into a straight line passing through the vertex of the cone. Lastly, when a plane that would otherwise form an ellipse is perpendicular to the axis of the cone, the ellipse becomes a circle (fig. 5). The properties of these curves are discussed under their several names.

Coniferæ, an order of plants, one of those recognized in 1751, in the infancy of botany, by Linnæus. Jussieu in 1789 adopted the name. Lindley altered it to *Pinaceæ*, but retained the term Conifers as its English equivalent. Formerly he called them *conaceæ*. They belong to the class or subclass of *Gymnosperms*. They are fine trees or shrubs abounding in resin. Leaves linear, acerose, or lanceolate, entire at the margin, often fascicled. Inflorescence amentaceous, each floret with one stamen or a few united; ovary spread open: it arises from the axil of a membranous bract; ovule naked in pairs or several inverted. Fruit, a cone; embryo with two or many cotyledons. Lindley divides it into two sub-orders, (1) *Abietæ*, with the ovules inverted and the pollen oval, curved; and (2) *Cupresseæ*, with the ovules erect and the pollen spheroidal. Sometimes the *Taxineæ* (Yews) figure as a third, but Lindley makes them a distinct order, and calls them *Taxaceæ* (Taxads). Nearly 200 species are known. They are most useful to man, supplying timber, with oil, resin, and turpentine. They are diffused over the world. Their appropriate habitat is in temperate climates; when in the tropics it is generally high on the mountain-sides.

The wood of the coniferæ may be distinguished from those of ordinary dicotyledons by the absence of proper ducts in the woody layers, and by the presence of large areolar disks on the walls of the wood cells. The wood of the Yew (*Taxus baccata*), and the Douglas Fir (*Abies Douglasii*), are exceptions to this rule. On the other hand, the Winteræ, which are not coniferous, but belong to the Magnoliads, have similar circular disks. When by the chemistry of nature wood is silicified, these areolar disks are at least as visible under the microscope as in recent coniferous wood; and when they occur in fossil stems, or fragments of stems, these are presumably the remains of coniferæ. The ducts or glands also aid in distinguishing genera. When in double rows they are placed side by side in the European pines and firs, but are arranged alternately in the Araucarias. The coniferæ commence at least as early as the Devonian. They are well represented in the Carboniferous rocks, being associated there with the higher Acrogens. They flourish through the Secondary period, and on to present times. The Carboniferous Conifers may have been taxoid (Yew-like), though the genus *Pinites*

also occurs. The species in the Secondary rocks were more akin to the Araucaria of our gardens than to ordinary pines.

Conington, John, an English classical scholar; born in Boston, Aug. 10, 1825. He was educated at Beverley and at Magdalen College, Oxford. In 1854 he was appointed to the newly-founded chair of Latin Language and Literature at Oxford, which he filled until his death, Oct. 23, 1869. His greatest work is his edition of "Vergil" (3 vols., 1861-1868), with its singularly subtle and suggestive essays. His edition of the "Agamemnon" (1848), and "Choephoroi" (1857), of Æschylus are of less moment, though indeed the latter is admirable. In his last years he gave himself much to translation, the results of which were his metrical version of the "Odes" of Horace (1863), the "Æneid" (1866), in Scott's ballad-meter; the "Iliad" (1868), in the Spenserian stanza, and the "Satires and Epistles" of Horace (1869), in the couplet of Pope.

Coniostres, a sub-order, tribe, or division of *insessores* (perchers). They have a conical beak or bill, short and very thick at the base; in some whole, in others it is longer and thinner. The tip is generally entire, or if there is a notch it is small. This adapts the bird for feeding on grain, though some of them also eat insects. Cuvier says that in proportion to the thickness of their bill is the exclusiveness with which they feed upon seeds. There are eight families: (1) *Buceridæ* (horn-bills), (2) *Musophagidæ* (plantain-eaters), (3) *Opisthocomidæ* (hoatzins), (4) *Coliidæ* (colies), (5) *Corvidæ* (crows), (6) *Paradiseidæ* (birds of Paradise), (7) *Sturnidæ* (starlings), and (8) *Fringillidæ* (finches). (Dallas.) By another classification it includes (1) *Bucerotidæ* (horn-bills), (2) *Sturnidæ* (starlings), (3) *Corvidæ* (crows), (4) *Loxiadæ* (crossbills), and (5) *Fringillidæ* (finches and larks).

Coniston Grits and Flags, a series of siliceous sandstones, grits, flags, and conglomerates, belonging to the Silurian system of Cumberland, England, etc. They take their name from Coniston in Lancashire, and attain a maximum thickness of probably not less than 7,000 feet. They are characterized, the finer grained beds especially, by the presence of many species of graptolites and other fossils. They are believed to be on the same geological horizon as the Denbighshire grits and flags of Wales.

Coniston Lake, in the English Lake district, in N. Lancashire; at the E. foot of the Coniston Fells, 9 miles W. of Bowness on Windermere. It is 5 miles long, ½ mile broad, 147 feet above the sea, and its greatest depth is 260 feet. Its waters abound

Conium

with trout and perch. On the E. shore stand Ruskin's home, Brantwood, and Tent House, once Tennyson's residence. The Old Man of Coniston, to the N. W., is 2,633 feet high.

Conium, a genus of umbelliferous plants, family *Smyrniaceæ*. The fruit, which is broadly ovate, has five prominent waved or crenate ribs, without vittæ; the calyx teeth are obsolete, the petals obcordate; the general involucre of few leaves, the partial one with three, all on one side. *C. maculatum* is the common hemlock, the term *maculatum* referring to the spots or purple blotches on the stem. There is a fusiform biennial root. The leaves are tripinnate, the leaflets pinnatifid, with acute and often cut segments. When bruised the leaves smell very unpleasantly. The flowers are greenish-white. They appear in June and July. The plant is 2 to 4, 5, or more feet high. It is common in waste places, by roadsides, and under walls. Various species of hemlock occur in this country, Europe and Asia. Conium is a good anodyne and a valuable medicine in scirrhus, scrofulous tumors, dropsy, and epilepsy. Taken in undue quantities it produces giddiness, dimness of sight, nausea, and paralysis of the limbs. It is not, however, nearly so poisonous as the water hemlock, *Cicuta virosa*. It seems to have been the cicuta and not the conium which was used to poison Socrates. Still the conium is highly dangerous. The extract which renders it so is called conia.

In pharmacy *Conii Folia* are the fresh leaves and young branches of spotted hemlock, *C. maculatum*; also the leaves, separated from the branches and carefully dried, gathered from wild plants when the fruit begins to form. The leaf rubbed with a solution of potash gives out strongly the odor of conia. Preparations: Cataplasma Conii, Extractum Conii, Succus Conii.

Conjugating cells, two cells in some *mucorini*; one at the top of each of two club-shaped bodies, as pressed to one another by their ends, and containing protoplasm. The conjugating cell at the end of each becomes separated from the rest, after which the partition-wall between them disappears, and they unite into a reproductive cell called the zygospore.

Conjunction, in astronomy, one of the aspects of the planets. Two heavenly bodies are in conjunction when they have the same longitude—that is, when the same perpendicular to the ecliptic passes through both. If they have, at the same time, the same latitude—that is, if they are both equally far north or south of the ecliptic—they appear from the earth to be in the same spot of the heavens, and to cover one another. The sun and moon are in conjunction at the period of new moon. In the

Conjuring

case of the inferior planets Mercury and Venus, there is an inferior conjunction when the planet is between the earth and the sun, and a superior when the sun is between the earth and the planet. In general, a heavenly body is in conjunction with the sun when it is on the same side of the earth, and in a line with him; and it is in opposition to the sun when it is on the opposite side of the earth, the earth being in a line between it and the sun. Planets are invisible when in conjunction with the sun, except in rare cases when an inferior planet passes over the sun's disk, and may be seen as a speck on his surface. Conjunctions are either *geocentric* or *heliocentric*, according as they are actually witnessed from the earth, or as they would be witnessed if observed from the sun. In observing a conjunction from the earth's surface it is usual to reduce the observation to what it would be if made from the earth's center; by this means the exact times of conjunction are more accurately fixed, and the observations of one astronomer made available to every other, wherever he may be on the earth's surface. Grand conjunctions are those where several stars or planets are found together. Chinese history records one in the reign of the Emperor Tehuen-hiu (2514–2436 B. C.), which astronomers calculate to have actually taken place.

Conjunction, in grammar, a connective indeclinable particle serving to unite words, sentences, or clauses of a sentence, and indicating their relation to one another. They are classifiable into two main groups: Coordinating conjunctions, joining independent propositions, and subdivisible into copulative disjunctive, adversative, and illative conjunctions; subordinating conjunctions, linking a dependent or modifying clause to the principal sentence. The only active influence which the conjunction can be said to exercise grammatically in a sentence is in respect of the mood of the verb following it in dependent sentences, the rule being to employ the subjunctive where futurity and contingency are implied, the indicative where they are not; as "I will do it though he be there" (which he may or may not be); or "I will do it, though he is there" (which he is).

Conjuring, the production of effects apparently miraculous by natural means. The earlier professors of the art claimed *bonâ fide* supernatural powers; and in ages when the most elementary principles of physical science were unknown beyond a very limited circle, it was not difficult to gain credence for such a pretension. The modern conjurer makes no such claim, but tells the public frankly that his marvels are illusory, and rest either on personal dexterity or on some ingenious application of natural principles.

Conklin

Of the conjurers of remote antiquity we have few reliable records; though it is a tolerably safe conjecture that the prestige of the ancient mysteries rested in no small degree upon effects of natural magic. It may also be gathered that the conjurers of old were familiar with certain forms of optical illusion, in which the use of plane and concave mirrors, and a partial anticipation of the principle of the magic-lantern, played prominent parts. Chaucer mentions illusions of his own day of which the above seems the most probable solution. In the accounts of very early writers, however, large deductions must be made for the comparative ignorance of the observer, and the desire, common to all narrators of extraordinary occurrences, to make the marvel as marvelous as possible. Perhaps the earliest really trustworthy authority is Reginald Scot, who in his "Discoverie of Witchcraft" (1584) has enumerated the stock feats of the conjurers of his day.

The conjurers of Scot's time, and even of much later date, were accustomed, in order to facilitate the substitutions on which a great part of their tricks depended, to wear an apron with pockets, known (from its resemblance to a game-bag) as the *gibécière*. A later school suppressed this tell-tale article of costume, and used instead a table, with cover reaching nearly or quite to the ground. This table concealed an assistant, who worked most of the required transformations, etc., either handing the needful articles to the conjurer as he passed behind the table, or pushing them up through traps in the table-top. Conus the elder, a French conjurer who flourished at the close of the 18th century, made a further improvement by discarding the concealed assistant, and using an undraped table with a secret shelf (now known as the *servante*) behind it, on which his substitutions were made. His immediate competitors did not follow his example, a whole generation of later conjurers, including Comte, Bosco, and Philippe, retaining the suggestive draped table. Its death-blow, however, was struck by Robert Houdin (1805-1871), with whom about 1844 a new era began. The most modern school of conjurers, following the lead of Wiljalba Frikell, etc., represented by Hartz, Herrmann, Buatier de Kolta, Verbeck, Lynn, Bertram, etc., generally aim at producing their magical results with the minimum of visible apparatus. There are, however, signs of a reaction in favor of more spectacular illusions, such as those of Messrs. Maskelyne and Cooke, in which the resources of optical and acoustic, as well as mechanical science, are laid under contribution in aid of conjuring proper.

Conklin, Jennie Maria (Drinkwater), an American author; born in Portland, Me., April 14, 1841. She was educated in the

Connecticut

public schools, and while still in her teens won fame with her stories for children. In 1880 she married Rev. Nathaniel Conklin. Her works include "Miss Prudence," "Tessa Wadsworth's Discipline," and "Fifteen." She originated the "Shut-In Society," an organization of invalids for correspondence. She died in New Vernon, N. J., April 28, 1900.

Conkling, Roscoe, an American legislator; born in Albany, N. Y., Oct. 30, 1829; was admitted to the bar in 1850; sat in Congress as a Republican in 1858-1862 and 1864-1866, and was elected to the United States Senate in 1867, 1873, and 1879. He became an influential member of his party; in 1876 he received 93 votes for the Presidential nomination, and in 1880, by his support of Grant and his personal opposition to Blaine, divided the Republicans into two sections. In 1881 he and his colleague, Thomas C. Platt, suddenly resigned from the Senate, owing to a dispute with President Garfield on a question of patronage, and sought reëlection; but after a warm canvass, both were rejected, though vigorously supported by Vice-President Arthur. Conkling afterward practised law in New York city. He died April 18, 1888.

Connaught (kon'nât), the smallest of the four provinces of Ireland; between Leinster and the Atlantic; area, 4,392,086 acres. Its W. coast is much broken up by numerous bays and inlets, and is thickly studded with islands. The central parts are comparatively level and of limestone formation, while the surrounding and picturesque mountains are formed of sandstone, clay-slate, granite, and quartz. A large proportion of the province is bog, and, generally, it is the least fertile of all the provinces. It is divided into five counties: Galway, Mayo, Roscommon, Leitrim, and Sligo. Pop. (1901) 646,932.

Connecticut, a State in the North Atlantic division of the North American Union; bounded by Massachusetts, Rhode Island, Long Island Sound, and New York; gross area, 4,845 square miles; one of the original 13 States; number of counties, 8; population (1890) 746,258; (1900) 908,355; (1910) 1,114,756; capital, Hartford.

Topography.—Connecticut lies on the S. slope of the New England hill region, and while its surface is diversified by hills and valleys it is in only a few places over 1,000 feet in altitude. The highest elevation is Bear Mountain, Salisbury, 2,354 feet. The State is drained by three large rivers and their tributaries; the Connecticut, rising in New Hampshire, bisects the State in a N. and S. direction, and is navigable for 50 miles; the Thames, formed by the Shetucket, Yantic, and Quinnebaug, is navigable as far as Norwich; and the Housatonic,

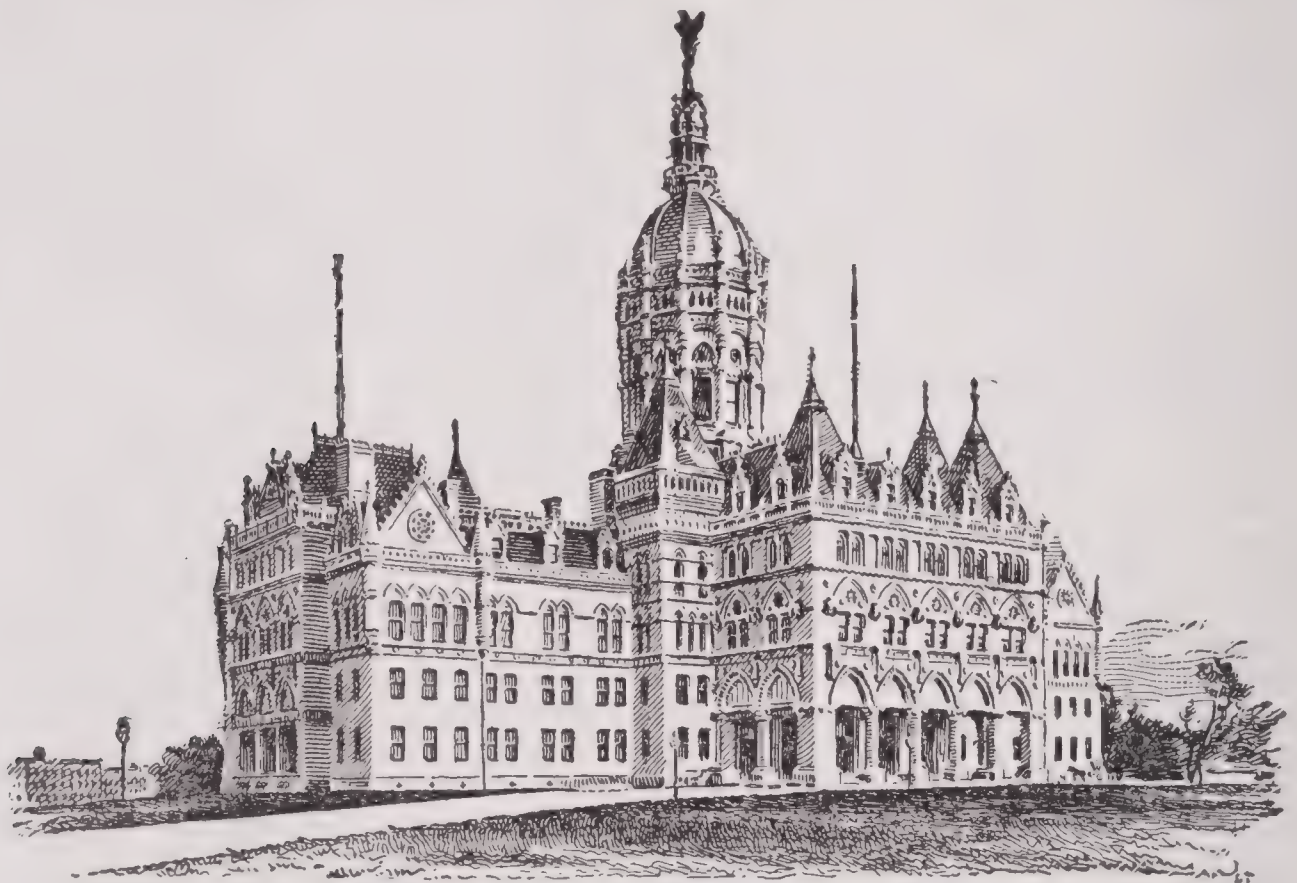
with its main branch, the Naugatuck, navigable to Derby. The coast line is about 100 miles in length and affords many excellent harbors, of which New Haven and New London are the largest.

Geology.—The valley of the Connecticut river exhibits triassic sandstone and post-tertiary formation; but the greater part of the State is of eozoic or primary formation, which is separated into E. and W. sections by secondary rocks. Extensive trap dykes traverse the E. and W. sections, and boulders of great size on the hill tops, together with scratches on the mountain sides, are indications of a glacial passage down the Connecticut valley.

Soil.—Along the coast as far N. as Middletown the soil is very sandy; but the remainder of the Connecticut valley has a

and Massachusetts produced 20,251 long tons of brown hematite and Connecticut alone produced granite to the value of \$682,768, and sandstone, \$215,733.

Agriculture.—The agricultural interests of the State are very important. Cereals, fruits, and vegetables grow in great abundance in the W. valleys, and tobacco in the valley of the Connecticut. During the calendar year 1900 hay was the most valuable product, yielding 427,411 tons, valued at \$7,150,586; white potatoes yielded 2,478,528 bushels, valued at \$1,734,970; corn, 1,771,180 bushels, valued at \$974,149; oats, 578,987 bushels, valued at \$202,645; rye, 239,802 bushels, valued at \$155,871; buckwheat, 60,304 bushels, valued at \$39,198, and wheat, 6,864 bushels, valued at \$5,628. The latest report on the tobacco crop by



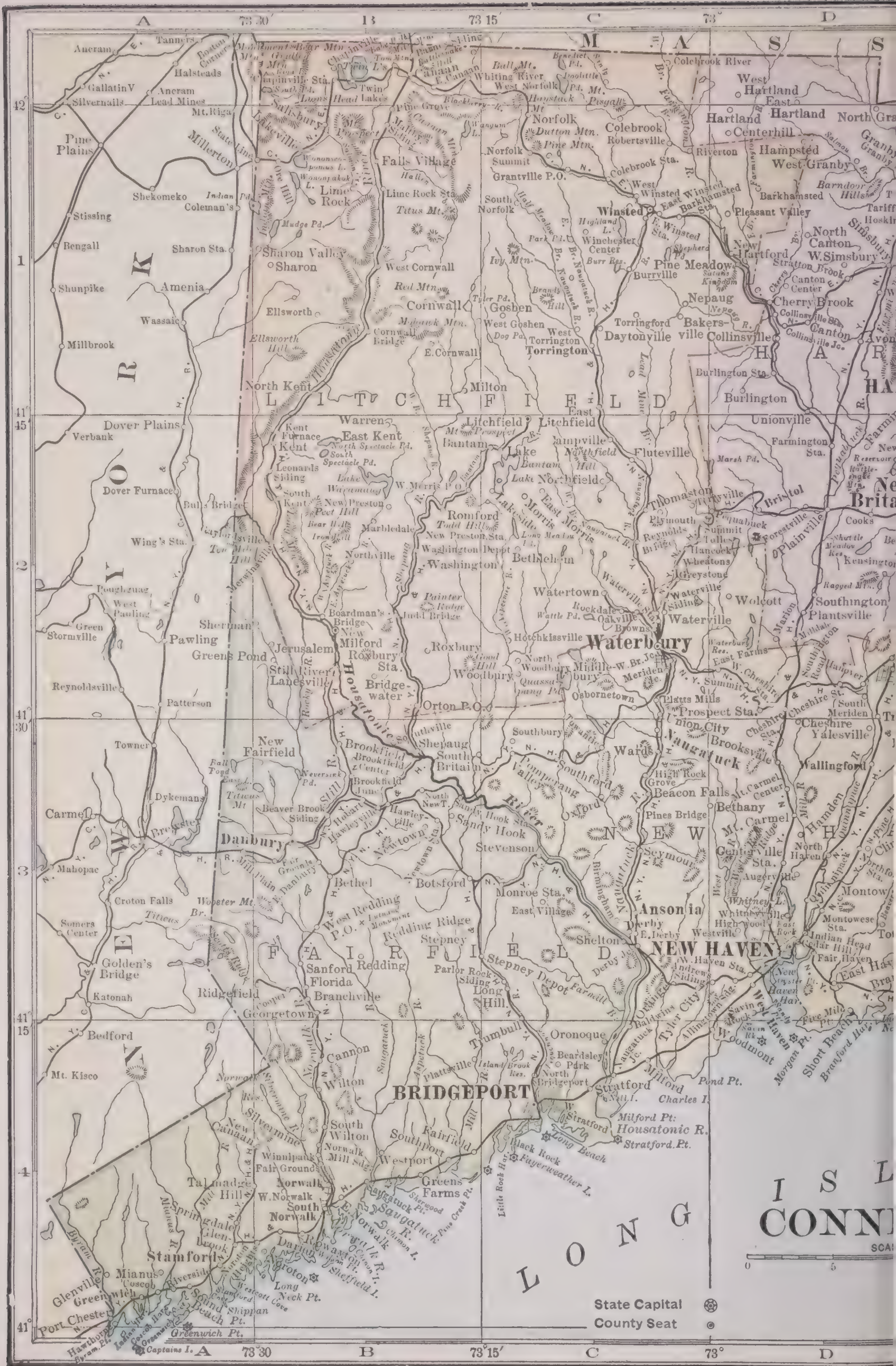
CAPITOL OF CONNECTICUT, IN HARTFORD.

rich deep loamy soil. In the N. E. is a light gray loam and in the S. E. a dark argillaceous soil. The climate is temperate, and there are no swamps or marshes. The trees include several varieties of oak, pine, cedar, tamarack, chestnut, beech, wild cherry, ash, basswood, hickory, walnut, willow, poplar, dogwood, sycamore and holly.

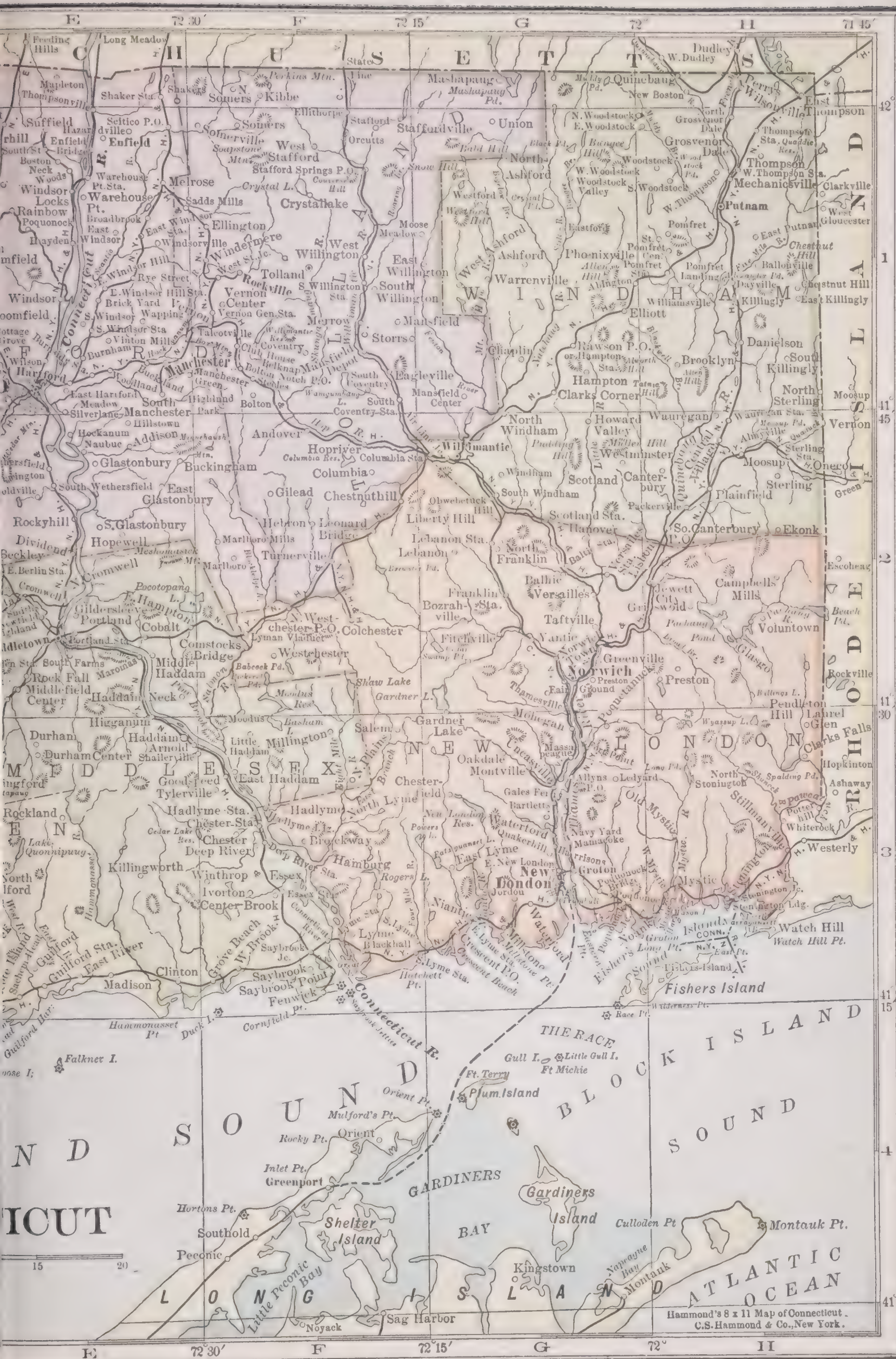
Mineralogy.—Of various mineral productions iron ore is the most abundant. Copper and lead exist, but have never been mined with much profit. Silver occurs in minute quantities. There are immense quarries of red sandstone at Portland and Cromwell, and marble and limestone is quarried at Canaan and Washington, while the largest amount of orthoclase quarried in the United States comes from Glastonbury and Middletown. In 1898 Connecticut

the United States Department of Agriculture, 1896, credited Connecticut with an output of 10,197,450 pounds, valued at \$1,325,668. The tobacco, which is of superior quality and mild flavor, is used chiefly for the wrappers of cigars made from the stronger flavored Havana tobacco. In 1900 there were 44,119 horses, valued at \$3,259,754; 31,808 sheep, valued at \$124,194; 144,529 milch cows, valued at \$5,029,609, and 66,188 other cattle, valued at \$2,045,545. According to the census of 1890 the State had 26,350 farms, comprising 2,253,432 acres, worth with buildings and improvements, \$95,000,595.

Commerce.—During the calendar year 1900, the imports of merchandise at the custom houses at Fairfield, Hartford, New Haven, New London, and Stonington aggreg-



State Capital
County Seat



Hammond's 8 x 11 Map of Connecticut.
C.S. Hammond & Co., New York.

Connecticut

gated \$2,628,184, an increase over the previous year of \$1,549,375; exports, \$4,170. The Sound ports of the State have a considerable coasting trade.

Manufactures.—Connecticut is one of the foremost manufacturing States in the Union. In 1900 there were 9,128 manufacturing establishments reported, employing \$314,696,736 capital and 176,694 persons; paying \$82,767,725 for wages and \$185,641,219 for materials; and having a combined output valued at \$352,824,106. The principal articles were rolled brass and copper (\$29,787,282); foundry and machine shop products (\$18,991,079); hardware (\$16,301,198); and cotton goods (\$15,489,442). Other important manufactures were woolen goods, silk and silk goods, plated and britannia ware, hats and caps, brass castings and finishings, corsets, and worsted goods. In the fiscal year 1898-1899 the collections of internal revenue on taxable manufactures aggregated \$2,916,759.

Banking.—In 1900 there were 84 National banks in operation, having \$20,546,020 capital, \$10,390,354 in outstanding circulation, and \$12,933,280.14 in reserve. There were also 8 State banks, with \$2,240,000 capital, \$7,145,744 in deposits, and \$10,504,875 in resources. In the year ending Sept. 30, 1900, the exchanges at the United States clearing-houses at Hartford and New Haven aggregated \$206,702,591, a decrease over the previous year of \$14,595,210.

Education.—In 1899 the school population was 209,300; enrollment in public schools, 151,325, and average daily attendance, 109,951. There were 1,620 public schools; 4,085 teachers; public school property valued at \$10,192,747; receipts of the year, \$3,054,797; and expenditures, \$3,120,516. For higher instruction there were 68 public high schools; 62 private secondary schools; 4 public normal schools, at Bridgeport, New Britain, New Haven (State Normal School), and Willimantic, and Yale University, New Haven (opened 1701, Cong.); Wesleyan University, Middletown (1831, M. E.), and Trinity College, Hartford (1824, P. E.). Among the principal private secondary schools are: the Hotchkiss School, at Lakewood; Morgan School, at Clinton; David M. Hunt School, at Falls Village; Porter and Dow's School, at Farmington; Norwich Free Academy, at Norwich; and Bulkley School, at New London.

Churches.—The strongest denominations numerically in the State are the Roman Catholic, Congregational, Methodist Episcopal, Protestant Episcopal, Baptist, Lutheran, Presbyterian, and Disciples of Christ. All denominations reported in 1890: organizations, 1,149; churches and halls, 1,175; members, 309,341; and value of church property, \$16,985,036. In 1899 there were 1,200 evangelical Sunday-schools, with 20,-

000 officers and teachers, and 125,000 scholars.

Railroads.—The total length of railroads within the State Jan. 1, 1900, was 1,024.55 miles, of which 16.40 miles were constructed during the previous year. The principal railroad systems are the New York and New England, New York, New Haven and Hartford, the New London Northern, the New Haven and Northampton, the Housatonic, the Central New England, the Norwich and Worcester, and the Naugatuck.

Post Offices and Periodicals.—In 1900 there were about 510 postoffices of all grades, and 190 periodicals, of which 46 were daily, 98 weekly, and 28 monthly.

Finances.—In 1900 the net debt was \$2,108,873. The assessed valuation was formerly one-half the actual value, but in 1900 it was slightly higher, amounting to \$570,163,749.

State Government.—The governor is elected for a term of two years and receives a salary of \$4,000 per annum. Legislative sessions are held biennially. The Legislature has 255 members in the House and 24 in the Senate, each elected for a term of two years, and receiving \$300 for the regular sessions and mileage one way at 25 cents per mile. Connecticut sends five Representatives to Congress.

History.—The first settlement in Connecticut was made at Hartford, in 1633, by the Dutch. The first constitution was adopted in Hartford in 1639, and formed the basis of the charter of 1662. In 1686 the royal governor, Andros, attempted to obtain the charter, but, according to popular belief, it was hidden in the hollow of an oak tree. On the dethronement of James II. the Colonial government resumed its functions. Connecticut took an active part in the French, Indian, Revolutionary, English (1812), and Civil Wars. She instructed her delegates in the Continental Congress to propose a declaration of independence, and was the fifth State to ratify the Federal Constitution. The Hartford Convention, most memorable of gatherings in the State, assembled Dec. 15, 1814. It protested against the war with England and against the action of the National Government with reference to State defence. This convention, which adjourned Jan. 5, 1815, raised the Federal party in the estimation of the people. GEORGE S. LOUNSBURY.

Connecticut, a river of the United States, the W. branch of which forms by treaty the boundary between the United States and Canada to lat 45° N. It rises on the N. border of New Hampshire; forms the boundary between Vermont and New Hampshire, passes through the W. part of Massachusetts and the central part of Connecticut, and falls into Long Island Sound. It is navigable for vessels drawing from 8

Connecticut Reserve

to 10 feet for about 300 miles from its mouth, subsidiary canals, however, being required above Hartford; total length, 450 miles. It is famed for its shad fisheries.

Connecticut Reserve. See WESTERN RESERVE.

Connellsville, a borough in Fayette county, Pa.; on the Youghiogheny river, and the Baltimore and Ohio and the Pennsylvania railroads, 57 miles E. of Pittsburgh. It is the center of the most extensive coke burning region in the United States, the ovens here producing 5,462,490 short tons in 1898. It also contains one of the largest lock factories in the country. Other important industries are machine shops, pump works, brick works, and coal mining. It is the seat of Cottage State Hospital; and has electric lights, electric railways connecting with South Connells-ville and adjacent towns, several newspapers, 3 National banks, and an assessed property valuation of \$4,000,000. Pop. (1900) 7,160; (1910) 12,845.

Connelly, Celia Logan, an American journalist; born in Philadelphia, in 1839. She was educated in private schools and became the wife of the American artist, Kellogg, in 1859. Her literary career began in London, but she returned to the United States after the death of her husband, and in 1872 married James H. Connelly. Her works include "Her Strange Fate," "Sarz," many short stories and articles in magazines and newspapers, and the plays, "An American Marriage" and "Gaston Cadol." She died June 18, 1904.

Connelly, James H., an American journalist; born in Pittsburgh, Pa., in 1840. He began newspaper work when 17 years old, writing for leading Chicago, New York, and San Francisco journals. He was a volunteer officer in the Civil War. His writings include short stories and special articles for newspapers and magazines, and novels, notably, "My Casual Death." After 1889 he was prominent in the Theosophist movement. He died March 15, 1903.

Connemara ("the Bays of the Ocean"), a boggy and mountainous district occupying the W. portion of county Galway, Ireland; about 30 miles in length and 15 to 20 miles in breadth. Its coasts are very broken, and there are numerous small lakes. It is subdivided into Connemara Proper in the W., Jar-Connaught in the S., and Joyce Country in the N.

Conning Tower, the place in modern battleships where the commander stands during a naval engagement, and from which he directs the movements of the ship and men. The conning tower is built over the forward turret and is a circular chamber, scarcely 6 feet across and protected by walls of steel 12 inches thick. The roof is also

Conquest

of solid steel. Between the arched roof and the walls is a narrow slit from which the eye can sweep the whole horizon. The sharp pointed bow of the boat is just below, and directly in front are the two big guns that protrude from the turret. Throughout the engagement the commander is invisible to his men, his voice alone being heard through the speaking tubes and telephone with which the turret is fitted. In its center are the steam-steering wheel, binnacle and compass, and by the directing hand of the commander, standing beside the compass, the battle is fought. He touches one button and the great engines drive the boat through the water; another signals the discharge of the heavy guns; the touch of a third loosens the torpedoes, while a word through a tube sends a storm of steel and lead flying from the machine guns on the upper decks and in the round top.

Conodonts, minute fossils met with in Palæozoic strata. They are variable in form, and look very like the teeth of different kinds of fishes, some being simple slender pointed sharp-edged cones, while others are more complex, resembling in form the teeth of certain sharks. Their affinities are very uncertain—some maintaining that they are really the minute teeth of fishes allied to the living hag-fishes and lampreys—others suggesting that they have more analogy with the hooklets or denticles of annelids and naked mollusks.

Conoid, in geometry, a surface generated by a straight line moving in such a manner that it constantly touches a curve and another straight line; similar to the cone, but having a straight line instead of a point for its apex.

Conon, a celebrated astronomer of Samos, who lived in the 3d century B. C.

Conon, an Athenian general, was the son of Timotheus. Having been defeated in a naval engagement at Ægospotamos by Lysander, he for a time went into exile; but being aided by Artaxerxes, King of Persia, he returned and defeated the Spartans near Cnidos, 394 B. C. Conon then began to rebuild the fortifications of Athens, and restored it to liberty and security; but being sent on a political mission to Tiribazus, a Persian satrap, he was imprisoned, and it is not known what became of him.

Connor, Ralph. Pen name of GORDON, CHARLES WILLIAM.

Conquest, in the law of succession in Scotland heritable property acquired during the lifetime of the deceased, by purchase, donation, or excambion; so called in opposition to that to which he has succeeded, which is called Heritage. The distinction was abolished by the Conveyancing Act, 1874. Conquest, in a marriage-contract, is property acquired by the husband during

the marriage as distinguished from what he possessed before the marriage. Such property was frequently but is now rarely settled either on the heir or on the issue of the marriage.

Conrad I., Count of Franconia; was elected King of Germany in 911; but Arnulf, Duke of Bavaria, and Henry, Duke of Saxony, disputed his title, and engaged the Huns to overrun Germany. Conrad is said to have received a mortal wound in combat with these revolted chiefs. He died in 918.

Conrad II., son of Henry, Duke of Franconia; was elected King of Germany in 1024. Attempts were made to displace him, but without success, and in 1027 he was crowned emperor at Rome, in the presence of Canute, King of England, and Rudolph, King of Burgundy. As heir to Rudolph, who died in 1033, Conrad became King of Burgundy. He died in 1039.

Conrad III., Duke of Franconia, of the house of Hohenstauffen; born in 1093; was elected emperor in 1138. His title was disputed by Henry the Proud, Duke of Saxony, and the rivalry of these two princes was the germ of the factions afterward so famous under the names of Guelfs and Ghibellines. In 1146, at the diet held at Spire, Conrad was persuaded by the eloquence of St. Bernard to undertake a crusade, on which he set out the following year. It was fruitless and disastrous, and Conrad returned with the wreck of his army in 1149. He died in 1152.

Conrad IV., Duke of Suabia, chosen King of the Romans in 1237, son of the great Emperor Frederick II., and like him excommunicated by the Pope, Innocent IV., who set up a rival emperor in William, Count of Holland. On the death of his father, in 1250, Conrad marched into Italy to recover the towns which had declared against him. He took Naples, but could not get the investiture of the kingdom of Sicily from the Pope. He died in Italy in 1254. See CONRADIN.

Conrad, George, pseudonym of Prince George of Prussia; a German dramatist; born Feb. 12, 1826. He has experimented successfully with various forms of dramatic literature; and among his productions, "Phædra," a metrical drama, "Where Is Happiness?" a comedy, and "The Marchioness of Brinvilliers," a tragedy, may be cited as specimens of a trained and true talent.

Conrad, Robert Taylor, an American lawyer and dramatist; born in Philadelphia, June 10, 1810. He wrote: "Aylmere" (1852), a tragedy in which Edwin Forrest played the role of Jack Cade; "Conrad of Naples," a tragedy; "Poems," (1852), etc. He died in Philadelphia, June 27, 1858.

Conradin, the son of Conrad IV., Duke of Suabia, and the last of the house of

Hohenstauffen; born in 1252. As the greatest part of the possessions of his family had been swept away, Conradin accepted the invitation of the Italian Ghibellines to place himself at their head. He crossed the Alps with 10,000 men; was well received at Verona, and, notwithstanding the treason of his relatives Meinhard and Louis of Bavaria, who left him with but 3,000 men, he entered South Italy. Charles d'Anjou, on whom the crown of Naples had been bestowed by Pope Urban IV., met Conradin at Tagliacozzo, defeated him, and caused him to be beheaded, in 1268.

Conrad von Wurzburg, one of the most celebrated poets of the Middle Ages. Conrad is fertile in imagination, learned, and — although marking the decline of Middle High-German poetry by his prolix and artificial style — probably the most perfect master of German versification that had appeared up to his own day. His last poem, which he left in an unfinished condition, has for its subject, "The Trojan War." But he appears to most advantage in his smaller narrative poems, of which the best are "Engelhart," "Otto," "Der Welt Lohn," "Silvester," "Alexius," "Der Schwanritter," and "Die Goldene Schmiede." His "Lieder" have been edited by Bartsch (1870). He died in Basel in 1287.

Conried, Heinrich, a German theatrical manager; born in Bielitz, Austria, Sept. 13, 1855; came to the United States in 1877; became manager of the Irving Park Theater, New York, in 1892; and succeeded Maurice Grau as manager of the Metropolitan Opera House in 1903. After much litigation with the heirs of the great composer, he produced Wagner's great musical drama "Parsifal" at the Metropolitan Opera House on Christmas Eve, 1903, the first time it had been rendered outside of Baireuth. He died April 27, 1909.

Consanguinity, the quality or state of being related by blood; nearness of kin; descent from a common ancestor. Consanguinity is of two kinds, lineal and collateral. Lineal subsists among persons who descend in what may be called a straight line from a common ancestor; thus grandfather, father, son, grandson, great-grandson have lineal consanguinity. Collateral consanguinity is when there is descent from a common ancestor, but not in a direct line; as grandfather, father, his brother, son of the first, etc. Here the line is not direct. If A has two sons, each of whom has children, these children are related to each other by consanguinity. Consanguinity, which is of Latin origin, is nearly the same as kindred, which is Anglo-Saxon.

Conscience, the moral sense, the internal monitor which signifies approval when we do well, and inflicts more or less

Conscience

acute and lasting pain when we act sinfully. It is generally held to be the vicegerent of God, or, as Byron calls it, the oracle of God, letting us know what the Divine judgment on our conduct is; but here the difficulty arises that the indications of the conscience are often wrong. Saul of Tarsus was conscientious when he took part in the cruel martyrdom of Stephen and subsequently persecuted the Christians, but, in popular phrase, his conscience was not enlightened. This suggests that conscience is not a simple but a complex part of our nature. In its decisions there mingles first an operation of fallible intellect judging of conduct, then follows an emotional part generating the satisfaction or the dissatisfaction produced by that judgment. In this case the emotional part would be the vicegerent of God, and unerring, such mistakes of reasoning as might be committed being those of the intellect. Moral sensibility may be blunted by neglect of the monitions of conscience till at length it scarcely operates, the state being reached in which, to use Scripture phraseology, "the conscience is seared as with a hot iron."

Conscience, Hendrik (kôn-syons'), a Flemish novelist, one of the re-creators of Flemish literature; born in Antwerp Dec. 3, 1812. His first story, "In the Wonder-Year 1566," was received with unbounded popular favor, and his delineations of lowly Flemish home life soon became familiar throughout Europe. His historical novels, "The Lion of Flanders" (1838) and others, won his widest fame; but his distinctive power and merit were in his peasant studies, of which the masterpieces are "Siska van Roosmael" (1844); "The Conscript" (1850); "Rik-ke-tikke-tak" (1851); "The Poor Nobleman" (1851); "The Luck to be Rich" (1855). He wrote a musical drama, "The Poet and His Dream" (1872). He died in Brussels Sept. 10, 1883.

Conscience Money, stolen or wrongfully acquired money returned to its rightful owner (specially to the government) when conscience is awakened to a sense of right dealing. In the United States such money paid into the Treasury at Washington by self-avowed debtors anonymously is known as the Conscience Fund. This fund reaches a large sum every year. In England the phrase is applied to money forwarded, as a rule anonymously, to the Chancellor of the Exchequer for unpaid income-tax. It amounts to some thousand pounds a year.

Consciousness, the state of being conscious; knowledge or perception of what passes in one's own mind. The act of the mind which makes known an internal object. Internal sense or knowledge of guilt or innocence. Consciousness is the recogni-

Conscription

tion by the mind of its own acts. While it is thus a comprehensive term for the complement of all our mental energies, it, nevertheless, from its high generality, cannot at all be defined. It is so elementary that it is impossible to resolve it into any notion more simple than itself. But while consciousness cannot logically be defined, it may still be philosophically analyzed. The forms under which this condition of all thinking operates, are: I know that I know, I know that I feel, and I know that I desire; or, in other words, I am conscious that I know, feel, and desire. And while this is so, the act necessarily involves, 1, a knowing mind; 2, a known object; 3, a recognition by the mind of its object. It accordingly appears that consciousness and knowledge mutually involve each other; they are not opposed as really diverse. It is somewhat remarkable that a term in all ways so important and convenient should have escaped the subtle Greeks and the rhetorical Latins, and that it should have been reserved for Descartes, a Frenchman, to introduce the term *conscientia*, or consciousness, in its modern signification.

Conscription, the enlisting (*enrôlement*, in French) of the inhabitants of a country capable of bearing arms, by a compulsory levy, at the pleasure of the government. It is distinguished from recruiting, or voluntary enlistment. The name is derived from the military constitution of ancient Rome. Every Roman citizen was obliged to serve as a soldier from his 17th to his 45th year; hence no recruiting, in the modern sense of the word, took place, but only levying (*delectus*). According to law, four legions of infantry, two for each consul, were annually levied. The consuls, who in the time of the republic were always commanders of the army, announced every year, after the legionary tribunes were elected, by a herald or a written order, that a levy was to be made (*milites cogere, colligere, scribere, conscribere*). This was the proper conscription.

All citizens who were capable of bearing arms were obliged, under penalty of losing their fortune and liberty, to assemble in the Campus Martius, or near the capitol, where the consuls seated in their curule chairs, made the levy by the assistance of the legionary tribunes. The consuls ordered such as they pleased to be cited out of each tribe, and every one was obliged to answer to his name, after which as many were chosen as were wanted. This lasted until the time of the emperors, when large armies were constantly required; these were generally recruited in the provinces.

The word conscription was introduced into the French language as well as the system into France, by the law of 19th Fruc-

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tidor, year VI. (Sept. 5, 1798), which declared that every Frenchman was a soldier, and bound to defend the country when in danger. Excepting in times of danger it provided that the army should be formed by voluntary enrollment or by conscription. The number of conscripts to be called into the service each year was to be determined by the Corps Législatif. The conscription included all Frenchmen from 20 years of age complete to 25 years complete. The conscripts were divided into five classes by the number of the completed years of their age. They could only be struck off the list on being officially found incompetent for service. Each conscript not in active service was discharged on completing his 25th year. In time of peace all conscripts were discharged absolutely at this age. The first class, that is from 20 to 21, were first called out; the second were only called out when all the first were in active service, and so on.

When the requisite number was made up, the name and surname of the last conscript on the list, his canton and department, the year, the month, and the day of his birth were published by proclamation throughout the republic. By this proclamation all conscripts up to this age were notified to join the colors.

At first the conscripts of the first class were found sufficient, and complaints of the conscription did not begin till 1802, on the introduction of a principle of indemnity, by which a payment ranging from 50 to 1,200 francs (\$10 to \$240), according to the annual taxation of the parents of the conscript, secured him exemption. By 1804 the increasing demands of the conscription had so greatly augmented the number of refractory conscripts as to call for the serious attention of the legislature. The conscription legislation was amended by the law passed on the 8th Fructidor, year XIII. (Aug. 26, 1805).

The selecting of the conscripts by lot was then introduced the only sons of widows and those whose brothers were in the army being exempted. This law also admitted substitution which had previously been practised by connivance. Although drawing by lot was established, the classes were maintained, and an individual who was drawn one year, and paid for a substitute, could be drawn again the next. The levies were always large under the empire. For the last 15 months (September, 1812, to November, 1813) they reached the enormous number of 1,260,000. The conscription was attended with gross abuses in the matter of exemption and substitution, and it was chiefly in consequence of these that on the restoration of the Bourbons it was abolished. It was, however, reënacted in its substantial features by the law of Marshal Gouvion de St. Cyr, and continued through

Conscription

the Revolution of 1848 and the Second empire.

Under the monarchy the demands of the conscription were comparatively light and the abuses few. The wars of the Second empire made the demands much heavier, and the old abuses in exemption and substitution reappeared. In the intervals of peace, while the army was kept up to a war footing, particularly in the latter part of the reign of Napoleon III., these abuses assumed the most venal form. The ranks of the army were filled up on paper, while officials of various ranks pocketed the price of substitutes instead of providing them. On the outbreak of the Franco-Prussian War the hollow machine which had thus been gradually taking the place of an army collapsed, and involved in its fall the ruin of the empire.

A new army bill which was promoted by the government of M. Thiers, was passed by the National Assembly in July, 1872. The terms of service was 20 years, but by subsequent enactments this has been extended to 25, viz., 3 in the regular army, 10 in the army reserve, 6 in the territorial army, and 6 in the territorial reserve. A youth may volunteer into the army at 18, but at 20 he is compelled to serve, with certain exceptions.

The Prussian military system was indirectly the work of Napoleon. By the treaty of Tilsit in 1807 he obliged Prussia to undertake during the next 10 years not to keep on foot more than 42,000 men. This induced Scharnhorst to adopt the principle of frequent levies and a short period of training and enlistment, which he carried out with so much success that in 1813 Prussia was able to take her place again as a first-class power. The Prussian military system is now extended to the German empire. Its terms in regard to conscription were fixed by a law passed in 1887, and are obligatory service for all subjects; the total length of the service being 12 years, 3 in the active army, 4 in the reserve, and 5 in the landwehr. The age of service begins with Jan. 1 of the year in which the conscript completes his 20th year. All those between 17 and 20, and between 32 and 42, who are capable of bearing arms, belong to the landsturm, which is only called out on great emergencies. By the Army Bill of 1893 the three years' term was reduced to two.

The Russian army has been completely remodeled in recent years. It has long been partly raised by conscription, and by a law (subsequently modified) which came into force in 1874 an annual conscription was established, to which all men who have completed their 21st year and are not physically incapacitated, are liable. The men have to serve in the active army for 5 years, after which they pass into the re-

Consecration

serves for 18 more years, during which they are liable to active service only in time of war.

In time of peace the reserve men are called out for short periods of drill. Young men possessed of a certain degree of education may volunteer for service at the age of 17, and may pass into the reserve as privates after a short period, or be appointed officers. In Austria military service is compulsory for all citizens, and the length of service is 12 years, viz., 3 in the standing army, 7 in the reserve, and 2 in the landwehr.

In Great Britain and the United States a small militia is usually kept up in time of peace, but the regular army and navy are recruited by voluntary enlistment. In Great Britain volunteer recruitment is commonly found to be sufficient to raise the contingents for the militia required from the separate counties.

Consecration, the act of solemnly dedicating a person or thing to the service of God. In the Jewish law, rites of this nature are frequently enjoined, the Levites and priests, the tabernacle and altar, etc., being specially dedicated or consecrated to God; and analogous forms occur in most pagan nations. Among Christians the word consecration describes—the ordination of bishops. The Nicene Council requires the ceremony to be performed by not less than three bishops. This rule is maintained by the Church of England. Among Roman Catholics the Pope may permit Consecration by one bishop and two priests. The hallowing of the elements in the eucharist, by the words of institution according to Roman Catholics and Anglicans; by the invocation of the Holy Spirit according to the Greeks. The dedication of churches; first mentioned by Eusebius. The rites, originally very simple, have become long and elaborate in the Church of Rome, though the present form is in substance as old as the Sacramentary of St. Gregory. In the English Church the bishop chooses his own form. That most generally used was drawn up by the Anglican episcopate in 1712. In the American Episcopal Church a form was appointed in 1799. The benediction of abbots and abbesses according to forms prescribed in the Roman Pontifical. It is usually performed by a bishop. The consecration of altars, chalices, and patens by the bishop with the chrism or hallowed oil. The Consecration of altars is mentioned by councils of the 6th century, that of chalices and patens in the Gregorian Sacramentary.

Consent, in law, is understood to be a free and deliberate act of a rational being. It is invalidated by any undue means—in-

Conservatory

timidation, improper influence, or imposition—used to obtain it. Idiots, pupils, etc., cannot give legal consent; neither can persons in a state of absolute drunkenness, though partial intoxication will not afford legal ground for annulling a contract.

Consequential Damages, in law, are such losses or damages as arise out of a man's act, for which, according to a fundamental principle in law, he is answerable if he could have avoided them. The same law applies to railways and corporations generally, as determined in numerous cases.

Conservation, the act of preserving, maintaining, supporting, or protecting. The conservation of energy is a principle based on the general one that energy communicated to a body or system of bodies is never lost; it is merely distributed and continues to exist as potential energy, as motion or as heat. Faraday directed attention to the subject, Grove elaborately treated it, and it now stands as one of the axioms of physics. It is sometimes called correlation of forces.

Conservative, as applied to one of the two great parties in English politics, was first used by J. W. Croker in an article in the "Quarterly" for January, 1830, and was by Macaulay in the "Edinburgh" for 1832 referred to as a "new cant word." Conservative accordingly began to supersede Tory about the time of the Reform Bill controversies. The plural form of the word has been assumed as a distinctive name by certain political parties in many nations. These parties are sometimes actually, and always avowedly, opposed to changes from old and established forms and practices. In United States history these names have never been in general use, but in Van Buren's administration the name of Conservatives was applied to those Democrats that at the special session of Congress, of September, 1837, opposed the establishment of the sub-treasury system. In the Congress that met in December, 1839, they had practically disappeared. The name was also assumed by Southern whites during the reconstruction period following the Civil War, to show their adherence to the old State governments, the abolition of which by Congress they opposed. In Virginia the name was in use until 1872. The name was also used at the North during this period. The Democrats applied it to themselves to draw moderate Republican votes.

Conservatory, a name given on the European continent to a systematic school of musical instruction. In Great Britain the term is usually applied to foreign schools of music. Conservatories were originally benevolent establishments attached to hospitals, or other charitable or

religious institutions. In Naples there were formerly three conservatories for boys; in Venice four for girls; the Neapolitan group being reduced in 1818 to a single establishment under the name of the Royal College of Music. In Milan a conservatory was established in 1808. In France the musical school established in connection with the Opera received its final organization in 1795 under the name of *Conservatoire de Musique*. Among its teachers have been Méhul, Cherubini, Grétry, Boieldieu, and others of like standing. The Conservatorium founded at Leipzig in 1842 under the auspices of Mendelssohn is perhaps the most influential in Germany, though of late years other schools have pressed closely upon it. Institutions of the same description exist in Warsaw, Prague, Munich, Berlin, and Vienna.

Conservatory, in gardening, is a term generally applied by gardeners to plant-houses, in which the plants are raised in a bed or border without the use of pots, the building being frequently attached to a mansion. The principles of their construction are in all respects the same as for the greenhouse, with the single difference that the plants are in the free soil, and grow from the floor instead of being in pots placed on shelves or stages. The distinction, however, is often overlooked.

Conserve, a form of medicine in which flowers, herbs, fruits, roots, are preserved as nearly as possible in their natural fresh state.

Considerant, Victor-Prosper (kôn-sêd-âr-ân'), a French Socialist; born in Salins in 1808. After being educated at the Polytechnic School of Paris, he entered the army, which, however, he soon left to promulgate the doctrines of the Socialist Fourier. On the death of his master (1837), Considérant became the head of his school, and undertook the management of the "Phalange," a review devoted to the spread of their opinions. Having gained the support of a young Englishman, Mr. Young, who advanced the money, Considérant established, on a large estate in the department Eure et Loire, a socialist colony or *Phalanstere*; but the experiment failed, and with it the "Phalange" fell to the ground. Thereafter he continued to promote his views in the "*Démocratie Pacifique*." Among his numerous writings, the chief is the "*Destinée Sociale*," dedicated to Louis-Philippe. In 1849 Considérant was accused of high treason and compelled to flee from France. In Texas he founded a socialist community, "*La Réunion*," which flourished for a time, but afterwards came to nothing. Considérant returned to France in 1869. He died Dec. 27, 1893.

Consideration, in law, the thing given, or done, or abstained from by agreement with another, and in view of that other doing, giving, or abstaining from something. In the United States, consideration in law has the same general signification as in England, and is subject to the same general divisions, "good" or "meritorious" and "valuable." A consideration is an essential element enforceable in law, and must be actual and expressed, or the instrument must be such as to bear evidence of a consideration. By common law statutes reenacted in the United States, negotiable paper and sealed instruments are declared to bear this evidence; but in some States by usage, and in others by statute, courts of equity are empowered to set aside these instruments for want of, or a failure of, a valid and legal consideration on the ground that the instrument was executed on a promise or stipulation not fulfilled.

Consignment, a mercantile term which means either the sending of goods to a factor or agent for sale, or the goods so sent. The term is chiefly used in relation to foreign trade. The receivers of consignments have usually to keep magazines and stores, for the use of which their consigners are charged. The profits of a consigning agency often compare favorably with the occasionally larger, but much less safe profits of original ventures. The consigning trade is protected by special laws. In most countries a consigner can claim his goods and collect all outstanding debts for goods sold on his account by a consignee who has suspended payment.

Consistory, an assembly of ecclesiastical persons; also certain spiritual courts holden by the bishops in each diocese. At Rome the consistory denotes the judicial court constituted by the college of cardinals. The representative body of the reformed church in France is styled consistory.

Consolatodel Mare [It., the consulate of the sea], a code of sea-laws compiled by order of the ancient kings of Aragon. This code has been translated into every language of Europe, and was reprinted, Paris, 1831, in the collection of *Lois maritimes*, by J. M. Pardessus; a collection of sea-laws which is very complete.

Console, a bracket or truss, mostly with scrolls or volutes at the two ends, of unequal size and contrasted, but connected by a flowing line from the back of the upper one to the inner convolving face of the lower. Also called *ancones*.

Consolidated funds, funds so called because consolidated out of several others. In this country loans of different dates have several times been consolidated, the bonds and securities for which are quoted on the market as "consols" (*q. v.*). In England

Consols

the consolidated fund has been created of three loans or funds—the aggregate, the general, and the South Sea funds. It was first formed in 1786. On Jan. 5, 1816, it became as it now is, the consolidated fund of the United Kingdom.

Consols, securities of a consolidated indebtedness, whether of public or private corporation, are in this country quoted as consols. In England, the 3 per cent. consolidated annuities, constituting part of the British funded debt, are indicated by the word. Their value fluctuates perpetually, but within narrow limits; they are generally not much below par. In 1761 4 per cent., and in 1762 5 per cent. consols were created, but the interest upon them was gradually reduced, till now it is only 3 per cent.

Consort, he, she or that which shares the same lot with another; a companion; a partner; an intimate associate; a wife or husband; applied in a modern sense chiefly to persons of royal degree or position, in countries where women are able to reign; as, a queen consort; a prince consort; *i. e.*, the wife of a reigning monarch, or spouse of a queen-regnant. It is also applied to a ship sailing in company with another.

The queen consort, the wife of the reigning king, is, in all legal proceedings, looked upon as a single, not as a married woman. She may purchase and convey lands, grant leases, and do other acts of ownership without the intervention of the king. She may also sue and be sued in her separate person, and possesses courts and officers distinct from those of the king. She pays no toll, and is free from any fine which a court could impose upon women in general; but in other respects she is on a similar footing with the other subjects of the king. In her life and person, however, she enjoys the same protection as the king, it being high treason to design the death of either. The husband of a queen regnant is not endowed by the constitution with any distinctive rights or privileges. All his privileges and honors, therefore, must emanate from the crown, under the form of a warrant, grant, or patent, or else be conferred by act of Parliament introduced after a royal message on the subject. Up to 1857, when the title of Prince Consort was bestowed upon him by letters-patent, the late Prince Albert possessed no distinctive title and no place in court ceremonial but such as was accorded to him by courtesy.

Conspiracy, a secret agreement or combination between two or more persons to commit any unlawful act that may injure any third person or persons. Specifically a combining falsely and maliciously to indict, or to procure the indicting or conviction of any innocent person of felony.

Constable

Every act of conspiracy is a misdemeanor at common law. In June, 1900, the House Committee on the Judiciary, of the United States Congress, reported a bill that aroused widespread interest in the labor and business world because it contained a definition of the word conspiracy. The bill provided "That no agreement, combination or contract by or between two or more persons to do or procure to be done, or not to do or procure not to be done, any act in contemplation or furtherance of any trade dispute between employers and employees in the District of Columbia or any Territory of the United States, or who may be engaged in interstate or foreign trade or commerce, shall be deemed criminal, nor shall those engaged therein be indictable or otherwise punishable for the crime of conspiracy if such act committed by one person would not be punishable as a crime, nor shall any restraining order or injunction be issued with relation thereto. Provided, that the provisions of this act shall not apply to threats to injure the person or the property, business or occupation of any person, firm, association or corporation, to intimidation or coercion, or to any acts causing or intended to cause an illegal interference by overt acts with the rights of others.

"Nothing in this act shall exempt from punishment, otherwise than as herein excepted, any persons guilty of conspiracy for which punishment is now provided by any act of Congress, but such act of Congress shall, as to the agreements, combinations and contracts hereinbefore referred to, be construed as if this act were therein contained."

Constable, in the Middle Ages, an officer under certain European crowns, who had the command of the army, and the cognizance of military matters, and who was judge of the court of chivalry; as, the Constable of France, Lord High Constable of England, Constable of the Tower of London, etc.

A constable in English law is a police officer or person placed in charge of the public peace; more properly applied, at the present time, to a petty officer who keeps the peace in a parish or rural district.

In the United States, a constable is, generally, a petty officer, whose duties include a limited judicial power as conservator of the peace, a ministerial power for the service of writs, etc., and some other duties not strictly referable to either of these heads. They are authorized to arrest, without warrant, on a reasonable suspicion of felony, for offenses against the peace committed in their presence, and in various other cases.

Constable, Archibald, a Scotch publisher; born in 1774. He was the original publisher of the "Edinburgh Review," the

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poems of Sir Walter Scott, the "Waverley Novels," the "Supplement to the Encyclopædia Britannica," and other valuable works. In 1825 he projected the well-known series of works, "Constable's Miscellany." In 1826, however, the firm was compelled to stop payment with liabilities exceeding \$1,250,000. Sir Walter Scott, who was heavily involved, practically sacrificed his life in the endeavor to meet his creditors. Constable himself did not long survive his misfortunes, as he died July 21, 1827. Notwithstanding the unfortunate result of Mr. Constable's business, he did much for the literature of his country by his readiness in appreciating literary merit, his liberality in rewarding it, and the sagacity he displayed in bringing it in an acceptable manner before the public. In the introduction to the "Fortunes of Nigel" he is commended as one "whose vigorous intellect and liberal ideas had not only rendered his native country the mart of her own literature, but established there a court of letters which commanded respect even from those most inclined to dissent from many of its canons."

Constable, Henry, an Elizabethan poet; born in 1556, educated at Cambridge. His chief work was his book on sonnets, "Diana," published in 1592 when few sonnets in the Italian form had been written. He was probably the author also of the "Forest of Fancy" (1579), attributed to Chettle. Suspected of treason against Elizabeth, he was compelled to leave the country in 1595, and on his return in 1601 was confined in the Tower for 3 years. His lyric "Diaphenia" and his pastoral "Venus and Adonis" take a high place in contemporary song. The date of his death is unknown.

Constable, John, an English landscape painter; born in East Bergholt, Suffolk, June 11, 1776; son of a miller. He studied at the Royal Academy; began with portraits and history, but finally fixed upon landscape as his vocation. He produced but little, and all his subjects were English. The National Gallery has his best pictures, "The Cornfield," "The Valley Farm," and "The Hay-wain." In 1824 some of his pictures were exhibited at the Paris Salon along with works by Stanfield and Bonington, and excited great interest among the French artists. Eugene Delacroix was so moved by these works that he re-painted his "Massacre in Scio" after seeing them. To these pictures of Constable a more powerful influence upon modern French landscape art has been ascribed than the facts will warrant. The French themselves have been almost too generous in acknowledging their indebtedness to Constable. The romantic movement which had been felt in so many fields had not left that of land-

Constance

scape art unvisited. Paul Huet, Théodore Rousseau, and Diaz were all working before Constable's pictures went to France; but they were working in obscurity, and were upheld only by one another and by the encouragement of a few amateurs. Georges Michel, one of the greatest of these men, (born 1763, died 1843,) was entirely independent of Constable; but he was hardly known to his own time, and has only been discovered, so to speak, in our own day. What Constable's pictures did was to make a conspicuous rallying-point for the new school; to focus in the public eye the scattered rays of the light that already existed. Lately several good examples of Constable's art have been added to the Louvre, and Mr. Henry Marquand has presented two fine pictures by him to the Metropolitan Museum of Art in New York city. Constable died in London, March 30, 1837.

Constable of Bourbon. See **BOURBON, CHARLES, DUKE OF.**

Constance (Ger. *Constanz*, or *Konstanz*, ancient *Constantia*), city and lake-port of Germany, in the grand-duchy of Baden, occupying the only territory belonging to Germany on the S. side of the Lake of Constance, at the place where that lake communicates with the arm known as the Untersee ("Lower Lake"), and where the Rhine issues from it; 35 miles N. E. Zurich. The chief edifices are a cathedral, the Kaufhaus, in which the famous Council of Constance sat from 1414 to 1418 (and which deposed three anti-popes, and condemned Huss and Jerome of Prague); an ancient palace; a grand ducal residence. One of its suburbs is connected with it by a long covered bridge across the Rhine. The city has manufactories of cotton goods, carpets, chemicals, and sacking. Constance is said to have been founded in 378 A. D. by Constantius Chlorus as a bulwark against the Alemanni. In the Middle Ages, when it reached the height of its prosperity (at the time of the Council it was able to receive 20,000 visitors), it was frequently called Kostnitz. It was annexed to the Austrian dominions in 1549, and to Baden in 1805. Pop. (1905) 24,818.

Constance, Council of, a general council of the Church of Rome, held between 1414 and 1418. The German emperor, the Pope, 26 princes, 140 counts, more than 20 cardinals, 7 patriarchs, 20 archbishops, 91 bishops, 600 other clerical dignitaries and doctors, and about 4,000 priests were present at this ecclesiastical assembly, which was occasioned by the divisions and contestants about the affairs of the Church. After the death of Gregory XI. the French and Italian cardinals could not agree on a successor, and so each party chose its own candidate. This led to a schism which

lasted 40 years. Indeed, when the Emperor Sigismund ascended the throne in 1411, there were three Popes, each of whom had anathematized the two others. To put an end to these disorders and to stop the diffusion of the doctrines of Huss, Sigismund went in person to Italy, France, Spain, and England, and (as the Emperor Maximilian I. used to say in jest) performing the part of the beadle of the Roman empire, summoned a general council. In this council the novel teaching of Wyclif and Huss was condemned as heretical, and the latter was burned July 6, 1415; while his friend and companion, Jerome of Prague, met the same cruel fate May 30, 1416. After the ecclesiastical dignitaries supposed they had sufficiently checked the progress of heresy by these executions they proceeded to depose the three Popes—John XXII. (also called XXIII.), Gregory XII., and Benedict XIII. John, who was present at the council, was forced to consent to his own removal. He escaped, indeed, with the aid of Frederic, Duke of Austria, who was excommunicated and put under the ban of the empire for rendering him assistance, and also lost a large part of his territory. But Frederic at last yielded, delivered John up to the council, and allowed him to be imprisoned. The former Pope now gladly received the humbler office of a cardinal. Gregory XII. experienced a similar loss of dignity. Benedict XIII., in Spain, retained for some time the name of Pope, but was little noticed. Martin V., on the contrary, was legally chosen to the chair of St. Peter. Sigismund now thought a complete reformation might be effected in the affairs of the Church; but the new Pope having retired to Italy against the emperor's will the assembly was dissolved, and his object was not attained. It was first accomplished at the Council of Basel.

Travelers are still shown the hall where the council assembled (now known as the "merchants' hall"); the chairs on which sat the emperor and the Pope; the house where Huss was apprehended, and where his bust is still to be seen; his dungeon in the Dominican monastery; his statue, which serves as a support to the cathedral; and, in the nave of the church, a brazen plate on the spot where the venerable martyr listened to his sentence of death. After the council had been convinced of the heresy of Huss, the Bishop of Concordia read, in the cathedral, the sentence that his books should first be burned, and that he, as a public and scandalous heretic, and an evil and obstinate man, should be disgracefully deprived of his priestly dignity, degraded, and excommunicated. The sentence was immediately executed, and began with the degradation. The Bishop of Milan and six other bishops led Huss to a table where lay the garments used in the mass, and the

other raiment of the priests; they clothed him with them, and when he was in full dress, with the cup in his hand, the bishops once more called upon him to save his life and honor, and to abjure his opinions. Huss refused, and spoke to the people from the scaffold. After he had spoken, the bishops cried out to him "Descend from the scaffold." The Bishop of Milan and another bishop now took the cup, saying, "O Huss, we take from thee the cup in which was offered the blood of Christ; thou art not worthy of Him." The other bishops then came forward, and each one took off some part of the priestly apparel with the same speech. When they had finished with the clothes they scraped his shaven crown (to designate the removal of the oil of consecration). Finally, when the excommunication was ended, they placed on his head a paper crown, nearly a yard high, with devils painted upon it, and the inscription, "John Huss, arch-heretic." The bishops now turned to the emperor and said, "The holy council of Constance now surrenders to the temporal power and tribunal John Huss, who has no longer office or dignity in the Church of God." The emperor arose and took Huss, and said to the palatine Louis, "As we, dear cousin and prince, wear the temporal sword, take this John Huss and have him punished as becomes a heretic." Louis laid down his princely ornaments, and led Huss to the Provost of Constance, to whom he said, "Upon the sentence of our gracious lord, the Roman emperor, and our special order, take this Master Huss, and burn him as a heretic." The governor gave him to the executioner and his attendants, and Huss was burned. See HUSS, JOHN.

Constance, Lake of (ancient *Lacus Brigantinus*; German *Bodensee*), a lake of Central Europe, in which Switzerland, Baden, Württemberg, Bavaria, and Austria meet; forming a reservoir in the course of the Rhine; length N. W. to S. E. 42 miles, greatest breadth about 8 miles; area 207 square miles; greatest depth (between Friedrichshafen and Uttwil) 838 feet; 1,283 feet above sea-level. At its N. W. extremity the lake divides into two branches or arms, each about 14 miles in length; the N. called the *Überlingersee*, after the town of *Überlingen*, on its N. bank; the S. the *Zellersee* or *Untersee*, in which is the fertile island of *Reichenau*, belonging to Baden, about 3 miles long and $1\frac{1}{2}$ broad. The lake, which is of a dark green hue, is subject to sudden risings, the causes of which are unknown. It freezes in severe winters only. The traffic on it is considerable, there being numerous steamers. The shores are fertile, but not remarkably picturesque.

Constant

Constant, Jean Joseph Benjamin, a French portrait painter; born in Paris, June 10, 1845. He studied in the Ecole des Beaux Arts and under Cabanel. He has exhibited with growing distinction, at successive salons, from that of 1860, with his "Hamlet," his "Samson" in 1872, his "Scenes from Algiers" in 1873-1874, his great historical painting of "Mohammed II. in 1453" in the Exposition of 1878, and in 1885 a large Oriental subject, as melodramatic as possible, with splendid rendering of the human figure and strong effects of color. His noble picture of "Justinian" is in the Metropolitan Art Museum, New York. He was decorated with the Legion of Honor in 1878. He died in Paris May 26, 1902.

Constant de Rebecque, Henri Benjamin (kôn-ston'de re-bek'), a French publicist; born in Lausanne, Switzerland, Oct. 23, 1767; popularly remembered as the lover of Mme. de Staël. A member of the Revolutionary Tribunate, he was banished by Napoleon, and later by the Bourbons for accepting Napoleon. Besides many works on political questions and the history of political constitutions, and two on the history of religion,— viz., "Religion Considered in its Source, its Forms, and its Developments," and "Roman Polytheism,"—he wrote a romance, "Adolphe" (1816), which profoundly influenced European literature. He died in Paris, Dec. 8, 1830.

Constantia, a district of Cape Colony, in South Africa; on the E. and N. E. slopes of Table Mountain range, and distant from Cape Town 7 miles. Constantia consists of only three estates, High, Great, and Little Constantia, which have long been famed for the quality of the wines produced upon them. The wines are sweet wines of delicious aroma, both red and white.

Constantine, the ancient *Cirta*, a fortified city and bishopric, in Algeria; capital of the department of Constantine (of which the other chief towns are Philippeville and Bona on the coast, Setif and El Wad in the interior); on a detached rocky height, surrounded on three sides by ravines, crossed in one place by a Roman bridge (in 36° 22' 21" N., 6° 37' E.), elsewhere by four natural bridges. At the bottom of the ravines flows the Wad Rummel, here a turbid and filthy stream. The city has Roman remains, and a citadel on the site of the ancient Numidian fortress, rising 300 feet above the level of the rock. It manufactures saddlery and leathern goods, and exports corn of Tunis. It was taken by the French, Oct. 13, 1837. Pop. (1906) department, 2,025,044; commune, 58,435.

Constantine, Flavius Valerius Aurelius Constantinus, called the GREAT; born A. D. 274; son of the Emperor Constantius Chlorus and of his wife Helena. When Constan-

Constantine

tine's father was associated in the government by Diocletian, the son was retained at court as a hostage, but was educated with the greatest care. After Diocletian and Maximian Hercules had laid down the reins of government, Constantine fled to Britain, to his father, to escape the machinations of Galerius. After the death of his father he was chosen emperor by the soldiery, in the year 306. Galerius was very unwilling to allow him the title of Augustus, and gave him that of Cæsar only. Constantine, however, took possession of the countries which had been subject to his father, namely, Gaul, Spain, and Britain. He overcame the Franks, who had formerly overrun the territory of Gaul, made prisoners of two of their leaders, followed them over the Rhine, surprised and defeated them. He then directed his arms against Maxentius, who had joined Maximian against him. In the campaign in Italy he saw, it is said, a flaming cross in the heavens, beneath the sun, bearing the inscription, "*In hoc signo vinces.*" (Under this sign thou shalt conquer). In the following night Christ himself appeared to him, and commanded him to take for his standard an imitation of the fiery cross which he had seen. He accordingly caused a standard to be made in this form, which was called the *labarum*. Some days after this (Oct. 27, 312) he vanquished the army of Maxentius, under the walls of Rome, and drove it into the Tiber. He then entered the city in triumph, set at liberty all whom Maxentius had unjustly imprisoned, and pardoned all who had taken up arms against him. He was declared by the senate, chief, Augustus, and *pontifex maximus*. In the year 313, together with Licinius, he published the memorable edict of toleration in favor of the Christians. By this every one was allowed to embrace the religion most agreeable to his own mode of thinking, and all the property was restored to the Christians that had been taken from them during the persecutions. They were also made eligible to public offices. This edict marks the period of the triumph of the cross and the downfall of paganism.

Constantine had married his daughter to Licinius; but the latter, jealous of his fame, conceived a mortal hatred against him, which he displayed by persecuting the Christians. Both emperors took up arms and met in Pannonia, A. D. 314. Constantine, surrounded by bishops and priests, besought the assistance of the God of the Christians; while Licinius, calling on his soothsayers and magicians, relied on the protection of their gods. Licinius was defeated, but the conqueror granted him peace. He, however, renewed hostilities, was vanquished again, taken prisoner, and put to death at Constantine's command. Thus the latter became in 325 the sole head of the Eastern and Western Empires. His first

and chief cares were the establishment of peace and order, and the propagation of his religion. Many beneficial decrees were proclaimed by him. Among these were those which abolished all the establishments of debauchery, ordered the children of the poor to be supported at his expense, gave permission to complain of his officers, and promised that the emperor would not only hear complaints, but compensate the complainants for injuries received, when they were proved to exist. He diminished the land-taxes one quarter; and to secure a fair distribution of them, he caused a new valuation of estates to be taken. The State treasury had always been enriched by the property of criminals; but Constantine spared the property of their wives, and ameliorated the condition of their children. Death in prison, he said, was a cruel punishment for the innocent, and an insufficient penalty for the guilty; he therefore ordered all trials of prisoners to take place at once. He forbade the use of unwholesome dungeons and oppressive chains. The reason which he assigned was, that it was his duty to secure the person of the accused, but not to injure him. He gave leave to sick persons, widows, and orphans, to appeal from the local magistrates, and refused this privilege to their adversaries. It had been customary for the heirs of a person deceased to divide his slaves among them; Constantine forbade the separation in these cases of husbands from their wives, and of parents from their children. Divorces had been very common among the Romans, but he made them more difficult. To the Christians he gave permission not only to erect churches, but to be remunerated for the cost of them from his domains. Amid all the cares of government and the occupations of war he found leisure to assemble the Council of Arles to put an end to the schism of the Donatists. The ecumenical council held at Nice, in Bithynia, A. D. 325, was attended by him in person.

On Nov. 26, 329, he laid the foundations of a new capital of the empire, at Byzantium, on the Bosphorus, in Thrace. The city of Byzantium had been almost entirely destroyed by Severus; it was rebuilt by Constantine, enlarged and adorned with open squares, fountains, a circus, and palaces, and called by his own name. Highly favored by nature, it soon rivaled Rome herself. All the wealth of the empire was collected in the East; thither the nations poured their tribute and their trade; and Rome, the ancient mistress of the world, sank from her supremacy. Constantine divided the empire into four parts, which were governed by four prætorian prefects. These four parts contained 13 dioceses, each under the direction of a vicar, and the dioceses comprised 117 provinces. Constantine con-

tributed to bring much evil on the empire by employing mercenary troops to guard the frontiers; and the legions which had occupied the frontiers were dispersed in the provinces. Toward the close of his life he favored the Arians, to which he was induced by Eusebius of Nicomedia; and he even banished many Catholic bishops. In the year 337 he fell sick in the neighborhood of Nicomedia, was baptized, and died after a reign of 31 years.

Constantine committed a great political error in dividing his empire among his three sons, Constantine, Constantius, and Constans. The condemnation of his son Crispus, who had been falsely accused by his stepmother of an attempt to seduce her, has always been considered a stain on his memory. His zeal for Christianity appears to have been excited not less by the knowledge that the religion which was embraced by a majority of the inhabitants of the Roman empire must prevail, and that, of course, the strength of the government must be increased by protecting it, than by a wish to apply its consoling powers to the relief of a heavy conscience. He has been accused of inordinate ambition, excessive liberality, and an Oriental fondness for parade. But he was brave at the head of his army, mild and indulgent in his intercourse with his subjects, the favorite of his people, the terror of his foes. In the year 332 he fought successfully against the Goths, who had already experienced his power. His eldest son gained many victories over them, and about 100,000 of the enemy perished by the sword or by hunger. Constantine made use of his advantages only to grant them a favorable peace, on terms equally beneficial to himself. He took this opportunity to rid his empire of a disgraceful tribute which his predecessors had paid to these barbarians, and to secure his frontier on the Danube. The Sarmatians, who had been expelled their country by the slaves whom they had injudiciously armed against the Goths, and who took refuge in his dominions, he provided with lands in Thrace, Lesser Scythia, Macedonia, and in Italy itself. He even resolved, in his 56th year and but a short time before his death, to take the field against the Persians. He was fond of the sciences as well as of arms, and gave them his protection. He read much, and wrote nearly all his own letters. In Eusebius we find many proofs of his theological learning. Some of the martyrologists have counted him among the saints, and fix the 20th of May as his festival. The Greeks and Russians observe it on the 21st of the same month.

Among all the writers who have attempted to describe the character, influence, and policy of Constantine, Gibbon, from the extent of his researches and the profound-

Constantine II.

ness of his views, appears to deserve the first place, though his impartiality is more than doubtful.

Constantine II., called the younger, eldest son of the above, received as his share of the empire on the death of his father, Gaul, Spain, and Britain. Being desirous, however, of possessing himself of the territory of his brother Constans, he was killed in Italy in 340.

Constantine III. (Novus), born in 612 A. D.; died in 641.

Constantine IV., Emperor of the East, surnamed **POGONATUS**, or the Bearded, was son of Constans II., whom he succeeded in 668. His two brothers, Tiberius and Heraclius, shared the title of Augustus, but had little or no share in the government, and toward the close of his reign, Constantine IV., under the influence of suspicion, had them mutilated and put to death. Constantinople was unsuccessfully attacked by the Mussulmans in 672 and the six following years; and it was during these wars that the famous "Greek fire" was invented. Constantine convoked and took part in the sixth general council held at Constantinople, at which the doctrine of the Monothelites was condemned. He died in 685.

Constantine V., Emperor of the East, succeeded his father, Leo the Isaurian, in 743. He sided with the Iconoclasts, who hurled down the images of the saints, and persecuted the followers of the Roman Catholic Church. He died in an expedition against the Bulgarians in 775.

Constantine VI., Emperor of the East, was son of Leo IV., whom he succeeded in 780. Being only 10 years old when his father died, his mother Irene was his guardian and regent of the empire. On arriving at a mature age he wished to assume the government himself; but Irene, made cruel by ambition, had him imprisoned. He escaped in 790, exiled his mother, recalled her, and finally, ruined by his licentious living, and despised by his subjects, a conspiracy was formed against him, Irene taking the lead in it; and being imprisoned, his eyes were put out by her order. The blind prince languished some time in obscurity, and died in 797.

Constantine VII., was named emperor in 868, during the lifetime of his father, Basilus I., but died in 878.

Constantine VIII., surnamed **PORPHYROGENITUS**, Emperor of the East, succeeded Leo the Wise in 905. He was destitute of energy, and devoted himself chiefly to study. He admitted colleagues to the throne, so that at least five emperors were reigning together. Constantine VIII. left a treatise on state affairs, a geography of the empire, and the "Life of the Emperor Basilus, the Macedonian." He died in 959.

Constantine

Constantine IX., son of Romanus I., reigned with his father and his two brothers, from 919 to 945, during the time that Porphyrogenitus was deposed.

Constantine X., son of Romanus II., succeeded John Zemiscus, and was proclaimed emperor of the East, with his brother, Basil II., who held the principal authority till 1025, when he died. Constantine X. was, after that, sole emperor. He died in 1028.

Constantine XI., surnamed the **GLADIATOR**, obtained the empire in 1042, having married the Empress Zoe, widow of Romanus III. The prince is known alone for his debaucheries. He allowed the Turks to increase their territories at his expense, and to establish themselves in Persia.

Constantine XII., surnamed **DUCAS**, succeeded, in 1059, Isaac Comnenus, who had adopted him. In his reign the Scythians ravaged the empire, and some cities were destroyed by earthquakes. He died in 1067.

Constantine XIII., the last of the Greek emperors, succeeded to the throne in 1448. He was killed in bravely defending Constantinople against Mahomet II., who in 1453 besieged the city with 300,000 men. The heroic valor displayed by Constantine XIII. in this unequal contest demands our admiration; but valor was of no avail, the city was taken by storm, and thus ended the Greek empire.

Constantine, Flavius Julius, a private soldier, who was raised by the army in Britain to the imperial dignity in 409, on which he crossed over to Gaul and conquered that country and Spain. He fixed his court at Arles, where he was besieged by Constantius, the general of the Emperor Honorius, to whom he surrendered on the promise that his life should be spared; but it was basely violated, and both Constantine and his son were put to death, A. D. 411.

Constantine I., King of Scotland from 458 to 479. Constantine II., king from 859 to 871. Constantine III., king from 903 to 943. Constantine IV., usurped the throne, and was killed by the brother of Kenneth, 1062.

Constantine, a Pope who was elected in 708, and died in 714. There was also an anti-pope of this name, who usurped the holy office in 767.

Constantine, Paulovitch, the second son of the Emperor Paul of Russia; born in 1779. In the wars against France he distinguished himself by his personal bravery, though not by his capacity for command. He was the elder brother of the Emperor Nicholas, to whom he ceded the crown on the death of Emperor Alexander I., their brother. Constantine was afterward made Viceroy of Poland, and ruled that unfortu-

Constantine

nate country with great severity. He died in 1831.

Constantine, Nikolaevitch, the second son of the Emperor Nicholas of Russia, and brother of the Emperor Alexander II., grand-duke and great admiral of Russia; born in St. Petersburg, Sept. 21, 1827. In the war of 1854-1856 he had the defenses of the Baltic intrusted to his care, in conjunction with Admiral Lütke; but the policy of the emperor hardly allowed the prince any display of courage or ability. He was made Viceroy of Poland in 1862. He died in St. Petersburg, Jan. 24, 1892.

Constantine Tolmen, a great oblong stone, 33 feet long, 18 wide, and 14 thick, poised on the points of two upright rocks in Cornwall, England. This uplifted mass weighs 750 tons, and is a freak of nature.

Constantinople ("city of Constantine") called by the Turks STAMBOUL; a celebrated city of Turkey in Europe; capital of the Turkish Empire; on a promontory jutting out into the Sea of Marmora, having the Golden Horn, an inlet of the latter, on the N. and the Bosphorus on the E. The city proper is thus surrounded by water on all sides excepting the W., where is an ancient and lofty double wall 4 miles in length, stretching across the promontory. On the opposite side of the Golden Horn are Galata, Pera, and other suburbs, while on the Asiatic side of the Bosphorus entrance is Scutari. Occupying the extreme point of the promontory on which the city stands is the Seraglio or palace of the Sultan, which, with its buildings, pavilions, gardens, and groves, includes a large space. At the principal entrance is a large and lofty gate, called Bab Humayum, "the high door" or "sublime porte," from which has been derived the well-known diplomatic phrase.

Of the 300 mosques, the most remarkable are the royal mosques, of which there are about 15, esteemed the finest in the world. First among these is the Mosque of St. Sophia, the most ancient existing Christian Church, converted into a mosque in 1453 on the capture of the city by the Turks. Another magnificent mosque is that of Soliman; after which are those of the Sultana Valide, built by the mother of Mohammed IV., and of Sultan Achmet, the most conspicuous object in the city when viewed from the Sea of Marmora. The streets are mostly extremely narrow, dark, dirty, and ill paved, and exceedingly crooked and tortuous, but there has been a certain tearing up and improvement in the last 20 years owing to the construction of tramways and the railway to Adrianople, which runs along the shore of the Sea of Marmora and past the Seraglio to the entrance of the Golden Horn. The numerous

Constantinople

covered and uncovered bazars are severally allotted to particular trades and merchandise.

Constantinople has but one remarkable square, called the At-Meidan, occupying the site of the ancient Hippodrome. There are about 130 public baths in the city, mostly of marble, of plain exterior, but handsome and commodious within. The numerous cemeteries, mostly outside the western wall, have become vast forests, extending for miles round the city and its suburbs. The few manufactures are chiefly confined to articles in morocco leather, saddlery, tobacco-pipes, fez caps, arms, perfumes, gold, and silver embroideries, etc. The foreign commerce is considerable. The harbor, the Golden Horn, which more resembles a large river than a harbor, is deep, well-sheltered, and capable of containing 1,200 large ships, which may load and unload along the quays. It is about 6 miles long, and a little more than half a mile broad at the widest part. Among the imports are corn, timber, cotton stuffs, and other manufactured goods. The exports consist of silk, carpets, hides, wool, goats'-hair, and valonia.

The suburb Galata is the principal seat of foreign commerce. Here are situated the arsenals, the dock-yard, and the artillery barracks, extending along the Bosphorus for nearly 1½ miles. It is an ancient place. Pera occupies the more elevated portion of the promontory of which Galata forms the maritime port. Both it and Galata have now much of the appearance of a modern European town. Top-Haneh is situated a little further up the Bosphorus than Galata, of which it forms a continuation. It has a government foundry and arsenal for cannon. Constantinople occupies the site of the ancient Byzantium, and was named after Constantine the Great, who rebuilt it about A. D. 330. It was taken in 1204 by the Crusaders, who retained it till 1261; and by the Turks under Mohammed II., May 29, 1453—an event which completed the extinction of the Byzantine Empire. See BYZANTINE EMPIRE and BYZANTIUM. Pop. (1900) 1,125,000.

Constantinople, General Councils of, these include the second, fifth, sixth, the Trullan, and the eighth. The second was convoked by Theodosius the Great, in 381, to put down the enemies of the Nicene Creed, who had already been restrained by his decrees. The fifth general council was held by the Emperor Justinian in 553, to decide the dispute of the Three Chapters, or three doctrines of the Bishops Theodore of Mopsuestia, Theodoret, and Ibas of Edessa, who were suspected of Nestorianism, and declared heretics by the council. The sixth council, held 680-681, condemned the doctrines of the Monothelites, and declared

Constantinople, Strait of

their leaders heretics. As these two councils made no new ecclesiastical laws, the Emperor Justinian II., in 692, again summoned a general council, which, because it was held in the Trullan Palace, was called the Trullan Council. It instituted rigid laws for the clergy, among them those fixing the rank of the patriarchs and the permission of marriage to priests, which were so offensive to the Latin Church that she rejected all the decrees of this council; but in the Greek Church they are still valid. The eighth general council (869-870) declared against the Iconoclasts, deposed Photius, and confirmed St. Ignatius in the see of Constantinople. This council is not recognized by the Greek Church.

Constantinople, Strait of. See BOSPORUS.

Constantius, Chlorus, nephew of the Emperor Claudius II., became Cæsar in 292 A. D., received Britain, Gaul, and Spain as his government, and after reëstablishing Roman power in Britain and defeating the Alemanni, became one of the two Augustuses in 305, but died in York in 306. Constantine the Great was his son.—(2) Constantius, third son of Constantine, was Roman emperor, 337-361 A. D. He fought with the Persians; and after the death in 350 of his brother Constans (who in 340 had defeated their elder brother Constantine), became sole emperor till his death in 361.

Constellation, a group or configuration of stars, within certain boundaries, to which a definite name has been assigned, the



CAPRICORNUS.

name being generally expressed in its Latin for the sake of international convenience and of exactness. This grouping is almost entirely artificial, though some of the configurations bear some resemblance to the object indicated by the name. Most of them date from a time earlier than any au-

Constellation

thentic records can trace, and many of the names have been borrowed from myths and fables. Though quite devoid of any thing like systematic arrangement this traditional grouping is found a sufficiently convenient classification, and still remains the basis of nomenclature for the stars among astronomers.



SAGITTARIUS.

History.—Before the invention of almanacs the risings and settings of the Constellations were looked to by husbandmen, shepherds, and sea-faring men as the landmarks of the seasons, and of the weather which each season was expected to bring; and it is not surprising if the storms or calm weather that usually accompanied such seasons were connected in the popular imagination with the influence of the stars themselves, or of other beings with whom superstition or fable identified them. The earliest description that we have of the Constellations is the poem by Aratus, called "The Phenomena of Aratus," about 280 B. C., but it is not of much scientific accuracy or value. The Greek sphere used by Hipparchus, B. C. 125, appears to be the earliest known accurate representation of the positions and magnitudes of the stars, and upon this they were grouped into 48 constellations. We know of this work through the description of it in Ptolemy's "*Megale Syntaxis*," A. D., 170. This was translated by the Saracens into Arabic A. D. 813-832, and miscalled by them the "*Almagest*," and it is principally through translations of this work that we know of these 48 original asterisms. Various astronomers have since then added a host of others, but most of these have fallen into disuse, and we shall note only the 88 which are accepted today, taking Argelander's "*Uranometria Nova*" as the authority for those N. of the equator, and Gould's "*Uranometria Argentina*" for those S.

Constellation

Ptolemy's original 48 were all visible from the latitudes of Southern Europe or of Alexandria. The next that were added were 12 from the observations of Petrus Theodori, a Dutch navigator attached to the first expedition from Holland to the East Indies, and who died there in 1596. These were all near the South Pole, and it is uncertain whether he introduced any of them as new, or whether they had already been added by earlier Portuguese or Spanish navigators. Bayer places these 12—*Apus*, *Chamæleon*, *Dorado*, *Grus*, *Hydrus*, *Indus*, *Musca*, *Pavo*, *Phoenix*, *Triangulum*, *Australe*, *Tucana*, and *Volans*—upon one map at the end of his *Uranometria*, in which he had attached to the stars of Ptolemy's 48 Constellations the Greek letters which we use today; and on the 40th map of his *Uranometria*, in the hind feet of *Centaurus*, we find delineated for the first time the *Crux*, or Southern Cross, long known in song and story, and mentioned by navigators in the early part of the 16th century. This great work of Bayer's was published in 1603, and on the 37th map, just below *Canis Major*, we find what is often overlooked, a delineation of *Columba* (*Noachi*), Noah's Dove, although it is frequently stated that this constellation was first introduced by Royer in 1680. Dr. Gould, in his "*Uranometria Argentina*," states that it was added by Petrus Planicius, the teacher of Petrus Theodori above mentioned. Likewise on the second map of



VIRGO.

Bayer, the constellation *Ursa Major*, we find in the lower left-hand corner a delineation of *Coma Berenices*, which had been dropped as a distinct constellation by Ptolemy, and had but now, after 13 centuries, been restored by Tycho Brahé in his catalogue. But on the fifth map, that of *Boötes*, the same group of stars is deline-

Constellation

ated as a sheaf of wheat, indicating an apparent doubt as to its proper designation at that day. This *Coma Berenices* is sometimes given as one of the new ones introduced by Hevelius in the latter part of the 17th century, as is likewise *Monoceros*, although the latter was given as a separate constellation on Bartsch's "*Planisphere*"



PISCES.

in 1624, and is stated by Olbers to have been in use more than half a century before that. Hevelius, in the "*Prodomus Astronomiæ*," published in 1690, a few years after his death, introduced ten new constellations, eight of which have survived till the present, and are included in the list below. The next to survive the test of time were the 14 added by Lacaille at the Cape of Good Hope in 1751-1752, 13 of them being implements used in the arts and sciences, and the 14th, the Table Mountain, a prominent feature of the landscape at the Cape. With the dividing up of the Ship "*Argo*" into *Carina*, *Puppis*, and *Vela* by Dr. Gould in the "*Uranometria Argentina*," which had been partly done by Lacaille, the list of constellations as accepted today is completed. We give the list of them below, after a few words as to the system of designating the individual stars in the constellations, and as to their boundaries.

Lettering the Stars.—In 1603 Bayer, in his "*Uranometria*," immortalized himself by the happy thought of assigning letters to the individual stars of each of the 48 constellations of the "*Almagest*" beginning with the Greek alphabet and following approximately the order of brightness of the stars, and then using the lower-case Roman letters where needed to complete any constellation. Some confusion has arisen, especially in those extending far toward the S., in trying to identify all of Bayer's lettered stars. Argelander's "*Uranometria Nova*," is, however, accepted today.

Constellation

with a few trifling exceptions, as the correct interpretation of Bayer. Lacaille, at the Cape, 1751-1752, extended the same system to the southern constellations, and was also compelled to revise the lettering of a few of Bayer's most southern ones, which were very inaccurately delineated. As far N. as his work extended, to $+10^\circ$ of declination, Dr. Gould also assigned letters in the constellations still unlettered, *Monoceros*, *Scutum*, and *Sextans*. In the northern constellations added by Hevelius, or between his time and Ptolemy, and which had not been lettered, Baily assigned a few Greek letters when publishing the "*B. A. C.*" (*British Association Catalogue*) in 1845. These letters will probably stand in any future revision of the northern heavens, though they are not very generally used by astronomers today. It should also be noted that the last letters of the capital Roman alphabet, beginning with R, are reserved for the variable stars. This has been agreed upon since Argelander's time, and has compelled the abandonment of several such letters assigned by Lacaille in the southern heavens to stars that are not variables. Flamsteed's numbers in each constellation of the stars observed by him are also extensively used as a system of naming individual stars. These numbers refer to the order in which the stars occur in each constellation in his "*Catalogus Britannicus*." Other early catalogues of stars arranged in this way by constellations are often used as a means of naming individual



LEO.

stars, especially that of Hevelius, a capital H being used in this case. These numbers refer, not to the arrangement of the stars in Hevelius's original "*Prodomus Astronomiæ*," (1690) nor to Bailey's edition of it in the 13th volume of the "*Memoirs of the Royal Astronomical Society*," but to Flamsteed's edition of the catalogue as published

Constellation

in the third volume of the "*Historia Cælestis Britannica*," London, 1725, and considerable confusion has at times arisen from ignorance of this fact.

Boundaries.—The boundaries of the constellations have been an ever-increasing source of confusion and perplexity with the increasing number of observed stars, and



LIBRA.

with the attempt in star-catalogues to assign them to some constellation. Argelander's "*Uranometria Nova*" has in recent times been accepted as the best authority in this respect, but no system which makes these boundaries free-hand curves can be perfectly satisfactory, as it is impossible to represent them on different spherical projections so that they will correspond to exactly the same parts of the surface of the sphere. Dr. Gould, in the "*Uranometria Argentina*," which extends from the South Pole to $+10^\circ$ of declination, has taken the bull by the horns and adopted the suggestion of Sir John Herschel, which was received with such disfavor when it was offered, and has made the boundaries of the constellations to consist of the meridians and parallels of right ascension and declination for the epoch of 1875 wherever it could be done, and where this was impossible he has followed as nearly as possible arcs of great circles between points defined by these coördinates. If this latter plan had been rigorously followed, even at the expense of corners or cusps at the intersections of these arcs of great circles, it would seem that it would have been a slight improvement, for the position of a star could then be accurately computed for 1875.0, (zero) and the matter rigorously determined as to which of two constellations it belonged when it fell near the boundary between two.

Modern Constellations.—The 88 Constellations before mentioned, which are accepted

Constellation

today, are given in the following list. In the first column is given the name by which it is known today, and where the original or more complete name is needed to show the meaning or origin, it is given or completed in brackets. In the second column is given the translation or commonly accepted signification of the Latin name in the first. The names of Ptolemy's original 48 are printed in capitals. Those of the 16 added between the times of Ptolemy and Hevelius in small capitals. The 8 added by Hevelius in italic. The rest, the 14 added by Lacaille, and the 3 into which he and Gould have divided *Argo*, are printed in Roman type. They are also arranged in three groups, the 29 N. of the Zodiac, the 12 Zodiacal and the 47 S. of the Zodiac. The first and last are arranged alphabetically, the zodiacal ones in the order of increasing longitude.

TWENTY-NINE NORTH OF THE ZODIAC.

ANDROMEDA,	THE CHAINED LADY.
AQUILA,	THE EAGLE.
AURIGA,	THE CHARIOTEER.
BOOTES,	THE WAGONER, or PLOWMAN.
<i>Camelopardalis,</i>	<i>The Camelopard.</i>
<i>Canes Venatici,</i>	<i>The Hunting Dogs.</i>
CASSIOPEIA,	THE LADY IN THE CHAIR.
CEPHEUS,	CEPHEUS, THE KING.
COMA BERENICES,	BERENICE'S HAIR.
CORONA BOREALIS,	THE NORTHERN CROWN.
CYGNUS,	THE SWAN.
DELPHINUS,	THE DOLPHIN.
DRACO,	THE DRAGON.
EQUULEUS,	THE COLT.
HERCULES,	HERCULES, [KNEELING.]
<i>Lacerta,</i>	<i>The Lizard.</i>
<i>Leo Minor,</i>	<i>The Lesser Lion.</i>
<i>Lynx,</i>	<i>The Lynx.</i>
LYRA,	THE LYRE, or HARP.
OPHIUCHUS,	THE SERPENT HOLDER.
PEGASUS,	THE WINGED HORSE.
PERSEUS,	PERSEUS, THE HERO, WITH MEDUSA'S HEAD.
SAGITTA,	THE ARROW.
<i>Scutum,</i>	<i>The Shield.</i>
SERPENS,	THE SERPENT.
TRIANGULUM,	THE TRIANGLE.
URSA MAJOR,	THE GREATER BEAR.
URSA MINOR,	THE LESSER BEAR.
<i>Vulpecula [et Anser],</i>	<i>The Fox, [and the Goose.]</i>

TWELVE ZODIACAL CONSTELLATIONS.

ARIES,	THE RAM.
TAURUS,	THE BULL.
GEMINI,	THE TWINS.
CANCER,	THE CRAB.
LEO,	THE LION.
VIRGO,	THE VIRGIN.
LIBRA,	THE BALANCE, or SCALES.
SCORPIUS, or SCORPIO,	THE SCORPION.
SAGITTARIUS,	THE ARCHER.
CAPRICORNUS,	THE GOAT.
AQUARIUS,	THE WATER-BEARER.
PISCES,	THE FISHES.

FORTY-SEVEN SOUTH OF THE ZODIAC.

Antlia, [Pneumatica,]	The Air-Pump.
APUS, [or AVIS INDICA,]	BIRD OF PARADISE, or OF INDIA.
ARA,	THE ALTAR.

Constipation

ARGO [NAVIS]	{ Carina, THE SHIP { The Keel. Puppis, { The Stern, Vela, { The Sails. Cælum [Sculptorium,]	The [Engravers'] Tool.
CANIS MAJOR,		THE GREATER DOG.
CANIS MINOR,		THE LESSER DOG.
CENTAURUS,		THE CENTAUR.
CETUS,		THE WHALE.
CHAMELEON,		THE CHAMELEON.
Circinus,		The Pair of Compasses.
COLUMBA, [NOACHI,]		NOAH'S DOVE.
CORONA AUSTRINA,		THE SOUTHERN CROWN.
CORVUS,		THE CROW.
CRATER,		THE BOWL.
CRUX, [AUSTRALIS,]		THE SOUTHERN CROSS.
DORADO, [or XIPHIAS,]		THE GILT-HEAD, or SWORD-FISH.
ERIDANUS,		THE RIVER PO.
Fornax, [Chemiæ,]		The [Chemist's] Furnace or Retort.
GRUS,		THE CRANE.
Horologium,		The Clock.
HYDRA,		THE WATER-SERPENT, or HYDRA, [fem.]
HYDRUS,		THE WATER-SNAKE, or SEA-SERPENT, [male.]
INDUS,		THE INDIAN.
LEPUS,		THE HARE.
LUPUS,		THE WOLF.
MENSA, [Mons Mensæ,]		Table Mountain, [at Cape of Good Hope.]
Microscopium,		The Microscope.
MONOCEROS,		THE UNICORN.
MUSCA, [or APIS,]		THE FLY, [or THE BEE.]
Norma,		The Square and Rule.
Octans,		The Octant.
ORION,		ORION, THE HUNTER.
PAVO,		THE PEACOCK.
PHENIX,		PHENIX, THE FABULOUS BIRD.
Pictor, [Equuleus Pictorius,]		The Painter's Easel, [or Little Horse.]
PISCIS AUSTRINUS,		THE SOUTHERN FISH.
Pyxis, [Nautica,]		The Ship's Compass.
Reticulum,		The Reticule, or Micrometer [of Lacaille's Telescope.]
Sculptor, [Apparatus Sculptorius,]		The Sculptor's Tools.
Sextans,		The Sextant.
Telescopium,		The Telescope.
TRIANGULUM AUSTRALE,		THE SOUTHERN TRIANGLE.
TUCANA,		THE TOUCAN.
VOLANS, [PISCIS VOLANS,]		THE FLYING-FISH.

Constipation, an undue retention of the fæces or their imperfect evacuation. When the morbid affection is but slight it is of little moment. In most cases, however, there is headache, more rarely vertigo; while if the disease be protracted and severe, colic, hæmorrhoids, cutaneous eruptions, hysteria, epilepsy, or even ileus or enteritis, the last two fatal diseases, may be the result. In many cases constipation is from a torpid condition of the liver, or loss of tone in the muscular coat of the alimentary canal, which in some cases is moreover distended by flatus. In many cases it is produced by the eating of an undue quantity of food, or of food that is indigestible. It is continually present in those who lead a sedentary life. Purgatives may temporarily remove a confined state of the bowels, but without abundant exercise in the open air no permanent cure can be expected.

Constituent Assembly

Constituent Assembly, a name given to the first convention of the delegates of the French nation (1787-1791) to distinguish it from the legislative assembly of 1791. It drew up and obtained the acceptance of the first of the famous revolutionary constitutions. The Constituent Assembly of 1848 had a similar aim.

The opening of the States General of 1789 was set for May 4, the deputies being presented to the king on that day, and religious services held. On May 5 the formal opening took place in a magnificent hall; the king and royal family being present. According to the decision of the king's council the claim of the third estate to be equal in numbers to the two others was granted and from the first these representatives of the people took a threatening attitude. On June 17, on a motion of the Abbé Sièyes, the majority voted in favor of constituting the body a "National Assembly."

Three days later the deputies under the lead of Bailly gathered on a racket ground near their usual place of meeting and took an oath not to permit the dissolution of the assembly until a new constitution had been given to France. On July 11, Lafayette presented the celebrated Declaration of Rights, which after discussion was ordered placed at the head of the constitutional code.

From time to time the assembly voted addresses to the king and Louis had several times appeared before them and expressed his views. Early in October he signed the Declaration and the Constitution.

Constitution, the organic law, written or unwritten, of a body politic, though the word is used popularly with great vagueness. The natives of England speak with pride of the British "constitution." Each of the United States of America has a "constitution," while the Federal "constitution" holds them all together. During the democratic uprising in Continental Europe in 1848, the people in each country demanded that their despotic sovereigns should grant them a "constitution." In all these cases the constitution is an organization of the great body politic with regard to such fundamental matters as legislative, executive, and judicial power and authority. In the uprisings in 1848, the constitution sought was an instrument having the force of solemn compact, by which the despot, who had hitherto ruled alone, or nearly alone, gave a substantial share of his power to his subjects, so as to render them in a manner self-governed. In the United States, whether the State in point was founded before or after the War of Independence, it was an engagement between the different portions of society as to the political powers which they should respectively exercise. In the

Constitution

British constitution it is the complex political organization which has grown up during the many centuries that the British people have existed, and which consequently has a stability and an adaptation to all classes.

One reason of the successful working of the American and the British constitutions has been their mixed character. No class of men are morally capable of wielding supreme power without abusing it. A Nero, a Caligula, a Tiberius, and a multitude of other emperors, show what uncontrolled royal power can do. The French Reign of Terror, when the real power was in the hands of the lower classes of society, shows to what depths unchecked democracy can fall. The tyranny of the mediæval Pope forever teaches that unlimited power cannot be trusted even in sacred hands. In a national organization no class should be allowed all that it desires to obtain; its claims should be conceded only with reference to the counter claims of others. When this is the case, all classes, from the highest to the lowest, obtain more liberty and gain more real advantage than if any single class, king, nobles, or common people, had their way. By the State and National Constitutions of the United States the legislative power is vested in the National and State legislatures; the executive power in the President and governors, both of whom are elected and removed at frequent intervals. The judiciary interpret the law, and are in turn restrained by written statutes and prescription. The rights of the people are guarded by the habeas corpus act, and by the further constitutional guarantees of both the State and National charters. The jury trial stands as a bar to malicious persecution. Should an exigency arise necessitating a change in the Constitution of the State or of the nation, the change must be submitted to the people and ratified by them.

The Constitution of the United States as it now stands consists of 7 original articles and 15 articles of amendment, the last one being that enfranchising the former negro slaves. It was originally framed by the representatives of the people, who met at Philadelphia, and finally adopted it on Sept. 17, 1787. It became a law of the land on the first Wednesday of March, 1789. In the British constitution legislative power is placed in the hands of the king, lords, and the commons; the executive power is nominally in the hands of the sovereign, but really in those of responsible ministers. The judicial authority is vested in judges, not removable except for very serious fault; while the jury system affords a guarantee that no one can be pronounced guilty unless 12 of his peers see their way to convicting him of the offense. Nor can one be imprisoned for an indefinite period without being brought to trial; for a writ of habeas cor-

pus may be applied for, which requires the individual to be produced for trial within a certain time, or released. These fundamental arrangements are not like the changeless laws of nature. A constitution made directly or indirectly by men may be altered by men, and, in exceptional circumstances, when parts of the constitution are systematically abused to the detriment of society, society, speaking by its mouthpiece, the Legislature, can meet the crisis by enacting that they shall be temporarily suspended or permanently repealed.

Apostolic Constitutions are ordinances for the discipline of the Church, particularly the apostolic constitutions and a collection of regulations attributed to the Apostles, and supposed to have been collected by St. Clement, whose name they bear. Their authenticity has been greatly questioned. "Constitution, properly speaking in the sense of the civil law, is that law which is made and ordained by some king or emperor; yet the canonists, by adding the word sacred to it, make it to signify the same as an ecclesiastical canon,"—Ayliffe, "Parergon Juris Canonici."

In Scots Law, a decree of constitution is a decree by which the extent of a debt or obligation is ascertained. The term is generally applied to those decrees which are requisite to found a title in the person of the creditor in the event of the death of the debtor or the original creditor.

The Constitutions of Clarendon are constitutions, in the sense of laws or regulations, made at a Council held at Clarendon, near Salisbury, on Jan. 25, 1164. They were designed to define the boundary-line between civil and ecclesiastical jurisdiction, and did so in a sense favorable to the civil power. On this account Thomas à Becket, Archbishop of Canterbury, refused to sign them, and excommunicated many of the ecclesiastics who had done so. This led to the feud between him and the civil government, which ultimately caused his assassination on Dec. 29, 1170.

Constitution, better known as "Old Ironsides," a frigate of the United States navy, famous for the part she played in the War of 1812. She was built in Boston in 1797-1798, and carried an armament of 32 long 24-pounders, and 20 32-pounder carronades, and was first commanded by Capt. Isaac Hull. War was declared June 18, 1812, and on July 17 the "Constitution" had a running fight with five of the enemy's vessels, which lasted three days, in an almost dead calm, but from which she escaped. This was considered a remarkable feat of seamanship. On Aug. 19, 1812, she fought and conquered the "Guerriere," one of the five ships mentioned. Dec. 29, 1812, she defeated and captured the British frigate

"Java," off the coast of Brazil; Feb. 14, 1814, she captured the "Picton," and Feb. 15, 1814, she attacked and captured two British vessels, the "Cyane" and the "Levant." In 1830 it was proposed by the Secretary of the Navy to dismantle the old ship and sell her; but this aroused general indignation, voiced in the poem "Old Ironsides," by Dr. Oliver Wendell Holmes. She was afterward used as a school ship; later as a receiving ship at Portsmouth, N. H., and in 1900 she was stationed at the navy yard, Boston.

Constitution of the United States. The Constitution of the United States is the product of a few great minds assembled in a brief convention. The greatest of modern statesmen has termed it "the most wonderful work ever struck off at a given time by the brain and purpose of man." This characterization has been accepted by all thinking men. There have been, indeed, cavils at some provisions, and speculative suggestions of alterations and improvements by individual minds; but the universal wonder is that the framers of the Constitution did so well; and that wonder was never so great as at the close of a stormy century, littered with the wrecks of governments and nations and dynasties and constitutions.

The "given time"! The work was great, the difficulties many—most men then deemed them insuperable—and the work and its difficulties have had commentators and historians for over a century; but will there be a single reader of this article who has noted how short a time it took to frame the Constitution? Has there been a single commentator or historian who has adequately shown how exceedingly brief the "given time" was? Less than 100 working days measured it.

Moreover, the framers had had no means of previous personal communication by telegraph and almost none by mail; there were no stenographers or typewriters; there was, indeed, no clerical assistance; for the proceedings of the Convention were secret and the clerical work was done by great men. When we see recent conventions with modern facilities for rapid work spending months in putting a few patches on existing State constitutions, we can best appreciate the ability of the men who in 85 working days forged the great compact of the people of the United States with themselves—a compact which has lasted more than a century substantially unchanged, which survived the storm of the greatest civil war of the modern world, which has expanded with an unforeseen and unprecedented expansion of inhabited territory from a narrow strip upon the Atlantic seaboard to the shores of the Pacific, and which, notwithstanding changed conditions of life and thought, has grown steadily in the power of moral obli-

gation and become more and more truly the "supreme law" of nearly 100,000,000 people.

As the time was brief, so were the framers few. The Convention was composed of 55 members; the Constitution was signed by 39, including Washington; 51 members took part in the debates (according to the most complete report we have of them, the "Journal" of Madison), again including Washington. It is generally assumed that he took no part in the debates; but Professor Fiske has said in words which cannot be too often brought before the American citizen:

"It was suggested that palliatives and half measures would be far more likely to find favor with the people than any thorough-going reform, when Washington suddenly interposed with a brief but immortal speech, which ought to be blazoned in letters of gold, and posted on the wall of every American assembly that shall meet to nominate a candidate or declare a policy or pass a law, so long as the weakness of human nature shall endure. Rising from his president's chair, his tall figure drawn up to its full height, he exclaimed in tones unwontedly solemn, with suppressed emotion, 'It is too probable that no plan we propose will be adopted. Perhaps another dreadful conflict is to be sustained. If, to please the people, we offer what we ourselves disapprove, how can we afterward defend our work? Let us raise a standard to which the wise and honest can repair; the event is in the hand of God.'"

Some of the 55 took no real part in framing the Constitution, and some were obstructionists. Their objections may have exercised a wholesome influence on the Convention, but added much to the cares and perplexities of the greater men who assumed the responsibility and did the work. But whether we take the 39 members who signed the Constitution or the 51 who took part in the debates, or the 55 who composed the Convention, the number seems perilously small to be intrusted with the titanic task of founding for all time a great and growing and intensely active nation. Edmund Randolph, speaking of the time when the Articles of Confederation were framed, apologetically called it "the then infancy of the science of constitutions and of confederacies." He might have said the same of the moment at which he was addressing the Convention. Very little did the world then know of the science of constitutions or confederacies! He well summed up the new and added difficulties which confronted the Convention, and which it must meet and overcome.

"The inefficiency of requisitions was unknown [to the framers of the Confederation]—no commercial discord had arisen among any States—no rebellion had appeared, as in Massachusetts—foreign debts had not become urgent—the havoc of paper money had not been foreseen—treaties had not been violated; and perhaps nothing better could be obtained, from the jealousy of the States with regard to their sovereignty."

There were other difficulties which Randolph, like a tactful statesman, left unnoticed. At one end of the line of financial troubles Rhode Island stood intent on her

great scheme of making fiat paper money the equivalent of gold and silver by imprisoning the citizen who charged more for a commodity in the one kind of money than in the other. At the other end of the line stood New York, with the greatest custom house of the country, her chief source of revenue, which she would be called on to surrender to the new Federal government as a part of the price she must pay for coming within the sovereignty of the Constitution. Virginia owned a vast territory, which she must cede that it might become the public lands of the United States. Even in the greatness and authority of the men who composed the Convention, there were dangers and impediments. Three of the greatest proposed things would have defeated the great work. Franklin, the wisest member of the Convention, proposed that the legislative power be vested in a single house, which would have been substantially the House of Representatives; Hamilton, the brilliant genius of the Convention, advocated a government of which the President and the Senators should hold office during good behavior, *i. e.*, for life; Madison, the most sagacious statesman in the Convention, would have cast the responsibility of legislation on the judiciary by lodging a veto power in the Supreme Court. Any one of these provisions would have wrecked the Constitution before it was adopted; and any one of them, if it had been adopted, would have given us a government essentially different from that which we possess.

There is still another extraordinary fact connected with the framing of the Constitution which has received little if any attention, and substantially no comment. In the order of philosophical research the first subject of investigation would be the means or process by which the framers worked. A true philosopher, contemplating the clearness and conciseness of the Constitution, the masterly handling of the chief elements of the future government, the wonderful adaptation of insufficient means to a glorious end, would instantly exclaim, "Such a work is not born of the human mind completed! What was the secret process by which these great inventors attained their grand result?" And the philosopher would find, as he suspected, that even as the Constitution stands alone in the records of constructive statesmanship, so do the means and methods by which the Convention did its work. It speaks badly for more recent statesmanship that not one of the lesser conventions which have convened frequently to experiment with State constitutions has done its work in the same way. In a word, there is nothing which equals the Constitution; there is nothing which approaches the patient workmanship of the great Convention.

At the beginning, propositions for consideration and discussion were tentatively

placed before the Convention in an abstract form. These propositions were embodied in 15 resolutions, which were immediately referred to the Committee of the Whole. They were taken up one by one, and considered and discussed and amended or rejected or adopted or postponed for later consideration. The abstract of a part of a single day's proceedings will give a clear idea of the way in which the Convention worked:

"Tuesday, June 5. Mr. Randolph's *ninth* proposition — *The national judiciary to be chosen by the national legislature* — Disagreed to — *To hold office during good behavior and to receive a fixed compensation* — Agreed to — *To have jurisdiction over offenses at sea, captures, cases of foreigners and citizens of different States, of national revenue, impeachment of national officers, and questions of national peace and harmony* — Postponed."

At the end of two weeks of such consideration and discussion (June 13), the Committee of the Whole reported the conclusions which had so far been reached in the form of 19 resolutions. But everything was still abstract and tentative. No line of the Constitution had yet been written; no provision had yet been agreed on. The 19 resolutions, in like manner, were taken up one by one, and in like manner considered, and discussed, and amended, or rejected, or adopted, or postponed. Other propositions coming from other sources were also considered; and so the work went on until July 26, when the conclusions of the Convention were referred to the Committee of Detail, and the work of reducing the abstract to the concrete began. The Convention then adjourned to Aug. 6, to enable the Committee to "prepare and report the Constitution."

On Aug. 6 the Committee of Detail reported and furnished every member with a printed copy of the proposed Constitution. Again the work of consideration began, and went on as before, section by section, line by line. Vexed questions were referred to special committees—"grand committees" they were called—amendments were offered, changes were made, the Committee of Detail incorporated new and additional matters in their draft until, on Sept. 8 the work of construction stopped. But not even then did the labors of the Convention cease. On that day a committee was appointed, "by ballot, to revise the style of, and arrange, the articles which had been agreed to." This committee was afterward known as the Committee of Style. It reported on Sept. 12, and the work of revision again went on till Saturday, the 15th. On Monday, the 17th, the end was reached, the members of the Convention signed the Constitution. Well might Franklin exclaim in his farewell words to the Convention: "It astonishes me, sir, to find the system approaching so near to perfection as it does!" He had been overruled more than once in the Convention; provisions which he had

proposed had been rejected; provisions which he had opposed had been retained; but he was a great man and saw that a great work had been accomplished.

This article was to treat of the Constitutional changes of the century. But the extraordinary fact is that from the framers' point of view there has been, with one trivial exception, absolutely no change in the Constitution of the United States. "Are there not 15 amendments," it will be asked, and "do not the presidential electors vote for a President and Vice-President in a different way, and is there not an unwritten change in the Constitution by virtue of which the selection of President has passed directly to the people, acting through their political national conventions?" All these questions may be answered generally in the affirmative; and yet the fact remains that from the framers' point of view there has been, with one trivial exception, absolutely no change in the Constitution of the United States.

The work of the great Convention was the making of a government; and the government which the framers made has remained absolutely unchanged. Madison, who was a wary as well as sagacious statesman, carried the first 10 amendments through the first Congress at the first session to assuage public excitement and strengthen the new government and close the mouths of those who railed against it. He introduced into the 10th amendment a rule of construction which would not have been adopted by the convention, a clause which politically made much mischief during the following 100 years, but which under the necessities of judicial construction amounted to nothing, viz., that powers not delegated or prohibited by the Constitution "are reserved to the States respectively or to the people." The other provisions of the 10 amendments are little more than quotations from the Bill of Rights. The Constitution contained but few such declarations; that the writ of habeas corpus shall not be suspended; that no bill of attainder or *ex post facto* law shall be passed; that the trial of all crimes shall be by jury; that such trials shall be in the State where the crime was committed; that no attainder of treason shall work corruption of blood or forfeiture except during the life of the person attainted. The 10 amendments declare that Congress shall make no law respecting an establishment of religion or prohibiting the free exercise thereof or abridge the freedom of speech, or the right of the people peacefully to assemble and petition the government for a redress of grievances, etc., etc. (Article 1.) They provide that no person shall be compelled to be a witness against himself, nor be deprived of life, liberty, or property, without due process of law; nor shall private

property be taken for public use without just compensation, etc. (Article 5.) These are great principles and noble sentiments, but their efficacy depends on the rectitude of the government and the vigor and integrity of the people. No Congress would ever have dared to "make a law respecting an establishment of religion," though there had been no constitutional prohibition; and many an unfortunate citizen has lived and died with his claim for property taken for public use still unpaid, notwithstanding the constitutional guarantee of "just compensation." In a word, the 10 amendments served their temporary purpose; they have doubtless warned off Congress occasionally when in the heedlessness of the short session or in the heat of political excitement a legislative wrong might otherwise have been done; they have in a few instances secured the individual citizen judicially in his natural right to life, liberty, or property; they continue to be a standing moral restraint upon the legislative and executive branches of the government; and they form a noble decalogue of great principles to be kept before the eyes of all American citizens; but, nevertheless, the judicial records of the century show that the government which the framers of the Constitution established would have moved on just as it has done, if these 10 amendments had never been proposed. The conscience and intelligence of the country have been the real safeguards of the citizen against injustice and oppression.

The 11th amendment was caused by the extreme ground taken by the early Supreme Court in *Chisholm vs. Georgia* (2 Dall., R. 419), and in the incipient rebellion of that State. Its purpose was to overrule that decision and to exempt a State from suit by a citizen. If Marshall had been on the bench the decision would never have been made; and, singularly, it was overruled by the same court 100 years afterward (*Hans vs. Louisiana*, 134 U. S. R. 1). The 13th, 14th, and 15th amendments grew out of the Civil War. They abolished slavery; they impose restraints on State governments; they confer on some persons constitutional rights; they guarantee certain rights, privileges, and immunities to citizens and persons; and they contain some provisions relating to representation in Congress. Much litigation has been caused by them; some statutes have been held constitutional and some unconstitutional; a larger proportion of representation has fallen to the Southern States; the guarantee given to all citizens of the right to vote without regard to "race, color, or previous condition of servitude" is not absolutely effective, and the government of the United States moves on precisely as it did before.

It has been said herein that from the

point of view of the framers of the Constitution their work has been changed in only one trifling particular. That change relates to the election of President, and was effected by the 12th amendment. The purpose of the framers was a wise one, to secure for the country the two strongest statesmen of the party constituted for the time being of the majority of the people, to fill the offices of President and Vice-President. No better method could have been devised for obtaining a strong Executive.

We see a weak, modified application of the principle in national conventions when the defeated "wing of the party" is placated by being allowed to designate the candidate for Vice-President. Under the Constitution as it originally stood each elector voted for two persons for President. He who should have the greatest number of votes would become President; he who might come next would be Vice-President. Under this provision Mr. Lincoln in 1861 would have become President, and Mr. Seward Vice-President. That is to say, the Republican electors, following the direction of their party, as expressed by the national convention, would have cast all their votes for Mr. Lincoln, and all but one for Mr. Seward. But in 1801 there had been a tie, whereby the electors had failed to elect, and the election had gone into the House. If it had not been for that mishap, the 12th amendment would not now exist; and if the original system had survived till the time of rapid communication by railroad and telegraph and better party organization, it is safe to say that it would now be in unquestioned operation. Political conventions would long ago have adopted its leading principle, and the struggle would have been as to which of the two strongest candidates should be first or second upon the ticket. The system would have given greater dignity to the office of Vice-President, and would have brought the possible importance of that office always before the eyes of the citizen. But whether we think well or ill of the original method, one thing is certain—that the only change made by the 12th amendment is a trivial one of administrative detail. After all the changes this country has passed through in the last century—changes in civilization, of territory, of population, of ideas, education, and public convictions, and individual life—changes such as the world has never witnessed in one country or in one century, the only change made in the Constitution has been the paltry one of having the electoral vote cast in one form instead of in another.

The unwritten amendment of the Constitution, as it has been called, also relates to the selection of the President. It is said by some of the commentators, and indeed it is

now generally believed, that the electoral colleges were intended to be "deliberative bodies." In one sense this is true, in the legal sense. The electors are not ministerial or administrative officers; they do not perform a specific work in a way determined by higher official authority; in legal contemplation the responsibility of their action rests upon themselves. But the framers of the Constitution never supposed that the electors would disregard the political pledges on which they were chosen or that the American people, either directly or through their State Legislatures, would blindly choose electors to evolve a President out of their inner consciousness. On the contrary, they contemplated the successful candidates receiving the votes of "a majority of the whole number of electors," and they required the electors to vote "in their respective States," and to vote on the same day. If they had framed a provision requiring all of the electors to convene at the seat of the government in one body, and there in their own way and time proceed to choose a President, there would be some reason for saying that actual deliberation was intended; but they did not give to the electors one single power or attribute by virtue of which they could deliberate.

That very thing was attempted and the attempt failed. The question before the Convention was, in effect, "Where shall the deliberative power to choose the President be vested when the formal casting and counting of the electoral vote fails to elect?" The answering propositions were, "in the Senate," or "in the House of Representatives." Then Spaight, of North Carolina, said that "he would prefer their (the electors) meeting altogether (all together) and deciding finally"; and he moved "that the electors meet at the seat of the general government"; and all of the States except North Carolina voted against it. The evidence is therefore both negative and positive—the Convention did not invest the electors with the necessary powers and means for deliberation, and positively refused to do so.

The idea that it was ever intended that the electors should nominate the candidate for whom they themselves should vote is a myth which is generally believed and which has been unthinkingly reiterated by most eminent writers, but which does not rest on a single fact. There was no one thing which perplexed the Convention more than the subject of the Executive. Plan after plan was weighed and found wanting. The electoral system was late in coming to the front, and was the solvent of many difficulties. Hamilton early foresaw the inevitable, and proposed that "the selection be made by electors chosen by the people." Madison, later, said that the option before

the Convention "lay between an appointment by electors chosen by the people and an immediate appointment by the people"; and he at the same time said that "the electors would be chosen for the occasion, would meet at once, and proceed immediately to an appointment." It was as well understood then as it is now that they would but register the decree of the political power which appointed them. The internal evidence of intent is even more conclusive. He who supposes that the framers intended that 13 different bodies should convene in 13 different places at one time for one object and for one day, and that object the selection of the Executive of a nation, confesses a most superficial knowledge of the greatest constructive statesmen of their century and of the great work which they deliberately planned and built.

And what better could the framers of the Constitution have done? Wilson, who proposed "an election by the people," was "almost unwilling to declare the mode which he wished to take place, being apprehensive that it might appear chimerical." Gerry, "who liked the principle," "thought the community not yet ripe"; he "was for waiting till the people should feel more the necessity of it." Gouverneur Morris admitted "that difficulties attended this mode," but thought that they would be "found superable." Madison liked an election by the people best, but acknowledged "the disadvantage this would throw on the smaller States." Ellsworth declared "the objection drawn from the different sizes of the States unanswerable."

It has been a fashion of late to speak of the electoral system as curious machinery which may give rise to serious difficulties; but viewed amid the difficulties and conditions and limitations of 1787, there is no stroke of practical statesmanship in the Constitution more wise and ingenious. The choosing of candidates soon drifted into Congress; with the coming of the steamboat and the railroad it passed from the Congressional caucus to national conventions; and yet, notwithstanding these radical changes of usage, the expansion of territory, the multiplication of States, and the unscrupulousness of political partisanship, there have been no more mishaps than are incident to any system of human device.

To foretell the future of the Constitution is to foretell the future of the American people. They will change before it is changed. As with Washington and Lincoln, the more we know of them the better they appear; so of the Constitution, the more we contemplate its trials, the better it appears adapted to our national needs. With the growth of knowledge there has been a growth of reverence. The people will experiment with State constitutions and tear them up and experiment again, but when it

comes to the Constitution—the great Constitution—there is a sturdy sentiment of “hands off,” and that sentiment is incomparably stronger now than it was at the beginning of the century. Judicial construction has moved backward rather than forward.

The amendatory provision of the Constitution is an unbarred door which may be opened at any time. It was wise and prudent of the framers to leave it thus unlocked. But he who tries to swing open that door will find two things on which he did not reckon: First, a *vis inertiae* in the ignorance and indifference of Congressmen—in their doubts whether the amendments will be popular—in their absorption in lesser things; and, second, there is always some one on the other side pressing back the door.

At this time there is an amendment pending to have Senators elected directly by the people. It is a popular amendment, and yet is absolutely needless. The men who framed the Constitution constructed it of general principles, and left it flexible for administrative details. Long ago, Abraham Lincoln and Stephen A. Douglas were senatorial candidates, and were as directly candidates before the people of Illinois as Mr. Gladstone and Lord Beaconsfield ever were before the people of England; and the Legislature of Illinois carried into effect the public will. When the people of the United States find that it is easier to instruct the delegates they send to State conventions to proceed and nominate a candidate for United States Senator than to obtain an amendment to the Constitution, the election of Senators by the people will in practical effect take place.

CHARLES C. NOTT.

TEXT OF THE CONSTITUTION.

PREAMBLE.

We the people of the United States, in order to form a more perfect union, establish justice, insure domestic tranquillity, provide for the common defence, promote the general welfare, and secure the blessings of liberty to ourselves and our posterity, do ordain and establish this Constitution for the United States of America.

ARTICLE I.

THE LEGISLATIVE DEPARTMENT.

Section 1.

1. All legislative powers herein granted, shall be vested in a Congress of the United States, which shall consist of a Senate and House of Representatives.

Section 2.

1. The House of Representatives shall be composed of members chosen every second year by the people of the several States; and the electors in each State shall have the qualifications requisite for electors of the most numerous branch of the State Legislature.

2. No person shall be a Representative who shall not have attained to the age of twenty-five years, and been seven years a citizen of the United States, and who shall not, when elected, be an inhabitant of that State in which he shall be chosen.

3. Representatives and direct taxes shall be apportioned among the several States which

may be included within this Union, according to their respective numbers, which shall be determined by adding to the whole number of free persons, including those bound to service for a term of years, and excluding Indians not taxed, three-fifths of all other persons. The actual enumeration shall be made within three years after the first meeting of the Congress of the United States, and within every subsequent term of ten years, in such manner as they shall by law direct. The number of Representatives shall not exceed one for every thirty thousand, but each State shall have at least one representative; and until such enumeration shall be made, the State of New Hampshire shall be entitled to choose three; Massachusetts, eight; Rhode Island and Providence Plantations, one; Connecticut, five; New York, six; New Jersey, four; Pennsylvania, eight; Delaware, one; Maryland, six; Virginia, ten; North Carolina, five; South Carolina, five; and Georgia, three.

4. When vacancies happen in the representation from any State the executive authority thereof shall issue writs of election to fill such vacancies.

5. The House of Representatives shall choose their Speaker and other officers, and shall have the sole power of impeachment.

Section 3.

1. The Senate of the United States shall be composed of two Senators from each State, chosen by the Legislature thereof for six years; and each Senator shall have one vote.

2. Immediately after they shall be assembled in consequence of the first election, they shall be divided as equally as may be into three classes. The seats of the Senators of the first class shall be vacated at the expiration of the second year, of the second class at the expiration of the fourth year, and of the third class at the expiration of the sixth year, so that one-third may be chosen every second year; and if vacancies happen, by resignation or otherwise, during the recess of the Legislature of any State, the executive thereof may make temporary appointments until the next meeting of the Legislature, which shall then fill such vacancies.

3. No person shall be a Senator who shall not have attained to the age of thirty years, and been nine years a citizen of the United States, and who shall not, when elected, be an inhabitant of that State for which he shall be chosen.

4. The Vice-President of the United States shall be President of the Senate, but shall have no vote unless they be equally divided.

5. The Senate shall choose their other officers, and also a President *pro tempore* in the absence of the Vice-President, or when he shall exercise the office of President of the United States.

6. The Senate shall have the sole power to try all impeachments. When sitting for that purpose, they shall be on oath or affirmation. When the President of the United States is tried, the Chief Justice shall preside: and no person shall be convicted without the concurrence of two-thirds of the members present.

7. Judgment in cases of impeachment shall not extend further than to removal from office and disqualification to hold and enjoy any office of honor, trust, or profit under the United States; but the party convicted shall nevertheless be liable and subject to indictment, trial, judgment, and punishment, according to law.

Section 4.

1. The times, places, and manner of holding elections for Senators and Representatives shall be prescribed in each State by the Legislature thereof; but the Congress may at any time, by law, make or alter such regulations, except as to the places of choosing Senators.

2. The Congress shall assemble at least once in every year; and such meeting shall be on the first Monday in December, unless they shall by law appoint a different day.

Constitution of the United States

Section 5.

1. Each house shall be the judge of the elections, returns, and qualifications of its own members, and a majority of each shall constitute a quorum to do business; but a smaller number may adjourn from day to day, and may be authorized to compel the attendance of absent members, in such manner and under such penalties as each house may provide.

2. Each house may determine the rules of its proceedings, punish its members for disorderly behavior, and with the concurrence of two-thirds, expel a member.

3. Each house shall keep a journal of its proceedings, and from time to time publish the same, excepting such parts as may in their judgment require secrecy; and the yeas and nays of the members of either house on any question shall, at the desire of one-fifth of those present, be entered on the journal.

4. Neither house, during the session of Congress, shall, without the consent of the other, adjourn for more than three days, nor to any other place than that in which the two houses shall be sitting.

Section 6.

1. The Senators and Representatives shall receive a compensation for their services, to be ascertained by law, and paid out of the Treasury of the United States. They shall, in all cases, except treason, felony, and breach of the peace, be privileged from arrest during their attendance at the session of their respective houses, and in going to and returning from the same; and for any speech or debate in either house they shall not be questioned in any other place.

2. No Senator or Representative shall, during the time for which he was elected, be appointed to any civil office under the authority of the United States, which shall have been created, or the emoluments whereof shall have been increased during such time; and no person holding any office under the United States shall be a member of either house during his continuance in office.

Section 7.

1. All bills for raising revenue shall originate in the House of Representatives; but the Senate may propose or concur with amendments, as on other bills.

2. Every bill which shall have passed the House of Representatives and the Senate, shall, before it become a law, be presented to the President of the United States; if he approve, he shall sign it; but if not, he shall return it, with his objections, to that house in which it shall have originated; who shall enter the objections at large on their journal, and proceed to reconsider it. If after such reconsideration, two-thirds of that house shall agree to pass the bill, it shall be sent, together with the objections, to the other house, by which it shall likewise be reconsidered; and if approved by two-thirds of that house, it shall become a law. But in all such cases the votes of both houses shall be determined by yeas and nays, and the names of the persons voting for and against the bill shall be entered on the journal of each house respectively. If any bill shall not be returned by the President within ten days (Sundays excepted) after it shall have been presented to him, the same shall be a law in like manner as if he had signed it, unless the Congress by their adjournment prevent its return, in which case it shall not be a law.

3. Every order, resolution, or vote, to which the concurrence of the Senate and House of Representatives may be necessary (except on a question of adjournment), shall be presented to the President of the United States; and before the same shall take effect, shall be approved by him; or being disapproved by him, shall be repassed by two-thirds of the Senate and House of Representatives, according to the rules and limitations prescribed in the case of a bill.

Constitution of the United States

Section 8.

The Congress shall have power:

1. To lay and collect taxes, duties, imposts, and excises; to pay the debts, and provide for the common defence and general welfare of the United States; but all duties, imposts, and excises shall be uniform throughout the United States.

2. To borrow money on the credit of the United States.

3. To regulate commerce with foreign nations, and among the several States, and with the Indian tribes.

4. To establish a uniform rule of naturalization, and uniform laws on the subject of bankruptcies throughout the United States.

5. To coin money, regulate the value thereof and of foreign coin, and to fix the standard of weights and measures.

6. To provide for the punishment of counterfeiting the securities and current coin of the United States.

7. To establish post offices and post roads.

8. To promote the progress of science and useful arts, by securing for limited times, to authors and inventors, the exclusive rights to their respective writings and discoveries.

9. To constitute tribunals inferior to the Supreme Court.

10. To define and punish piracies and felonies committed on the high seas, and offences against the law of nations.

11. To declare war, grant letters of marque and reprisal, and make rules concerning captures on land and water.

12. To raise and support armies; but no appropriation of money to that use shall be for a longer term than two years.

13. To provide and maintain a navy.

14. To make the rules for the government and regulation of the land and naval forces.

15. To provide for calling forth the militia to execute the laws of the Union, suppress insurrections, and repel invasions.

16. To provide for organizing, arming, and disciplining the militia, and for governing such parts of them as may be employed in the service of the United States; reserving to the States respectively the appointment of the officers and the authority of training the militia according to the discipline prescribed by Congress.

17. To exercise exclusive legislation in all cases whatsoever, over such district (not exceeding ten miles square) as may, by cession of particular States, and the acceptance of Congress, become the seat of government of the United States; and to exercise like authority over all places purchased by the consent of the Legislature of the State in which the same shall be, for the erection of forts, magazines, arsenals, dockyards, and other needful buildings:— and

18. To make all laws which shall be necessary and proper for carrying into execution the foregoing powers, and all other powers vested by this Constitution in the Government of the United States, or in any department or officer thereof.

Section 9.

1. The immigration or importation of such persons as any of the States now existing shall think proper to admit, shall not be prohibited by the Congress prior to the year one thousand eight hundred and eight; but a tax or duty may be imposed on such importation not exceeding ten dollars for each person.

2. The privilege of the writ of habeas corpus shall not be suspended, unless when, in cases of rebellion or invasion, the public safety may require it.

3. No bill of attainder or *ex post facto* law shall be passed.

4. No capitation or other direct tax shall be laid, unless in proportion to the census or enumeration hereinbefore directed to be taken.

5. No tax or duty shall be laid on articles exported from any State. No preference shall

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be given by any regulation of commerce or revenue to the ports of one State over those of another; nor shall vessels bound to or from one State be obliged to enter, clear, or pay duties in another.

6. No money shall be drawn from the Treasury, but in consequence of appropriations made by law; and a regular statement and account of the receipts and expenditures of all public money shall be published from time to time.

7. No title of nobility shall be granted by the United States; and no person holding any office of profit or trust under them shall, without the consent of Congress, accept of any present, emolument, office, or title, of any kind whatever, from any king, prince or foreign state.

Section 10.

1. No State shall enter into any treaty, alliance, or confederation; grant letters of marque and reprisal; coin money; emit bills of credit; make anything but gold and silver coin a tender in payment of debts; pass any bill of attainder, *ex post facto* law, or law impairing the obligation of contracts; or grant any title of nobility.

2. No State shall, without the consent of Congress, lay any imposts or duties on imports or exports, except what may be absolutely necessary for executing its inspection laws; and the net produce of all duties and imposts laid by any State on imports or exports, shall be for the use of the Treasury of the United States, and all such laws shall be subject to the revision and control of Congress.

3. No State shall, without the consent of Congress, lay any duty on tonnage, keep troops or ships of war in time of peace, enter into any agreement or compact with another State, or with a foreign power, or engage in war, unless actually invaded, or in such imminent danger as will not admit of delay.

ARTICLE II.

THE EXECUTIVE DEPARTMENT.

Section 1.

1. The executive power shall be vested in a President of the United States of America. He shall hold his office during the term of four years; and, together with the Vice-President, chosen for the same term, be elected as follows:

2. Each State shall appoint, in such manner as the Legislature thereof may direct, a number of electors equal to the whole number of Senators and Representatives to which the State may be entitled in Congress; but no Senator or Representative, or person holding an office of trust or profit under the United States, shall be appointed an elector.

3. The electors shall meet in their respective States, and vote by ballot for two persons, of whom one at least shall not be an inhabitant of the same State with themselves; and they shall make a list of all the persons voted for, and of the number of votes for each; which list they shall sign and certify, and transmit sealed to the seat of the Government of the United States, directed to the President of the Senate. The President of the Senate shall, in the presence of the Senate and House of Representatives, open all the certificates, and the votes shall then be counted. The person having the greatest number of votes shall be President, if such number be a majority of the whole number of electors appointed; and if there be more than one who have such a majority, and have an equal number of votes, then the House of Representatives shall immediately choose, by ballot, one of them for President; and if no person have a majority, then, from the five highest on the list, the said House shall, in like manner, choose a President; but in choosing the President, the votes shall be taken by States, the representation from each State having one vote; a quorum for this purpose shall consist of a member or members from two-thirds of the States, and a majority of all the States shall be necessary to a choice.

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In every case after the choice of the President, the person having the greatest number of votes of the electors shall be Vice-President. But if there should remain two or more who have equal votes, the Senate shall choose from them, by ballot, the Vice-President.

4. The Congress may determine the time of choosing the electors, and the day on which they shall give their votes, which day shall be the same throughout the United States.

5. No person except a natural born citizen, or a citizen of the United States at the time of the adoption of this Constitution, shall be eligible to the office of President; neither shall any person be eligible to that office who shall not have attained to the age of thirty-five years, and been fourteen years a resident within the United States.

6. In case of the removal of the President from office, or of his death, resignation, or inability to discharge the powers and duties of the said office, the same shall devolve on the Vice-President; and the Congress may, by law, provide for the case of the removal, death, resignation, or inability, both of the President and Vice-President, declaring what officer shall then act as President; and such officer shall act accordingly, until the disability be removed, or a President shall be elected.

7. The President shall, at stated times, receive for his services a compensation, which shall neither be increased nor diminished during the period for which he shall have been elected; and he shall not receive within that period any other emolument from the United States, or any of them.

8. Before he enters on the execution of his office, he shall take the following oath or affirmation:

"I do solemnly swear (or affirm) that I will faithfully execute the office of President of the United States: and will, to the best of my ability, preserve, protect, and defend the Constitution of the United States."

Section 2.

1. The President shall be Commander-in-chief of the army and navy of the United States, and of the militia of the several States, when called into the actual service of the United States. He may require the opinion, in writing, of the principal officer in each of the executive departments, upon any subject relating to the duties of their respective offices; and he shall have power to grant reprieves and pardons for offences against the United States, except in cases of impeachment.

2. He shall have power, by and with the advice and consent of the Senate, to make treaties, provided two-thirds of the Senators present concur; and he shall nominate, and, by and with the advice and consent of the Senate, shall appoint ambassadors and other public ministers and consuls, judges of the Supreme Court, and all other officers of the United States whose appointments are not herein otherwise provided for, and which shall be established by law. But the Congress may, by law, vest the appointment of such inferior officers as they think proper, in the President alone, in the courts of law, or in the heads of departments.

3. The President shall have power to fill up all vacancies that may happen during the recess of the Senate, by granting commissions, which expire at the end of their next session.

Section 3.

1. He shall, from time to time, give to Congress information of the state of the Union, and recommend to their consideration such measures as he shall judge necessary and expedient. He may, on extraordinary occasions, convene both houses, or either of them; and in case of disagreement between them, with respect to the time of adjournment, he may adjourn them to such time as he shall think proper. He shall receive ambassadors and other public ministers. He shall take care that the

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laws be faithfully executed; and shall commission all officers of the United States.

Section 4.

1. The President, Vice-President, and all civil officers of the United States, shall be removed from office on impeachment for, and conviction of, treason, bribery, or other high crimes and misdemeanors.

ARTICLE III.

THE JUDICIAL DEPARTMENT.

Section 1.

1. The judicial power of the United States shall be vested in one Supreme Court, and in such inferior courts as Congress may, from time to time, ordain and establish. The judges, both of the supreme and inferior courts, shall hold their offices during good behavior; and shall, at stated times, receive for their services a compensation, which shall not be diminished during their continuance in office.

Section 2.

1. The judicial power shall extend to all cases in law and equity arising under this Constitution, the laws of the United States, and treaties made, or which shall be made, under their authority; to all cases affecting ambassadors, other public ministers, and consuls; to all cases of admiralty and maritime jurisdiction; to controversies to which the United States shall be a party; to controversies between two or more States; between a State and citizens of another State; between citizens of different States; between citizens of the same State claiming lands under grants of different States; and between a State, or the citizens thereof, and foreign states, citizens, or subjects.

2. In all cases affecting ambassadors, other public ministers, and consuls, and those in which a State shall be a party, the Supreme Court shall have original jurisdiction. In all the other cases before mentioned, the Supreme Court shall have appellate jurisdiction, both as to law and fact, with such exceptions and under such regulations as Congress shall make.

3. The trial of all crimes, except in cases of impeachment, shall be by jury, and such trial shall be held in the State where the said crimes shall have been committed; but when not committed within any State, the trial shall be at such place or places as Congress may by law have directed.

Section 3.

1. Treason against the United States shall consist only in levying war against them, or in adhering to their enemies, giving them aid and comfort. No person shall be convicted of treason, unless on the testimony of two witnesses to the same overt act, or on confession in open court.

2. Congress shall have power to declare the punishment of treason; but no attainder of treason shall work corruption of blood, or forfeiture, except during the life of the person attainted.

ARTICLE IV.

MISCELLANEOUS PROVISIONS.

Section 1.

1. Full faith and credit shall be given in each State to the public acts, records, and judicial proceedings of every other State; and Congress may, by general laws, prescribe the manner in which such acts, records, and proceedings shall be proved, and the effect thereof.

Section 2.

1. The citizens of each State shall be entitled to all the privileges and immunities of citizens in the several States.

2. A person charged in any State with treason, felony, or other crime, who shall flee from justice and be found in another State, shall, on demand of the executive authority of the State from which he fled, be delivered up, to be removed to the State having jurisdiction of the crime.

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3. No person held to service or labor in one State, under the laws thereof, escaping into another, shall, in consequence of any law or regulation therein, be discharged from such service or labor; but shall be delivered up on claim of the party to whom such service or labor may be due.

Section 3.

1. New States may be admitted by Congress into this Union; but no new State shall be formed or erected within the jurisdiction of any other State, nor any State be formed by the junction of two or more States, or parts of States, without the consent of the Legislatures of the States concerned, as well as of Congress.

2. Congress shall have power to dispose of, and make all needful rules and regulations respecting the territory or other property belonging to the United States; and nothing in this Constitution shall be so construed as to prejudice any claims of the United States, or of any particular State.

Section 4.

1. The United States shall guarantee to every State in this Union a republican form of government, and shall protect each of them against invasion; and, on application of the Legislature or of the executive (when the Legislature cannot be convened), against domestic violence.

ARTICLE V.

1. The Congress, whenever two-thirds of both houses shall deem it necessary, shall propose amendments to this Constitution; or, on the application of the Legislatures of two-thirds of the several States, shall call a convention for proposing amendments, which, in either case, shall be valid, to all intents and purposes, as parts of this Constitution, when ratified by the Legislatures of three-fourths of the several States, or by conventions in three-fourths thereof, as the one or the other mode of ratification may be proposed by Congress; provided that no amendment which may be made prior to the year one thousand eight hundred and eight shall in any manner affect the first and fourth clauses in the ninth section of the first article; and that no State, without its consent, shall be deprived of its equal suffrage in the Senate.

ARTICLE VI.

1. All debts contracted, and engagements entered into, before the adoption of this Constitution, shall be as valid against the United States under this Constitution as under the Confederation.

2. This Constitution, and the laws of the United States which shall be made in pursuance thereof, and all treaties made, or which shall be made, under the authority of the United States, shall be the supreme law of the land; and the judges in every State shall be bound thereby, anything in the Constitution or laws of any State to the contrary notwithstanding.

3. The Senators and Representatives before mentioned, and the members of the several State Legislatures, and all executive and judicial officers, both of the United States and of the several States, shall be bound by oath or affirmation to support the Constitution; but no religious test shall ever be required as a qualification to any office or public trust under the United States.

ARTICLE VII.

1. The ratification of the conventions of nine States shall be sufficient for the establishment of this Constitution between the States so ratifying the same.

Done in convention by the unanimous consent of the States present, the seventeenth day of September, in the year of our Lord one thousand seven hundred and eighty-seven, and of the Independence of the United States of America the twelfth.

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AMENDMENTS.

ARTICLE I.

Congress shall make no law respecting an establishment of religion, or prohibiting the free exercise thereof; or abridging the freedom of speech or of the press; or the right of the people peaceably to assemble, and to petition the government for redress of grievances.

ARTICLE II.

A well-regulated militia being necessary to the security of a free State, the right of the people to keep and bear arms shall not be infringed.

ARTICLE III.

No soldier shall, in time of peace, be quartered in any house without the consent of the owner; nor in time of war, but in a manner to be prescribed by law.

ARTICLE IV.

The right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures, shall not be violated; and no warrants shall issue but upon probable cause, supported by oath or affirmation, and particularly describing the place to be searched, and the persons or things to be seized

ARTICLE V.

No person shall be held to answer for a capital or otherwise infamous crime, unless on a presentment or indictment of a grand jury, except in cases arising in the land or naval forces, or in the militia, when in actual service in time of war and public danger; nor shall any person be subject for the same offence to be twice put in jeopardy of life or limb; nor shall be compelled in any criminal case to be a witness against himself; nor be deprived of life, liberty, or property, without due process of law; nor shall private property be taken for public use without just compensation.

ARTICLE VI.

In all criminal prosecutions the accused shall enjoy the right to a speedy and public trial, by an impartial jury of the State and district wherein the crime shall have been committed, which district shall have been previously ascertained by law; and to be informed of the nature and cause of the accusation; to be confronted with the witnesses against him; to have compulsory process for obtaining witnesses in his favor; and to have the assistance of counsel for his defence.

ARTICLE VII.

In suits at common law, where the value in controversy shall exceed twenty dollars, the right of trial by jury shall be preserved; and no fact tried by a jury shall be otherwise re-examined in any court of the United States than according to the rules of the common law.

ARTICLE VIII.

Excessive bail shall not be required, nor excessive fines imposed, nor cruel and unusual punishment inflicted.

ARTICLE IX.

The enumeration in the Constitution of certain rights shall not be construed to deny or disparage others retained by the people.

ARTICLE X.

The powers not delegated to the United States by the Constitution, nor prohibited by it to the States, are reserved to the States respectively, or to the people.

ARTICLE XI.

The judicial power of the United States shall not be construed to extend to any suit in law or equity commenced or prosecuted against one of the United States by citizens of another State, or by citizens or subjects of any foreign state.

ARTICLE XII.

1. The electors shall meet in their respective States, and vote by ballot for President and Vice-President, one of whom, at least, shall not be an inhabitant of the same State with themselves. They shall name in their ballots the

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person voted for as President, and in distinct ballots the person voted for as Vice-President; and they shall make distinct lists of all persons voted for as President, and of all persons voted for as Vice-President, and of the number of votes for each; which lists they shall sign and certify, and transmit sealed to the seat of the Government of the United States, directed to the President of the Senate. The President of the Senate shall, in the presence of the Senate and House of Representatives, open all the certificates, and the votes shall then be counted. The person having the greatest number of votes for President shall be the President, if such number be a majority of the whole number of electors appointed; and if no person have such majority, then from the persons having the highest numbers, not exceeding three, on the list of those voted for as President, the House of Representatives shall choose immediately, by ballot, the President. But, in choosing the President, the votes shall be taken by States, the representation from each State having one vote: a quorum for this purpose shall consist of a member or members from two-thirds of the States, and a majority of all the States shall be necessary to a choice. And if the House of Representatives shall not choose a President, whenever the right of choice shall devolve upon them, before the fourth day of March next following, then the Vice-President shall act as President, as in the case of the death or other constitutional disability of the President.

2. The person having the greatest number of votes as Vice-President shall be the Vice-President, if such number be a majority of the whole number of electors appointed; and if no person have a majority, then from the two highest numbers on the list the Senate shall choose the Vice-President. A quorum for the purpose shall consist of two-thirds of the whole number of Senators, and a majority of the whole number shall be necessary to a choice.

3. But no person constitutionally ineligible to the office of President shall be eligible to that of Vice-President of the United States.

ARTICLE XIII.

Section 1.

Neither slavery nor involuntary servitude, except as a punishment for crime, whereof the party shall have been duly convicted, shall exist within the United States, or any place subject to their jurisdiction.

Section 2.

Congress shall have power to enforce this Article by appropriate legislation.

ARTICLE XIV.

Section 1.

All persons born or naturalized in the United States, and subject to the jurisdiction thereof, are citizens of the United States, and of the State wherein they reside. No State shall make or enforce any law which shall abridge the privileges or immunities of citizens of the United States; nor shall any State deprive any person of life, liberty, or property, without due process of law; nor deny to any person within its jurisdiction the equal protection of the laws.

Section 2.

Representatives shall be apportioned among the several States according to their respective numbers, counting the whole number of persons in each State, excluding Indians not taxed. But when the right to vote at any election for the choice of electors for President and Vice-President of the United States, Representatives in Congress, the executive and judicial officers of a State, or the members of the Legislature thereof, is denied to any of the male inhabitants of such State, being twenty-one years of age, and citizens of the United States, or in any way abridged, except for participation in rebellion or other crime, the basis of representation therein shall be reduced in the proportion which the number of such male citizens shall

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bear to the whole number of male citizens twenty-one years of age in such State.

Section 3.

No person shall be a Senator or Representative in Congress, or elector of President and Vice-President, or hold any office, civil or military, under the United States, or under any State, who, having previously taken an oath as a member of Congress, or as an officer of the United States, or as a member of any State Legislature, or as an executive or judicial officer of any State, to support the Constitution of the United States, shall have engaged in insurrection or rebellion against the same, or given aid or comfort to the enemies thereof. But Congress may, by a vote of two-thirds of each house, remove such disability.

Section 4.

The validity of the public debt of the United States, authorized by law, including debts incurred for payment of pensions and bounties for services in suppressing insurrection or rebellion, shall not be questioned. But neither the United States nor any State shall assume or pay any debt or obligation incurred in aid of insurrection or rebellion against the United States, or any claim for the loss or emancipation of any slave; but all such debts, obligations, and claims shall be held illegal and void.

Section 5.

The Congress shall have power to enforce, by appropriate legislation, the provisions of this Article.

ARTICLE XV.

Section 1.

The right of citizens of the United States to vote shall not be denied or abridged by the United States or by any State on account of race, color, or previous condition of servitude.

Section 2.

The Congress shall have power to enforce this Article by appropriate legislation.

Consult: Bryce, "The American Commonwealth" (new ed. 1895); Curtis, "Constitutional History of the United States" (1896); De Tocqueville, "Democracy in America" (Eng. trans. 1889); Fisher, "The Evolution of the Constitution" (1887); Meigs, "The Growth of the Constitution" (1900); Story, "Commentaries on the Constitution of the United States" (1833).

Constitutional Convention, in the United States, an assembly of delegates elected by popular vote to prepare or revise the constitution of a State. The 13 original States were admitted into the Union by the act of ratifying the Federal Constitution of 1787; the others have been received after the passage of enabling acts by Congress, and the approval by it of drafts of proposed constitutions. The first duty of a territorial candidate for statehood after the adoption of its enabling act is to call a Constitutional Convention and prepare a constitution, which must conform to the provisions of the Federal Constitution and amendments, and to the spirit of subsequent legislation by Congress. On the filing in Washington of a certificate of adoption of a constitution by the popular vote of the people in the territory, the President of the United States issues a proclamation announcing the admission of the territory into the Union as a State. Subsequently, if deemed necessary or advantageous, the Legislature may authorize a Constitutional Convention for the

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purpose of revising the Constitution. At the close of the Civil War each of the States formerly in the Confederacy was obliged to hold a Constitutional Convention to prepare a new constitution, recognizing the amendments to the Federal Constitution that had been adopted by the Northern States as a consequence of the war, with those portions of national legislation which were designed to be general in their application.

Consubstantial, having the same substance or essence, co-essential. When the Arian controversy ran high in the Church, and with the view of settling it, Constantine was induced to summon the General Council of Nice in 325, the Council pronounced in favor of the Athanasian view that the Second Person of the Trinity is *homousios* with the Father. To this the corresponding Latin term was *consubstantialis*. The Greek and Roman Churches, as well as those of England and Scotland with the leading Continental Protestant Churches, still adopt this view; thus the second of the Thirty-nine Articles commences, "The Son, which is the Word of the Father, begotten from everlasting of the Father, the very and eternal God and of one substance with the Father." Similarly the Westminster Confession of Faith—the standard of the proper Presbyterian Churches—teaches that "In the unity of the Godhead there be three persons of one substance." (ch. ii, § 3.)

Consubstantiation, the doctrine that in the Holy Eucharist the real body and blood of Christ are present and are of the same substance with the bread and wine. The doctrine of Transubstantiation is that when the words of consecration are pronounced by the priest, the bread and wine are transformed into the body and blood of Christ, and consequently cease to exist in their original form. The doctrine of Consubstantiation, on the contrary, is that after consecration they continue to exist in their original form, but substantially conjoined with the body and blood of Christ.

This doctrine, generally ascribed to John of Paris, as its earliest advocate, has had few, if any, confessors. The term "Consubstantiation" is often incorrectly used to designate Luther's doctrine of the *sacramental* conjunction with the bread and wine, which is a very different thing from that of the *substantial* conjunction. Luther taught that the bread and wine are present in the natural, but the body and blood in a supernatural, manner. The presence is not "consubstantial;" for while the elements are masticated, swallowed, digested, etc., the body of Christ, according to Luther's teaching, is present only when the element is received by the communicant, as the

words of distribution are repeated, and no longer. The presence of the elements is comprehensible, visible, tangible; that of the body and blood incomprehensible, invisible, mysterious and inexplicable. The imagination that the body and blood of Christ can be received in the same way as the bread and wine, the Lutheran Church designates as "Capernaitic-error," as the people of Capernaum, in John vi: 52, seemed to have had such an impression. Consubstantiation is sometimes called Impanation.

Consul, two supreme magistrates, with equal authority, elected annually in ancient Rome from the time of the expulsion of the Kings and the commencement of the Republic (A. U. C. 244; B. C. 509). They were called at first *prætors* (prætors), *imperatores* (commanders), and *judices* (judges); but ultimately the name *consules* (consuls) prevailed over these designations. The annual meeting or assembly of the Roman citizens for their election was called by the plural term *comitia*, from the *comitium*, a place in or near the forum, where the elections were held. They continued, with a few exceptional elections, during the whole period of the republic, and were so important in the State that the successive years were distinguished by the consuls who had held office during each of them. At first none but patricians could hold the dignity, but in B. C. 366 a plebeian was elected one of the consuls, and in B. C. 172 two. The consulate nominally continued under the empire, but was little more than a titular dignity. Tiberius transferred the power of electing consuls from the people to the Senate. Afterward their number was augmented. The last consul at Rome was Decimus Theodorus Paulinus in A. D. 536; the last at Constantinople, Basilus junior in A. D. 541.

In French history, a consul was one of three supreme magistrates designated first, second, and third consul, who held office between 1799 and 1804. Napoleon Bonaparte was the first consul, and his power soon absorbed that of the rest.

In commerce, a consul is an officer appointed by the government of his country to reside in a specified foreign land, with the view of promoting the mercantile interests of the nation in whose service he is engaged. On arriving at his destination, or on his being appointed a consul — if he be a native of the land in which he is accredited, he shows his credentials to the government of the region in which he is to reside, and obtains an *exequatur* sanctioning his appointment, and according him all the rights and privileges enjoyed by his predecessors. He annually or more frequently reports to his government the state of commerce in the region where his opportunities of observation lie. The office of consul in this sense seems to have arisen in Italy about the

middle of the 12th century, and by the 16th had spread over Europe.

Consumption, Tuberculosis, or Phthisis, a more or less rapidly advancing process of lung-destruction, a disease characterized by emaciation, debility, cough, hectic fever, and purulent expectoration. It is caused by a germ known as the tubercle bacillus. The predisposing causes are very variable, hereditary taint, scrofulous diathesis, syphilis, smallpox, etc., exposure to fumes and dusty air in certain trades; violent passions and excess of various kinds; sudden lowering of the temperature of the body, etc. The more immediate or occasional causes are pneumonic inflammation proceeding to suppuration, catarrh, asthma, and tubercles in the lungs. The incipient symptoms usually vary with the cause of the disease; but when it arises from tubercles it is usually marked by a short dry cough which becomes habitual, but from which nothing is spit up for some time except a frothy mucus. The breathing is at the same time somewhat impeded, the body becomes gradually leaner, and great languor, with indolence, dejection, and loss of appetite prevails. At a later stage the cough becomes more troublesome, particularly at night, and is attended with spitting, the matter of which assumes a greenish color and purulent appearance, being on many occasions streaked with blood. In some cases a more severe degree of blood-spitting attends, and the patient spits up a considerable quantity of florid, frothy blood. At a more advanced period of the disease a pain is sometimes felt on one side in so high a degree as to prevent the person from lying easily on that side; but it more frequently happens that it is felt only on making a full inspiration, or coughing. At the beginning of the disease the pulse is often natural, but it afterward becomes full, hard, and frequent. At the same time the face flushes, particularly after eating, the palms of the hands and soles of the feet are affected with burning heat; the respiration is difficult and laborious; evening exacerbations become obvious; and by degrees the fever assumes the hectic form with remittent exacerbations twice every day, at noon and evening. From the first appearance of the hectic symptoms the urine is highly colored and deposits a copious branny red sediment. At this time the patient is usually costive; but in the more advanced stages a diarrhœa often comes on, colliquative sweats likewise break out, and these alternate with each other, and induce great debility. Some days before death, the extremities become cold and in some cases a delirium precedes it.

The morbid appearance most frequently to be met with on the dissection of those who die of phthisis is the existence of tubercles in the cellular substance of the lungs, most usually at the upper and back part; but, in

some instances, occupying the outer part, and forming adhesions to the pleura. In some cases life has been protracted till not one-twentieth part of the lungs appeared on dissection fit for performing their function. The left lobe is oftener affected than the right. This form of the disease is known as pulmonary tuberculosis. The tubercle bacillus also affects the lymphatic glands, the bones and many other parts of the body. Removal to an equable climate or to a pure and mild air may arrest the disease in its incipient stage. In October, 1890, Dr. Koch, of Berlin, gave to the medical world his theory of the treatment of tuberculosis by a new medicament which he styled lymph. Experiments following his idea are now being made in all prominent medical circles, with varying success. Koch's remedy or lymph cure is a method the operation of which is extremely simple and does not differ from that of hypodermic medication, the injection being made into the skin of the back, below the shoulder-blades, a place selected on account of the comparative absence of local reaction manifested. The fluid or lymph is a "brownish, transparent liquid," which for use is diluted with distilled water. Its composition was made known by Dr. Koch, Jan. 15, 1891. It consists of a glycerine extract, derived from the pure cultivation of tubercle bacilli, and contains besides the effective matter all the other matters soluble in 50 per cent glycerine. The original fluid keeps well, but the diluted fluid is liable to decomposition unless used at once. The remedy does not destroy the tubercle bacilli, but rather the affected tissues. It has been tried in various tuberculosis affections, including lupus, and the fluid has a distinctly specific action on tubercular processes of all kinds. As yet no markedly successful results have been obtained from its use, but it is often used for diagnostic purposes both in man and animals, and is a useful means of recognizing tubercular disease in any part of the body. There are quite a number of preparations of tuberculin now in use. See KOCH, ROBERT; TUBERCULOSIS.

Consumption, in political economy, all use or expenditure of the products of industry or of things having an exchangeable value. It is usually characterized as productive or unproductive, according as it does or does not conduce to the efficiency of a producer and to further production. Thus wealth in the form of machinery is consumed productively by wear and tear in the possession of production; and, similarly, wealth expended in improving land is productively consumed; but the wealth expended in the maintenance of an operatic artiste is, from the ordinary point of view, unproductively consumed. The classification, however, is not of a very definite kind, the dis-

inction lying for the most part in the degree of directness and obviousness with which the act of consumption is related to production. Hence, in the case of the operatic artiste, it is sometimes urged that the recreative benefit conferred upon the community tends indirectly to increase efficiency in production, and that from this point of view the artiste consumes productively. So the expenditure of wealth in war, or in preparations for war, usually classed as unproductive, may be really productive consumption, as tending to the assurance of the producer in the stability of the commercial conditions.

The perfect characterization of an act of consumption as productive or unproductive involves the consideration of elements of a frequently incommensurable kind, and the rough practical economic test has to be employed with some amount of reservation. Consumption is the end of all production; and as the demand of the consumer determines the employment of the various coefficients of production, land, labor and capital, it is urged by many later economists that the scientific treatment of economics should proceed from consumption to production, instead of from production to consumption in accordance with the method of the older economics. Too much stress may be laid upon this method, but the consideration of economic problems from the stand-point of the consumer is of advantage, as giving the social need rather than the producer's profit the prior claim upon the attention.

Contagion, the communication of a disease by contact with the person laboring under it, as distinguished from infection, used to signify its transmission by means of the air without actual personal contact with the diseased person. But sometimes the word contagion is used in both of these senses, and is divided into immediate or contactical contagion, that produced by actual contact, and mediate or remote contagion, communicated by the air. Infection is used in a more extensive sense, to include also miasmata or other causes of disease not coming from human beings but rising from marshes or from any other source. Some make the two words contagion and infection strictly synonymous.

Contango, in stock-jobbing, a sum of money paid to a seller for accommodating a buyer, by carrying the engagement to pay the price of shares bought over to the next account day. In reality contango is interest paid for the loan of money for the interval between account days.

Contarini, the name of a noble family in Venice, and one of the 12 that elected the first Doge. Between 1043 and 1674, eight Doges were furnished by this family, which also counted among its members four pa-

Contemporaneity

triarchs and a large number of generals, statesmen, artists, poets, and scholars. Cardinal Gasparo Contarini (1483-1542) distinguished himself as Venetian ambassador at the court of Charles V., and was papal legate at the Diet of Ratisbon (1541), where he displayed great moderation, seeking by concessions to bring about the reunion of the Protestants with the Church. Simone (1563-1633) was Venetian ambassador at several Italian courts, in Spain, in Constantinople, etc., and was a Latin poet. Ludovico (1629-1653) was ambassador in Paris.

Contemporaneity, formerly strata found partly with identical, partly with allied fossils, were held to be exactly contemporary, though widely separated on the earth's surface; now the same facts are used to establish the contrary conclusion. If each species came into existence at a certain spot on the earth's surface, from which it gradually spread in various directions, it cannot have reached a remote region till some considerable time after its birth. Two strata, then, widely separated in the world, containing some species common to both, are contemporaneous in this sense, that they were formed while that species lived; but the stratum near its birthplace is older than the one to which it spread after it had already multiplied greatly and rooted itself successively in all the intervening regions, wherever a place appropriate for its habitation could be found.

Contempt, an offense against the dignity, order, or authority of a court or legislative assembly. Contempts committed out of court may be punished by fine or imprisonment, contempts done before court are usually punished in a summary way by commitment or fine. The power of vindicating their authority against contempt is incident to all superior courts.

Content and **Noncontent**, words by which assent and dissent are expressed in the British House of Lords. **AYE** and **No** are used in the House of Commons, **AYE** and **NAY** generally in American deliberative bodies.

Conti, House of, this younger branch of the princely French house of Condé took its name from the small town of Conti, near Amiens, and sprang from Armand de Bourbon, brother of the "Great Condé"; born in 1629; died in 1666. The most remarkable member of the family was **FRANÇOIS LOUIS**, Prince de la Roche-sur-Yon and Conti, born in 1664. He took a brilliant part in the victories of Steinkirk and Neerwinden, and Massillon pronounced his funeral oration. Saint-Simon, in his celebrated "Memoirs," thus speaks of him: "He was the delight of armies, the divinity of the people, the hero of the officers, the darling of Parliament, and the admiration

Contorted Strata

of the most learned savants." He died in 1709. The last of the House of Conti was **LOUIS FRANÇOIS JOSEPH**, born in 1734; died in Spain in 1814.

Conti, Louise Marguerite de Lorraine, Princesse de, celebrated for her beauty and brilliant talents, daughter of Henri, Duc de Guise, was loved by Henri IV., who proposed to marry her; she, however, married, in 1605, François de Bourbon, Prince de Conti, son of Louis de Bourbon, first Prince de Condé, who died in 1614, without issue, and cannot therefore be accounted as the founder of the above house. After his death, the Princesse de Conti privately married the famous Marshal de Bassompierre, shared in his disgrace, and died in exile in 1631.

Continent, the large, unbroken tracts of land on the earth, whether altogether or entirely disconnected, are included under this name. Thus Europe and Asia together, Africa, North America, South America, and Australia, may all be thus regarded. There is absolutely no natural separation between Europe and Asia; and thus, although in descriptive and political geography they are distinct, in physical geography they are one. The word is also applied to the mainland of Europe, as distinguished from the British Islands.

Continent, the Dark. See **DARK CONTINENT**.

Continental, pertaining or relating to a continent; as a continental system. Belonging or relating to the mainland of Europe, in contradistinction to the islands belonging thereto, more especially Great Britain; as, a continental tour. Relating, or pertaining to, the American colonies confederated during the Revolutionary War; as, the Continental Congress.

Continental System, a name given to the plan adopted by Napoleon I. for cutting off England from connection with the continent of Europe, and thus destroying her maritime supremacy. It was prominently put forward by the publication of the Berlin Decree in 1806, which declared the British Islands in a state of blockade, and prohibited all trade in English goods. The British government, in retaliation, issued in 1807 the famous "Orders in Council." On the breaking up of Napoleon's power the continental system fell to the ground.

Contorted Strata, in geology, beds which are highly folded, plicated, and twisted—the folds being extremely irregular, and giving rise to rapid changes in the direction and angle of inclination. Contorted strata are frequently crumpled and puckered—the fossils and pebbles which they may chance to contain being

Contour

compressed, flattened, and distorted — facts which show that the beds have been subjected to great crushing and squeezing.

Contour, the outline or defining line of any figure or body; also the horizontal outline of works of defense. When the conformation of the ground or works is described by contours or horizontal sections, these sections are taken at some fixed vertical interval from each other suited to the scale of the drawing or the subject in hand, and the distances of the surface at each interval above or below some assumed plane of comparison are given in figures at the most convenient places on the plan.

Contraband of War, articles carried by neutrals in vessels or otherwise for the assistance of an enemy in waging war. The term embraces arms, ammunition, materials for manufacturing gunpowder, armed vessels, coal for warships, provisions and money intended for the military forces, and all supplies of warlike stores or any articles required for the prosecution of the war. Articles which are not ordinarily contraband are also liable to confiscation if they belong to the owner of the contraband and are mingled with the same in the same vehicle of conveyance or in the same packages. Where a blockade of a port is declared and successfully maintained, all articles of value become practically contraband in that they are liable to seizure and confiscation if the attempt is made to carry them into the blockaded port. According to international law, these are liable to seizure and to confiscation by order of a prize court. No recompense is made to the neutral except in the case of provisions.

Contrabasso, the Italian name, now usually employed by musicians of all nationalities to designate the largest instrument of the violin kind (called sometimes the double bass), with three strings usually tuned in fourths. Its compass is from the lower A of the bass clef to tenor F. In Germany a fourth string is used, which gives it a range of three notes lower.

Contract, the term usually applied to such agreements (whether express or implied) as create, or are intended to create, a legal right, and corresponding liability; such right not attaching to the possession of the subject-matter of the contract, except in equity, and that indirectly, but subsisting both in equity and law against the contracting party. The conditions essential to the legal validity of a contract relate either to the competency of the parties, the sufficiency of the consideration or inducement, the nature of the thing contracted for, the fairness of the transaction, or, lastly, to the form of the agreement. First, as to the competency of the parties: The party to be sued must have been at the time of the

Contrayerva

contract of sound mind, and, unless it was for the supply of necessities, of full age; and if a woman, she must have been unmarried, subject as to the latter condition to some exceptions established either by local custom or by the doctrines of equity. As to the sufficiency of the consideration on the part of the person suing: It must have been either future marriage since performed, or money, or something capable of being estimated in money; or some act, whether of performance or abstinence, whereby some undoubted advantage, though not capable of being exactly valued, accrues to the party sued. The act contracted for must be neither contrary to written law, nor to public policy; and it must be beneficial to the party seeking either performance or compensation, or to some one on whose behalf he gave the consideration. There must have been neither fraud (either by concealment or misstatement) nor compulsion on the part of the plaintiff in obtaining the agreement; and fraudulent acts subsequent to the agreement having reference to it are also sufficient to deprive the guilty party of all right under it. Some circumstances are in equity considered either as conclusive evidence of fraud, or as substantive acts of coercion, which are not strictly of such a nature, and are not so deemed at law. Lastly, as to the form of the agreement: Where it relates to an interest in land of three years' duration or more, or to goods of the value of \$50 or upward, unless there be earnest or delivery, or where it is an agreement as surety, or where it is upon marriage as a consideration, it must, by American law, be in writing; though the want of a written instrument may be supplied in equity by partial performance, that is, by acts evidently done in pursuance of the alleged contract.

Contractility, the property which a muscle has during life to contract or shorten itself under the operation of the will, or by mechanical, electric, or other stimulus. It continues for a short time after death. It is sometimes called irritability, but in this case that word is used in a limited sense.

Contralto, in music, the highest voice of a male adult, or the lowest of a woman or a boy; called also the *Alto*, or, when possessed by a man, *Counter-tenor*. It is next below the treble and above the tenor, its easy range being from tenor G to treble C.

Contravallation, **Lines of**, in military language, a chain of works round a besieged place to resist the sorties of the garrison.

Contrayerva, a medicine once in much repute against low fevers, and as a mild stimulant and diaphoretic, also as efficacious

Contusion

against snake-bites, whence the Spanish name, consists of the root-stocks (rhizomes) of different species of *Dorstenia*, a tropical American plant of the natural order *Arto-carpaceæ*. The genus is remarkable for the plane receptacle in which the numerous small flowers are depressed, the female flowers more deeply so.

Contusion, a bruise or injury of the soft parts of the body, without breach of surface. If the skin be broken, the injury is called a contused wound. Treatment: When slight, the blood stagnates in the capillaries of the skin, or is effused into the surrounding tissues. Time and cold applications remove it. When the texture has been lacerated, there is effusion of blood. Here cooling applications, general or local bleeding, emollients, poultices, etc., are necessary. When all the soft and solid parts, except the skin, are bruised and reduced to a kind of pulp there is no hope save in amputation. See BRUISE.

Convallaria, a genus of plants, order *Liliaceæ*, tribe *Asparageæ*. The *C. majalis* is the sweet-scented Lily of the Valley. It has two ovate lanceolate radical leaves, a semi-cylindrical scape with racemes of very pure white fragrant flowers, with the divisions of the perianth recurved at the tips. The berries, which are globose, are red. It is found in woods and coppices, especially in a light soil. There are a red-flowered and a double variety in gardens. *C. majalis* is a valuable cardiac tonic, administered in form of fluid extract or tincture. It has, to a considerable extent, superseded *digitalis purpurea* for heart disease, it being free, to a large degree, from many objections to which *digitalis* is obnoxious. The remedy is old enough to have proven its value.

Convection, the act or process of carrying or conveying from one place to another. It is also used to designate the mode by which heat is propagated through liquids. This is by the portion heated becoming lighter than the rest, and ascending to the surface, a colder one descending to take its place.

Convent, the fraternity or sisterhood of an abbey or priory; a community of religious persons, whether monks or nuns. At first those who withdrew to the desert lived solitarily; the gathering together into a community of all those solitaries who could be brought to tolerate the restraint of a society regulated by rule was a later movement.

In the United States, owing to religious upheavals going on in the Old World, a very large number of the religious consecrate of the Roman Catholic Church have found refuge. One of the oldest of our commonwealths, that of Maryland, was settled by

Convention

the Catholics who at an early date laid the foundations of numerous convents and monasteries. As the settlements and centers of population pushed further in every direction from the Atlantic coast, the emissaries of the Church were in the van, and the result has been the building and organization of some of the most noted convents in the world. Scarcely a large town in the country is without its convent or nunnery, while in many of the larger cities there are several communities of either sex. The term convent is here applied almost exclusively to an establishment containing a sodality of nuns, the male religious being denominated monks and their establishments monasteries.

It is said that the first convent in England was erected by Eadbald at Folkestone in 630, and the first in Scotland at Coldingham in 670. They were numerous during the Middle Ages. Henry VIII. suppressed them, confiscating their revenues. By the Roman Catholic Emancipation Act of 1829 their erection in the United Kingdom was prohibited, but the Act was from the first so much of a dead letter that they were established in various places with no protest from the community in general. For a long time convents in Great Britain were founded by the Church of Rome only, but in 1875 one was opened at Bournemouth under the auspices of the Ritualist party in the Established Church.

Conventicle, a small gathering for religious worship. The word was applied to the schools of Wycliffe. Afterward it was used of Dissenters from the Establishment in Queen Elizabeth's time, but it did not come into great prominence till the passing of the Uniformity Act in 1662. Then conventicles was employed as a term of contempt for the gatherings of Non-conformists in England and of Covenanters in Scotland, who remained in separation from the Established Churches of their respective countries.

Convention, the act of coming together or assembling; the state of being assembled. The word convention has in the United States an association of ideas pregnant with all that is most important in our political history. Several times have conventions been held at which were considered questions of the very existence of the nation. The secession conventions held in the Southern States resulted in the Civil War of 1861-1865. Several times have constitutional conventions been called to consider and prepare State constitutions—the most important being those held in the Southern States during the "Reconstruction" period. The great national political parties meet in convention to nominate candidates for President, and the same method of nom-

Conversion

ination prevails down to the smallest candidate for the lowest municipal or county office. Nothing can be done in a political way that does not emanate in a convention. The custom of assembling in convention has extended to other affairs than politics and many conventions for miscellaneous purposes are annually held.

In English history the word is applied to an extraordinary meeting of the Houses of Lords and Commons at a time of national crisis or revolution, without being called together by the writ of the sovereign or waiting to ask his assent. The name is specially applied (*a*) to the Parliament summoned, not by the sovereign, but by Gen. Monk, which met on April 25, 1660, and restored Charles II., and (*b*) to the Parliament convened by the Prince of Orange, who at the time was not King of England. It met on Jan. 22, 1689, and bestowed the kingdom on its author and his wife, William and Mary.

In French history the word is applied to what was more fully named the National Convention, which succeeded the National Legislative Assembly on Sept. 21, 1792, and was dissolved Oct. 26, 1795. It began by abolishing royalty and proclaiming a republic, it altered the calendar, was sanguinary in its measures, and was at feud with Europe.

In diplomacy, a convention is equivalent to a treaty. Thus there have been conventions by the United States with the leading nations of the world to secure uniform and reciprocal action for special purposes.

Conversion, a term in logic. A proposition is converted when the predicate is put in the place of the subject, and the subject in place of the predicate; as, "no A is B" ("no virtuous man is a rebel"), the converse of which is "no B is A" ("no rebel is a virtuous man"). Simple conversion, however, in this manner is not always logical. In the case of universal affirmatives, for example, "all A are B" (say, "all men are animals"), the simple converse "all B are A" ("all animals are men") would not be true.

Conveyancing, the practice of drawing deeds, leases, or other writings for transferring the title to property from one person to another, of investigating the title of the vendors and purchasers of property, and of framing those multifarious deeds and contracts which govern and define the rights and liabilities of families and individuals. The business of conveyancing is carried on by members of the legal profession generally.

Convocation, an assembly of the clergy. Specifically the name given to either of two such gatherings, the one termed the Convocation of Canterbury, or simply Convo-

Convolvulus

cation, the other the Convocation of York. In theory the Church of England is governed by means of the convocations of its bishops and clergy. Each of the two ecclesiastical provinces of Canterbury and York has its Convocation consisting of two houses, the upper composed of Bishops presided over by the Archbishop, and the lower being made up of the deans of Cathedrals, archdeacons, and proctors elected from the Cathedral chapters, with two additional proctors elected by clergy at large in the province of Canterbury and by the archdeacons in the province of York. The life of the Convocation is coincident with that of Parliament. At one time the bodies were paramount in matters ecclesiastical. Then their powers were abridged, and they gradually sank into almost utter nothingness, but were revived in 1872, and by subsequent legislation have had some portion of their old importance restored.

Convolvulaceæ, an order of perigynous exogens, placed by Lindley in his alliance *Solanales*. The species are generally twining and milky plants, though some are erect bushes. The leaves are often undivided. There are no stipules. Inflorescence axillary or terminal; the partial peduncles, when any exist, generally in the form of two bracts. Corolla, monopetalous, deciduous; the limb five-lobed, plaited; stamens five; ovary simple, with two or four cells, rarely with one; ovules few, erect; style one, generally divided at the top into as many segments as the cells of the ovary; capsule one to four celled, succulent or capsular. Very common in all parts of the tropics, rarer in cold countries. The roots abound in a milky juice, which is strongly purgative. It is the active principle in jalap, scammony, etc. *Batatas edulis* is the sweet potato. There are two tribes or sections of the order; convolvuleæ, with the carpels consolidated, and dichondreae, with them distinct. There are 46 genera known and nearly 700 species.



CONVOLVULUS.

Convolvulus, a genus of plants, the typical one of the order *Convolvulaceæ* and the tribe *Convolvuleæ*. The calyx is with-

out bracts, the corolla funnel-shaped, the capsule two-celled, each cell with two seeds. *C. arvensis* has a root running deeply into the ground, rendering the plant difficult of extirpation; sagittate leaves, with acute lobes; the peduncles usually single-flowered, with minute bracts distinct from the flowers, which are somewhat small and pale rose-colored. It is common in fields and hedges, especially when the soil is light. *C. Soldanella*, the Sea-side Convolvulus or Bindweed has reniform fleshy lines, and large rose-colored flowers. It has been sometimes placed in the genus *Calystegia*. *C. dissectus* abounds in prussic acid, and is one of the plants used in the preparation of the liquor called noyau.

Convoy, a fleet of merchantmen under the protection of a ship or ships of war, or the ship or ships appointed to conduct and defend them from attack and capture by an enemy. In military language it is used for escort.

Convulsion, a diseased action of the muscular tissues characterized by violent contractions with alternate relaxations, the sensibility and voluntary motion being for a time suspended. In adults convulsions indicate disease, either of the brain (particularly epilepsy) or of the kidneys. In children, especially before the age of three years, convulsions are of common occurrence, and, though serious in themselves, may be due to temporary and comparatively trifling causes. A fit of convulsions in a child may last from a few minutes to hours, and may prove fatal if not immediately relieved. The first symptom is often a twitching of particular muscles or groups of muscles, a change in the habitual expression or color of the face, with distention of the features, and turning of the globes of the eyes suddenly upwards. Fingers are sometimes clenched in the palm, and the feet turned inwards. Sometimes convulsions occur without warning, and in perfect apparent health. Their cause is usually to be found in some source of irritation, especially in the digestive organs; as disordered dentition, worms in the intestine, indigestible or unsuitable food with deficient exercise or bad ventilation, etc. In children, epidemic fevers in their early stages, whooping cough during its progress, and diseases of the brain and its membranes at every stage, are attended by convulsions. Convulsions are rare among horses and cattle. In young dogs they frequently occur from intestinal worms, disordered digestion, or in connection with distemper or other debilitating diseases; they usually disappear when their special causes are removed.

Conway, **Hugh** (the pseudonym of Frederick John Fargus), an English author;

born in Bristol, in 1847. He adopted his pseudonym from the school frigate "Conway," stationed on the Mersey, which he entered when he was 13, for the purpose of training for a seafaring life. His father opposed this, so young Fargus entered the auctioneer business, employing his leisure in writing clever newspaper verse and occasional tales. Some songs of his were accepted and published in 1878, a volume of verse in 1879; but it was the issue and rapid sale of his melodramatic story, "Called Back" (1884), which made him famous. Fargus sold his share in the auctioneer's business in Bristol, and went to London, where he adopted the profession of authorship. His "Dark Days" followed, and just as in "A Family Affair," and other works which he now produced in rapid succession, he had begun to show higher capabilities as a novelist, he died at Monte Carlo, May 15, 1885.

Conway, **Moncure Daniel**, an American author; born in Stafford county, Va., March 17, 1832. He was graduated at Dickinson College in 1849 and at the Harvard Divinity School in 1854, affiliating first with the Methodists and later with the Unitarians. From 1863 to 1884 he was minister at South Place Chapel, in London. He wrote lives of Thomas Paine, Edmund Randolph, Hawthorne, and Thomas Carlisle, "Emerson at Home and Abroad," "Republican Superstitions," "Demonology and Devil Lore," etc. He died in 1907.

Conway, **Sir William Martin**, an English explorer; born in Rochester in 1856. He was educated at Cambridge and was made Professor of Art at University College, Liverpool, soon after his graduation. In 1889 he explored Egypt; in 1892 the Himalayas; in 1894 the Alps; in 1898 the western slope of the Andes; and in 1900 the eastern slope of the Andes. He has published "Early Flemish Artists," "The Alps from End to End," "Climbing and Exploration in the Bolivian Andes," etc.

Cony, or **Coney**, an old name for the rabbit; used also in the English version of the Bible as a translation of a Hebrew word probably meaning the Hyrax syriacus, a rabbit-like animal common in Syria and Palestine, inhabiting clefts of rocks.

Conyza, a genus of composite plants, the type of the division Conyzeæ, and the sub-division Euconyzeæ. *C. camphoratta* and *C. marilandica* give out a strong smell of camphor.

Cooch Behar, or **Kuch-Behar**, a native State in India, in political relation with the government of Bengal. It forms a level plain of triangular shape, intersected by numerous rivers, and is entirely surrounded by British territory. The greater portion of the soil is fertile and well-cultivat-

ed; area, 1,307 sq. miles; pop. (1901) 566,974. The chief town, Cooch-Bihar, contains some handsome public buildings and a splendid new palace of the Maharajah. Pop. 9,535.

Cook, Clarence Chatham, an American journalist and art critic; born in Dorchester, Mass., Sept. 8, 1828. He contributed to the New York "Tribune" a series of articles on American art, 1863-1869; subsequently was its Paris correspondent. He was editor of the "Studio" until its suspension. He has published: "The Central Park" (1868), "The House Beautiful" (1878), "Stools and Candlesticks," "Essays on Beds and Tables," and edited with notes a translation of the 7th German edition of Wilhelm Lübke's "History of Art" (2 vols., 1878). He died in Fishkill, N. Y., June 2, 1900.

Cook, Eliza, an English poet; born in London, in 1817. "Melaia and Other Poems," made her name known. She also published "Eliza Cook's Journal." Her most familiar poem is "The Old Arm-Chair." She wrote also "The Old Farm Gate," "The Home in the Heart," and "I Miss Thee, My Mother." "New Echoes and Other Poems" is one of her volumes. She died in Wimbledon, Sept. 23, 1899.

Cook, James, a British seaman; born in Marton, Yorkshire, Oct. 27, 1728. After a meager education he was apprenticed to a shopkeeper in Snaith, a small town on



CAPT. JAMES COOK.

the sea-coast. Here he acquired a taste for the sea. At the commencement of the French War in 1755, he entered the royal navy. In 1759 he was made master of the "Mercury," which belonged to the squadron sent against Quebec, and performed the hazardous service of taking soundings in the St. Lawrence river, opposite the French encampment. He also made a chart of that river below Quebec in a very satisfactory manner. At the end of 1762 he returned to England; but the next year he accompanied Captain Graves to Newfoundland as a marine surveyor. After again visiting Great Britain he went out in the same capacity with Sir Hugh Palliser, appointed governor of Labrador and Newfoundland.

In 1768 he was appointed to the command of the "Endeavour," a vessel destined to convey to the Pacific Ocean persons employed by the government to make observations on the transit of Venus. He sailed from Deptford, June 30, 1768, with the rank of lieutenant in the navy. He was accompanied by Mr. (afterward Sir Joseph) Banks, and the Swedish naturalist Dr. Daniel Solander. The transit of Venus, June 3, 1769, was advantageously observed at Otaheite; the neighboring islands were explored, and Lieutenant Cook then sailed for New Zealand, where he arrived in October. Six months were employed in examining the shores of the islands; after which he took his departure for Australia, the E. coast of which he attentively surveyed. On his return Cook was raised to the rank of master and commander in the navy. An account of the voyage, drawn up by Dr. Hawkesworth, was speedily published, and a second expedition was planned to explore the Antarctic regions.

On this occasion two ships were employed—the "Resolution," of which Captain Cook had the command, and the "Adventure," under Captain Furneaux. Dr. John Reinhold Forster and his son went out as naturalists, Mr. Hodges as painter, and Messrs. Wales and Bayley as astronomers. The voyage was commenced July 13, 1772; and after proceeding as far as lat. 71° S., where a barrier of ice opposed any further progress, discovering the island of New Georgia in lat. 54° S., and visiting Otaheite and other places, Captain Cook returned to Great Britain in 1775. So successful were the means employed by Captain Cook for the prevention of disease among his crew, that only one man was lost by sickness during the expedition. The captain having communicated to the Royal Society a paper describing the regulations and remedies which he had adopted, he was chosen a fellow of that body, and his experiments were rewarded by the Copleian gold medal. The government rewarded him with the rank of post-captain in the navy, and the appointment of captain in Greenwich Hospital.

The narrative of this voyage was drawn up by Captain Cook himself, and was published at London in 1777.

In July, 1776, he sailed on an expedition to ascertain whether any communication existed between the Atlantic and Pacific Oceans in the Arctic regions. In this voyage he again commanded the "Resolution," which was accompanied by the "Discovery," and explored a considerable extent of the W. coast of North America. He also discovered the Sandwich Islands, and to Owhyhee (now called Hawaii), one of this group, he returned from his American survey to pass the winter of 1778. In February Captain Cook sailed for Kamschatka,

but was compelled by an accident to put back to Owhyhee. A boat having been stolen by one of the islanders, the captain went on shore to seize the King of Owhyhee, and keep him as a hostage till the boat was restored. The people, however, were not disposed to submit to this insult; their resistance brought on hostilities, and in attempting to reach his boat Captain Cook and some of his attendants became victims to the fury of the irritated islanders. The death of this great seaman took place Feb. 14, 1779. A medal in commemoration of him was struck by order of the Royal Society; his eulogy was pronounced in the Florentine Academy, and was made a prize subject by one of the French scientific societies; and a pension was bestowed on his widow and children.

Cook, Joseph, an American lecturer and author; born in Ticonderoga, N. Y., Jan. 26, 1838; graduated at Harvard and Andover, and after three years' preaching went to Europe in 1871, where he studied in Germany, and made a tour of the Mediterranean countries. In 1873 he began a series of "Monday Lectures" in Boston, which, endeavoring to harmonize science and religion, and discussing social and political questions, became very popular; and in 1880 he began an extended lecturing tour around the world. Besides his lectures, he published a number of works on such subjects as "Biology" (1877), "Heredity" (1878), "Marriage" (1878), "Labor" (1879), "Socialism" (1880), etc. He died in Ticonderoga, N. Y., June 24, 1901.

Cooke, George Frederick, an English actor; born in Westminster in 1756; made his first public appearance at Brentford in 1776; and in the period between 1784 and 1800 became very popular in the English provinces and in Ireland, attaining a front rank in his profession. From 1801 to 1810 he played at Covent Garden both in comedy and in tragedy, and rivalled Kemble in the public favor. His best characters were Richard, Shylock, Iago, Sir Giles Overreach, and Sir Pertinax MacSycophant. In 1810 he visited the United States and appeared before enthusiastic audiences in the chief cities. He died in New York city Sept. 26, 1811; a monument marks his grave, erected in 1821 by Edmund Kean, who regarded Cooke as the greatest of actors.

Cooke, George Willis, an American author; born in Comstock, Mich., April 23, 1848. His chief works are: "Ralph Waldo Emerson; his Life and Writings" (1881), "Life of George Eliot" (1883), "A Guide Book to the Poetic and Dramatic Works of Robert Browning" (1891), "Poets and Problems," "The Clapboard Trees Parish," and "Dedham, a History."

Cooke, Jay, an American financier; born in Sandusky, O., Aug. 10, 1821. He

entered mercantile life at 15. Having learned banking he founded in 1858 the house of Jay Cooke & Co., which financed the Civil War bond issues of the United States to the extent of \$2,000,000,000. The house failed in 1873, causing widespread financial panic. In 1894 he reestablished his fortune, investing in Western land and securities. He died Feb. 16, 1905.

Cooke, John Esten, an American novelist; born in Winchester, Va., Nov. 3, 1830. He was an extensive contributor of stories, sketches, and verses to various periodicals, and has written many books, in which are included: "The Virginia Comedians" (1854), "Hilt to Hilt" (1869), "Life of Gen. Robert E. Lee" (1871), "Virginia, a History of the People" (1883), "The Youth of Jefferson," "Surry of Eagle's Nest," "Wearing the Grey," "Pretty Mrs. Gaston," "Virginia Bohemians," etc. He died near Boyce, Va., Sept. 27, 1886.

Cooke, Josiah Parsons, an American chemist; born in Boston Oct. 12, 1827. He was Professor of Chemistry at Harvard University (1850-1894), and lectured on scientific subjects in various cities and towns throughout the country. Besides a number of technical works, he wrote: "Religion and Chemistry" (1864), "Scientific Culture" (new ed. 1885), "The Credentials of Science the Warrant of Faith" (1888). He died in Newport, R. I., Sept. 3, 1894.

Cooke, Philip St. George, an American military officer; born near Leesburg, Va., June 13, 1809. He was graduated at West Point in 1827 and rose to the rank of Brigadier-General. In the Mexican War he commanded a regiment in the city of Mexico, and in the Civil War he sided with the Union and greatly distinguished himself in the Peninsular campaign. He was the author of works on tactics and of "Scenes and Adventures in the Army," "Conquest of New Mexico and California," etc. He died in Detroit, Mich., March 20, 1895.

Cooke, Mrs. Rose (Terry), an American poet and story writer; born in West Hartford, Conn., Feb. 17, 1827. Her complete poems were published in 1888: "The Gentian" and "The Two Villages" are good representatives. Her best short stories treat of New England rural life. The novel "Steadfast" appeared in 1889. Her most acceptable work appeared originally in the "Atlantic Monthly" and other periodicals. She died in Pittsfield, Mass., July 18, 1892.

Cooke, Sir William Fothergill, an English electrician; born in Ealing in 1806; served in the Indian army from 1826 to 1831; and, after studying medicine at Paris and Heidelberg, abandoned this for telegraphy, and in 1837 entered into partnership with Professor Wheatstone. After ex-

periments on various railway lines, they patented the single needle apparatus in 1845. In 1846 Cooke formed a company, which paid £120,000 for the partners' earlier patents. In 1867 Cooke and Wheatstone received the Albert gold medal; Wheatstone was knighted in 1868, and Cooke in 1869. He died June 25, 1879.

Cookery, the art and practice of preparing food mainly by means of heat. The various processes of roasting, toasting, broiling, boiling, stewing, brewing, baking, grilling, braising and frying, chemically or mechanically alter the constituent elements of organic matter and make them more easily digestible. Thus vigorous boiling serves to loosen the fibers of cellulose which constitutes the largest constituent of vegetable food. Starch, which is practically insoluble in cold water begins to break up at 140° F., and when raised to the boiling point combines to a certain extent with water. When heated to 400°, starch changes to dextrin, which is soluble in water at any temperature. Dextrin in the intestine combines with the animal diastase there secreted and becomes perfectly digested. Gelatine, which composes at least 50 per cent. of animal food, is soluble by boiling or stewing. Albumen, if heated too long or to a temperature too high, becomes insoluble and hence indigestible. A knowledge of these principles is at the basis of good cooking. Animal food may be cooked at as low a temperature as 160° F., by extending the time commonly given to the process. Such an application of a low degree of heat renders tough meats tender without desiccation or loss of nutritious juices. The temperature of other processes, except frying and grilling, should not exceed 300° F. At a higher degree of heat the animal fats are converted into fatty acids which are indigestible. When cooked at the lower temperature fats are an important element in nutrition.

The art of cookery was carried to considerable perfection among the Egyptians, Persians, and Athenians. Extravagance and luxury at table were notable features of Roman life under the empire. Among moderns the Italians were the first to reach a high degree of art in this department. Their cooking, like that of the ancient Romans, is distinguished by a free use of oil. Italian cookery seems to have been transplanted by the princesses of the House of Medici to France, and was carried there to perhaps the highest degree of perfection; even yet the skill and resource which the French cook shows in dealing often with very slight materials is a highly creditable feature in the domestic economy of the nation. British cookery has been mostly confined to simple, strong and substantial dishes. The art of roasting is perhaps its

strong point. Of late attempts have been made in many places to diffuse a knowledge of cookery more widely among the lower classes. Cooking classes have been organized in the public schools and regular cooking schools have met with great success. The "National School of Cookery" (headquarters at South Kensington) has sent forth lecturers and teachers to almost all the chief towns of Great Britain. A multitude of cookery books exist, too many to name. These consist mainly of instructions in the preparation of particular dishes. The philosophy of cookery has a very limited literature. In the third, sixth and tenth essays of Benjamin Thompson, Count Rumford (1796), "The Chemistry of Cookery," by W. Mattieu Williams (1885); and the Cantor Lectures on "The Scientific Basis of Cookery," by the same author, the subject is treated as a branch of applied science. Count Rumford's essays also include his remarkable achievements in economic feeding of the poor in Munich and his improvements of cooking apparatus. An especially valuable contribution to the subject is the work of Mrs. Mary H. Abel, of Johns Hopkins University, in her essay on "Scientific Cooking."

A remarkable apparatus for the economic preparation of food both as regards the expenditure of fuel and the saving of waste is the Aladdin Oven, invented by Edward Atkinson, of Boston. This apparatus has been developed by Mr. Atkinson from a study of the Scandinavian Cooking Box, much used in Norway and Sweden. This box consists of an outer case of wood or other non-heat-conducting material, lined with hair felt. Into this cavity a metallic box, containing food with sufficient liquid heated to the boiling point, is placed and tightly closed in. The heat is thus retained for a long period, completing the process of cooking. On this basis Mr. Atkinson devised an outer oven of non-heat-conducting material in which, separated by a sufficient space for the circulation of heat, is placed a metallic oven or cooking chamber. Heat is passed from the top of a round wick kerosene lamp through a hole in the bottom of the outer oven. This heat passes around the entire inner oven, the products of combustion passing out at the same orifice at which the heat entered. There is no direct communication between the lamp or source of heat and the cooking chamber. By this apparatus a normal temperature can be maintained for a definite number of hours, either at the temperature of simmering or stewing at about 160° F., or at the temperature for baking and roasting not exceeding 300° to 320° F. By suitable arrangements thereto very little difference in temperature is found between the top and the bottom of the oven. The

heat can be regulated by the size of the lamp and height of the flame. Meats, fish, vegetables, and puddings can be cooked in the same chamber without the flavor of one being imparted to the other, the heat being kept below the distilling point of the animal fats or of the fruit and vegetable juices. In this apparatus two pounds of kerosene oil are computed to do the work of 120 pounds of anthracite coal burned in the ordinary stove or range and to do it in a more wholesome and appetizing manner. The patents on this apparatus have been dedicated to public use. No royalties are charged. EDWARD ATKINSON.

Cook Islands, otherwise known as the Hervey Archipelago, lie about midway between the Society and Navigator groups, near 20° S. lat., and 158° W. lon., and are some volcanic, some coralline. The principal members of the cluster are Mangaia, Atiou, and Raratonga. The natives, mainly of the brown Polynesian stock, are about 100,000 in all, of whom 6,000 are in Raratonga, which is mountainous but fertile. Formerly cannibals, they are now all Christians, and dress after the European fashion. The islands were annexed by Great Britain in 1888.

Cook, Mount, the highest peak of Australasia; is one of the Southern Alps near the center of the range, on the W. side of the South Island of New Zealand. It is 12,349 feet high, is covered with perpetual snow (the snow-line being 3,500 feet lower than in Switzerland), is difficult of access, and was scaled for the first time by the Rev. W. S. Green on March 2, 1882.

Cook Strait, discovered by Captain Cook on his first voyage, separates the N. and S. islands of the New Zealand group, and varies from 20 to 80 miles in width.

Cooley, Thomas McIntyre, an American jurist; born in Attica, N. Y., Jan. 6, 1824. He was Professor of Law in the University of Michigan (1859 and 1881); chief-justice of that State (1868-1869); chairman of the United States Interstate Commerce Commission (1887-1891). He wrote: "A Treatise Upon Wrongs and Their Remedies" (Vol. i., 1878); "General Principles of Constitutional Law in the United States" (1880); etc. He died in Ann Arbor, Mich., Sept. 12, 1898.

Coolidge, Susan. See WOOLSEY, SARAH.

Coolie, a name in Hindustan for a day laborer, also extended to those of some other E. countries. Many of these have been introduced into the West Indies, Mauritius, and other places, their passage being paid for them on their agreeing to serve for a term of years. The first coolie emigrants appear to have been those sent to British Guiana from Calcutta in 1839 to supply the want of labor felt after the

abolition of slavery. The coolies employed in Guiana are still chiefly from India, but there is also a considerable number of Chinese. Coolies have also been introduced into Jamaica, Trinidad, Natal, and large numbers into Mauritius, the Indian population of the latter island being nearly 250,000. The Chinese coolies have been principally sent to Cuba and Peru.

Coomassie. See KUMASI.

Coombe, William. See COMBE.

Cooper, Ashley. See SHAFTESBURY.

Cooper, Sir Astley Paston, an English surgeon; born in Norfolkshire, Aug. 23, 1768. He studied medicine in London, and attended the lectures of John Hunter. After visiting Paris in 1794, he was appointed Professor of Anatomy at Surgeon's Hall, and in 1800 head surgeon of Guy's Hospital. In 1822 appeared his great work on "Dislocations and Fractures." Shortly after he became President of the Royal College of Surgeons, and honors and titles of every kind poured in on him. He died in London, Feb. 12, 1841.

Cooper, James Fenimore, an American novelist; born in Burlington, N. J., Sept. 15, 1789; studied at Yale College, and after a preliminary voyage entered the American navy as a midshipman at the age of 16. He remained in the navy during three years, and acquired that knowledge of seafaring matters and sea characters which afterward constituted one of his peculiar excellences. In 1811 he married a sister of Bishop de Lancey of New York, and in 1821 appeared the novel of "Precaution," the first production of his pen. It met with considerable success; but though well written, is merely a tale of English domestic life, which gave no scope for his peculiar powers. These, however, were brilliantly displayed in the "Spy" (1821) and the "Pioneers" (1823), which gave him a high place among novelists. Encouraged by success he gave to the world upward of 30 novels. Among these the "Pilot" (1823), "Red Rover" (1828), and "Water-witch" (1830) are distinguished by admirable delineations of nautical characters; while the prairies and desolate wilds of North America have never been delineated more truly and powerfully than in his "Pathfinder" (1840), "Deerslayer" (1841), and "Last of the Mohicans" (1826). Of his other novels we may mention "The Prairie" (1827); "The Borderers" (1829); "Wyandotte" (1843); "Afloat and Ashore" (1844).

He acted from 1826 to 1829 as consul for the United States at Lyons. He afterward visited Germany, traveled through Switzerland and Italy, and returned home in 1831. For nearly 20 years afterward he continued his literary labors, and died in Cooperstown, N. Y., Sept. 14, 1851. He

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did not confine himself entirely to fiction, but wrote a "History of the United States' Navy" (1839); "Gleanings in Europe" (1837-1838); "Sketches of Switzerland" (1836), and other works.

Cooper, Peter, an American inventor, manufacturer, and philanthropist; born in New York, Feb. 12, 1791. A coachmaker by trade, he became a successful inventor and glue manufacturer, and acquired a large fortune. He built, after his own designs, the first locomotive engine constructed on this continent (1830); was one of the original promoters of the electric telegraph, actively interested in the construction of the New York State canals, etc.



PETER COOPER.

He was the candidate of the "Greenback" Party for President in 1876. He is best known by the institution that was dearest to his own heart, the "Cooper Union" of New York, founded for the instruction of the industrial classes (1854-1859). He wrote: "Political and Financial Opinions, with an Autobiography" (1877); "Ideas for a Science of Good Government" (1883). He died in New York city, April 4, 1883.

Cooper, Samuel, an American military officer; born in Hackensack, N. J., June 12, 1798. He was graduated at the United States Military Academy in 1815 and served on the staff of General Macomb from 1828 to 1836, when he was promoted captain. He was Assistant Adjutant-General from 1836 to 1841; chief of staff to Col. William J. Worth during the Florida War; and in 1848 was breveted colonel for meritorious service during the Mexican War. In 1852 he was appointed Adjutant-General of the army. He resigned this commission at the outbreak of the Civil War and tendered his services to the Confederacy, under which he became Adjutant-

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General and Inspector-General of the army. He wrote "A Concise System of Instructions and Regulations for the Militia and Volunteers of the United States" (1836). He died in Cameron, Va., Dec. 3, 1876.

Cooper, Susan Fenimore, an American author; daughter of James Fenimore Cooper; born in Scarsdale, N. Y., in 1813. During the last years of her father's life she was his secretary and amanuensis. She was author of "Rural Hours" (1850); "Fields Old and New" (1854); "The Shield: A Narrative"; "Mt. Vernon to the Children of America" (1858); "Rhyme and Reason of Country Life"; and others. She died in Cooperstown, N. Y., Dec. 31, 1894.

Cooper, Thomas, an English author, best remembered as a Chartist politician; born in Leicester, March 20, 1805. A shoemaker by trade, he engaged in politics, and soon found himself in prison, where he wrote "The Purgatory of Suicides," a moving epic of proletarianism. His "Captain Cobbler," a story, and his "Poetical Works," are favorably known. He died in Lincoln, July 15, 1892.

Cooperage, the art of making vessels of pieces of wood bound together by hoops. It is a very ancient art, such vessels having been in use among the Romans at the period of the Christian era. The upright pieces forming the sides of a barrel or cask, or other cooper's work, are called staves; and as casks are usually larger in the middle than at the top and bottom, this swelling, called the belly or bulge, is formed by skilfully shaping each stave so that it shall form part of the required double conoid, and that, when all are built and hooped together, their edges shall coincide perfectly; for this purpose each stave is made broadest in the middle, and narrowed down in a curved line toward each end. A skilful cooper can work this curve so accurately, that no further fitting or alterations shall be needed when the staves are put together. The staves are made to meet at their inner edges and by driving the hoops very hard, the inner part is compressed till the slight gaping outside is closed, and thus slight inaccuracies of fitting are remedied.

There are several branches of cooperage. The wet or tight cooper makes vessels for holding liquids. The dry cooper does inferior work, such as barrels for containing dry goods, where an inferior degree of accuracy is sufficient. The white cooper makes churns, pails, etc., which for the most part have straight sides. The best work is made of oak, which must be thoroughly dried before being put together. In warm countries, the drying of the sun is sufficient, and casks are therefore mounted

in summer only; but in Great Britain, artificial drying is commonly resorted to. The hoops are hammered down from the narrow to the wide part of the cask, by means of a mallet striking a piece of wood held against the hoop. Iron hoops are sometimes put on hot, in order that their contraction on cooling may bind the work together. Most ingeniously constructed machinery is now generally used in barrel-making.

Co-operation, in modern parlance the association of people for the accomplishment of any desired end, especially the association of working people for the management of their industrial interests in store, workshop, or other undertaking, and the equitable distribution of profits. The advantages of coöperation consist in the lower prices paid for the ordinary articles of life and of manufacture, the common use of capital, machines, buildings, water power, and in common production. In Great Britain coöperation has succeeded best in the form of distribution, that is in coöperative stores for the supply of the domestic wants of the workman's family. In Germany there are many forms of co-operation. In Germany and Italy it has flourished under the form of People's Banks, furnishing mutual credit to workmen and also small tradesmen. Instances of coöperative industry have been discovered among English miners and New England fishermen in the 17th century and among Greek sailors of the Levant. Coöperative societies established as early as 1777-1795 are still in successful operation. The earliest in England was founded in 1794 at Mongewell, in Oxfordshire, by Shute Barrington, Bishop of Durham. During the Owenite agitation, between 1820 and 1845, hundreds of coöperative societies rose up and for the most part have disappeared. Similar societies were founded in the United States, as, for example, at Brook Farm.

The modern movement first took practical and permanent form with the formation of the Rochdale Society of Equitable Pioneers in 1844. The founders were 28 weavers, nearly all Socialists of the Owen School and Chartists. The original capital was £28, slowly collected by subscription of two pence, and afterward three pence a week. With this capital they opened a store for supplying themselves with provisions; but at first they had only flour, butter, sugar, and oatmeal to sell. They limited the interest on shares to 5 per cent., and divided the profits among members in proportion to their purchases. At the end of 13 years they had a membership of 1,850, a capital of £15,000, and their annual sales amounted to £80,000. This society with its organization and

methods of conducting business became a model which was followed in many parts of England and abroad. In 1887 there were in Great Britain 2,318 building associations, with 605,421 members, and in 1897, 1,710 coöperative societies, with nearly a million members. In 1864 a Wholesale Society with annual sales amounting to over \$200,000,000, with a membership of 1,512,399 and a capital of nearly \$330,000,000, for supplying commodities to the various stores, was established at Manchester, and in 1869 a second at Glasgow. They do work in harmony and are practically one institution. In 1827 the first English paper for the propaganda of coöperation was established, entitled "The Brighton Co-operator." In 1871 "The Co-operative News" was established as the organ of the societies. Since 1869 annual congresses of coöperative societies have been held throughout England, and in 1873 the Coöperative Union was consolidated with a regular constitution. It is governed by a board of 12 members, representing the six sections into which the Union is divided. The Wholesale Society is a federation of Retail Societies for the supply of goods to the various societies composing it, with purchasing and forwarding depots in England, the United States, and on the Continent. It owns a number of steamships. It has extensive productive works, boot and shoe factories, woolen cloth works, corn mills, etc. There is also a coöperative fire and life insurance society. It is evident that probably a million families, or a sixth of the whole population of England, have their wants in whole or in part supplied by coöperative stores.

In the United States coöperation has made comparatively slow progress. In 1886 coöperative business in New England included creameries, banks, and building associations. A coöperative coopering association was established in Minneapolis in 1874. In 1882 the students of Harvard University formed a society for supplying themselves with books, stationery, and other articles. It has been a great success and has been imitated at Yale and other colleges. At the congress held Aug. 26, 1898, at Karlsruhe, the number of societies reported was 11,854, including 8,451 coöperative banks, 716 coöperative dairies, and 647 other societies. In 1899 there were 16,069 coöperative societies in Germany, an increase of more than 1,200 over the preceding year. Among these were 10,259 credit societies, and 1,396 "Konsumvereine," corresponding to the English coöperative stores. The agricultural coöperative societies had made immense progress during the previous two years. The central bank of the Universal Coöper-

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ative Union in 1897 had a capital of 405,000,000 marks. The united capital of the German coöperative societies in 1897 amounted to 818,000,000 marks. In Switzerland in 1897 there were 2,223 coöperative societies, 838 of which were coöperative dairies. The agricultural coöperative societies were organized in five central bodies, their aims being to purchase provisions, to sell their own products at a profit, to protect their members against over-production, to diminish the cost of production, and to improve and educate the members. In the Netherlands there were at the end of 1897, 697 societies, 253 of which were for exploiting milk, butter, cheese, and other products. In Belgium in 1898 there were 1,128 societies in active operation. In 1896 there were 1,442 societies in Russia, 605 of which were banks, the members of which numbered 201,843. In Hungary an interesting feature of co-operation is the share which the State takes in it, as a member adding 1,000,000 crowns to the capital. The coöperative societies in the Australian colonies have largely increased. In 1895-1896 there were 170 friendly societies, with 258,097 members, and a capital of £3,055,000. In France, in 1896, there were 213 societies.

So far as it has gone the movement has been a real and effectual training for the intelligence, business capacity, and moral character of the workmen. It has taught them thrift, foresight, self-control, and the habit of harmonious combination for common ends.

HENRY D. LLOYD.

Cooperstown, a village, and county-seat of Otsego county, New York; at the outlet of Otsego lake and on the Cooperstown & Charlotte Valley Railroad; 90 miles W. of Albany. It is noted as having been the residence of James Fenimore Cooper, the novelist. It has Thanksgiving Hospital, a Union free school, knitting mills, National bank, and an assessed property valuation of \$3,000,000. Pop (1890) 2,657; (1900) 2,368.

Cooper Union, or **Cooper Institute**, an institute founded in New York city in 1857 by Peter Cooper. Its object is to provide free schools of art and science, and free reading rooms and library for the working classes. The course in science includes the rudiments of engineering, chemistry, astronomy, and mechanical drawing; and that of art includes architectural, industrial, and ornamental drawing, clay modeling and painting. Instruction is also given in English Literature and Belles Lettres, wood engraving, pottery, typewriting, stenography, and telegraphy. There are lecture courses, a museum, an art gallery, and a library of 31,000 volumes, with a reading room containing current numbers of nearly 500 magazines and newspapers. The Institute was

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built at a cost of \$630,000 and was endowed by Mr. Cooper with \$300,000. It has received additional gifts from time to time from Edward Cooper and Abram S. Hewitt, and in 1899 Andrew Carnegie gave it \$300,000 for the founding of a mechanical day art school.

Co-ordinates, in geometry, a term applied to lines, to which points under consideration are referred, and by means of which their position is determined. Co-ordinates either determine the position of a point in space or in a plane which is understood to contain all the figure under consideration. They determine position by straight lines only, or by a straight line and angles; in the latter case they are called *polar* coördinates. When coördinates are at right angles to each other they are called *rectangular* coördinates, and when they make any other angle they are *oblique* co-ordinates. The reason the term coördinate was given is that if various points in a curve be fixed by such lines the points of the curve may be treated in order. Descartes first introduced this method.

Coorg, or **Kurg**, an ancient principality now a province in Southern Hindustan, lying between Mysore on the E. and N. E. and the districts of South Canara and Malabar on the W.; area, 1,583 square miles. The country has a healthful climate, and yields coffee, spices, timber, etc. The capital is Merkara. Pop. (1901) 180,607.

Coot, a wading bird belonging to the family *Rallidæ*, and the sub-family *Gallinulinæ* (water hens). The head and neck are deep black, the upper parts slaty black, those beneath bluish ash, the bill and frontal plate white, the former with a slightly roseate hue, iris crimson, feet ash-colored with greenish tinge below the knee, above it yellow or greenish red. It is found in Great Britain, Holland, France, Germany, Switzerland, and throughout Europe. It has been seen also in Japan. Its appropriate habitat is in rushy sheets of water. The nest, built early in the spring, is made of rushes, grasses, etc. It deposits from seven to ten eggs of a brownish white color, spotted with dark brown.

Coote, Sir Eyre, a British military officer; born in County Limerick, Ireland, in 1726; entered the army at an early age; and from 1754 to 1762 served in India. It was by his arguments that Clive was induced to risk the battle of Plassey, and for his services in this and other engagements, Coote was in 1759 given the command of the newly-raised 84th regiment. In this year he gained the great victory of Wandiwash; and his capture of Pondicherry in 1761 completed the downfall of the French in India. Coote returned to England, and

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was knighted in 1771. In 1779 he assumed the command-in-chief in India, with the rank of lieutenant-general, and in 1781 he routed Hyder Ali at Porto Novo; his victory here, with the success that followed, a second time saving the presidency. He died in Madras, April 26, 1783.

Coote, Sir Eyre, a British military officer; nephew of the famous general of the same name; born in 1762. He was at the battle of Brooklyn and in other campaigns of the American Revolutionary War until the surrender of Yorktown; became major-general and commander of Dover in 1798; in the same year led an expedition to cut the sluices at Ostend, and was captured by the French; served in the Egyptian campaign in 1800; and was made commander-in-chief of the Island of Jamaica in 1805. He died in 1824.

Coote, Richard, first Earl of Bellamont in the peerage of Ireland; born in 1636. In 1695 he was appointed Colonial governor of New England, and was given special authority to arrest pirates. An expedition was fitted out with Capt. Kidd in command, but the latter's own piratical acts caused his arrest in Boston, whence he was sent to England for trial. He died in New York March 5, 1701.

Copacabana, a small peninsula in the S. part of Lake Titicaca, Peru, which was a sacred place of the Incas, and where many ruins of their temples and other buildings can still be seen. Thousands of pilgrims yearly visit the chapel there, which contains an alleged miraculous painting of the Virgin.

Copaiba, the balsam or oleo-resin obtained from incisions made in the trunk of *copaifera multijuga* and other species of *copaifera*. Copaiba is about the consistence of olive-oil, light in color and transparent, with a peculiar odor, and an acrid aromatic taste; it is perfectly soluble in an equal volume of benzene; it does not become gelatinous when heated to 270° Fahr., and is not fluorescent. It contains a resin, copaivic acid, and an essential oil, copaiba oil. It dissolves one-fourth of its weight of magnesia carbonate when heated, and remains transparent; it is said that a small quantity of water contained in the balsam first combines with the magnesia, forming a hydrate which is soluble in the resin. Copaiba acts as a stimulant on the mucous membranes, especially on the genito-urinary organs. It is also a powerful diuretic.

Copaiba Balsam, an oily resin of an amber color; used as a vehicle in oil-painting, and also as a varnish.

Copaiba Oil, a colorless, transparent, mobile, peculiar smelling oil, obtained by distilling copaiba with water, and drying over

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calcium chloride and rectifying. It boils at 260°. Its optical rotatory power is 34.18° to the left. It became brown and viscid by continued boiling. Chlorine colors it yellow-green, then blue, and then white crystals separate out. Nitric acid heated with it turns it into a resin. When distilled with calcium hypochlorite it yields chloroform. When hydrochloric acid gas is passed into copaiba oil, it precipitates a crystalline hydrochlorate, called also hydrochlorate of copahene or copaivene ($C_{15}H_{24} \cdot 3HCl$), which is obtained by recrystallization from alcohol in transparent prisms, which melt at 77°, and are insoluble in water and cold alcohol, but easily soluble in ether. A liquid substance is formed at the same time, which is called hydrochlorate of copahilene. It is a black viscid oil, soluble in alcohol and ether.

Copal, a resin produced by a plant, *Rhus copallinum*, which grows in Mexico. It is obtained in rounded, nearly transparent, masses; is brittle and colorless, or slightly yellow. It is slightly soluble in alcohol and essential oils, and is made into varnish by mixing in a melted state with oils. Composition: Carbon, 78 to 80.5; hydrogen, 8.7 to 10.5; oxygen, 9 to 10.7 per cent.

Copalchi Bark, a bark resembling cascarilla bark in its properties, and produced by a shrub of the same genus, *Croton niveus*, a native of Central America. The bark is in quills a foot or two in length, and has a thin corky epidermis. Copalchi bark is much used as a substitute for cinchona in Mexico, where it goes by the name of *Quina blanca*, and is imported, though not to a large extent, into Europe. It contains a minute proportion of a bitter alkaloid resembling quinine.

Copan, an Indian village in the S. W. corner of the Central American State of Honduras; in a mountainous region; the site of a city still populous at the time of the conquest, and of which magnificent ruins still remain; first described by Stephens.

Coparcenary, in law, partnership in inheritance; joint heirship in which each is entitled to a distinct share of the benefits, while the property remains undivided.

Cope, an ecclesiastical vestment resembling a cloak. It takes its name from the *cappa* or hood, which was originally a very necessary and highly ornamental appendage. It is made of various materials: silk, satin, velvet, cloth, etc., of different colors, and richly embroidered. It is fastened across the breast by a jeweled clasp. When laid out flat it is in shape an exact semicircle. It is worn in the Roman Catholic Church by clergy of all ranks. As distinguished from the chasuble it is a processional vestment.

Cope

while the chasuble is Eucharistic. The cope is one of the vestments worn in Ritualistic Episcopal churches.

Cope, Charles West, an English painter; born in 1811; studied at the Royal Academy and in Italy; and first exhibited at the Academy in 1831. In 1843 he gained a prize of \$1,500 for his picture "The First Trial by Jury"; in 1844, by his fresco the "Meeting of Jacob and Rachael," secured the commission for one of six frescoes for the House of Lords, producing accordingly "Edward the Black Prince receiving the Order of the Garter." Altogether he executed eight frescoes from English history of the 17th century for the House of Lords, while his other works were numerous, the subjects being historical, romantic, or domestic. Among them are "Last Days of Cardinal Wolsey," "Prince Henry before Justice Gascoigne," "Departure of the Pilgrim Fathers," "Burial of Charles I.," "Parting of Lord William and Lady Russell," "L'Allegro and Il Penseroso," "Milton's Dream," "Shylock and Jessica," "Ann Page and Slender," "Lear and Cordelia." He became an A. R. A. in 1844 and R. A. in 1848, but retired in 1883. He died in Bournemouth, Aug. 21, 1890.

Cope, Edward Drinker, an American naturalist and comparative anatomist; born in Philadelphia, July 28, 1840; studied in the University of Pennsylvania; and worked in anatomy in Europe in 1863-1864. He was Professor of Natural Science in Haverford College from 1864 to 1867, and was for many years Curator and Corresponding Secretary of the Academy of Natural Sciences. In 1871 he explored the cretaceous formations of Kansas; in 1872 the eocene of Wyoming; in 1873 the tertiary beds of Colorado; in 1874 was employed by the United States Geodetic and Geological Survey under Lieut. G. M. Wheeler in New Mexico; in 1875 in Northern Montana; in 1877 in Oregon and Texas; and in 1878 he had charge of several parties exploring the Western regions. The result of these expeditions has been the creation of a collection of over 600 species of extinct vertebrate animals, of which Professor Cope made known to science at least 400 species. The structure of many of these animals is in the highest degree remarkable, and has been described in numerous papers, read before the scientific societies of Philadelphia, or published in the reports of the United States Geological Survey of the Territories, or in those of Lieutenant Wheeler. Professor Cope also published essays on fishes, batrachians, and reptiles of various parts of the world, and made observations on the anatomy of these animals which resulted in new views of their systematic arrangement. He also, from 1869, published a number of papers on the subject of evolution, which are to be found

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in the "Proceedings" of the Philadelphia Scientific Societies and in other works. He was a member of the National Academy of Science, and, together with Prof. A. S. Packard, was editor of the "American Naturalist." He received the Bigsby gold medal of the Geological Society of London in 1879, in recognition of his services in the field of vertebrate palæontology. He was the author of the doctrine of "acceleration and retardation," of "repetition," of the "doctrine of the unspecialized," and of a theory of the origin of the will. He died in Philadelphia, April 12, 1897.

Cope, Sir John, an English military officer; was a cornet in 1707; and, having been made a Knight of the Bath, in 1742 commanded the troops sent to the assistance of Maria Theresa. On the landing of Prince Charles Edward in 1745, Cope was appointed commander-in-chief of the government forces in Scotland. After a fruitless march to the Highlands, he returned with his troops by sea to Dunbar, and on Sept. 21 was totally defeated at Prestonpans. His defeat is celebrated in the Jacobite song, "Hey, Johnnie Cope, are ye waukin' yet?" Cope died July 28, 1760.

Copeck (a lance), a Russian copper coin, so called from the impression of St. George bearing a lance, the hundredth part of a silver ruble, or about the eightieth part of a paper ruble. It is equal to about three-eighths of an English penny.

Copenhagen (Merchants' Haven), the capital of Denmark, and headquarters of the national commerce, literature, and art; situated on the shore of the island of Zealand, in the Sound, which is here about 12 miles broad; an outlying portion, Christianshavn, stands at the N. end of the island of Amager or Amak, which is separated from Zealand by a narrow arm of the sea. The channel forms a fine and capacious harbor, which is bridged over so as to connect Christianshavn and the main part of the city at two points. The fortifications on the land side have been removed since 1863; so that the city has now practically incorporated the suburbs Osterbro, Nørrebro, Vesterbro, and Frederiksberg. To counterbalance the expected injury to the city's commerce from the opening of the Baltic Canal, a great free port (free from customs dues) was constructed in 1890-1894 to the N. of the harbor. The business quarter stretches from the harbor in a N. E. direction toward the principal and central square, Kongens Nytorv, which in itself forms the focus of the life of the city. Farther N. and E. of this point lies the aristocratic quarter, with the handsome Amalienborg Square and its royal and ministerial palaces; this district is bounded in the extreme N. by the citadel

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and the adjoining public gardens and walks on the shores of the Sound.

Among its few buildings of historical interest or intrinsic beauty, the metropolitan cathedral church, known as Vor Frue Kirke, rebuilt after the bombardment in 1807, possesses statues of Christ and the Apostles, and a baptismal font, designed and in part executed by Thorwaldsen. Trinitatis-kirke is remarkable for its round tower, which is ascended by a winding causeway instead of steps; and Holmens' kirke contains interesting monuments to the great naval heroes, Juel and Tordenskjöld. An English church, built at a cost of £10,000, was consecrated

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faculties, 40 professors, and is attended by 1,200 students. Connected with the university are a surgical academy, an observatory, a botanical garden, a zoological museum, a polytechnic institution, and a library of 250,000 volumes, containing also a great collection of ancient Persian MSS., and another of ancient Northern MSS. Copenhagen is the center, not only of Danish, but Northern literature and art, and is the seat of a number of societies for the advancement of these in all their branches, among which are the Royal Society, founded in 1742; and the Royal Society of Northern Antiquaries, founded in 1825; as well as agricultural,



FREDERIKSBORG PALACE AND MUSEUM,
NORTHWEST OF COPENHAGEN.

in 1887. The royal palace, called Christiansborg, was rebuilt between 1794 and 1828, but was never remarkable for architectural beauty. The principal part of the vast building was destroyed by fire in 1884, when many precious works of art were destroyed. Happily most of the pictures in its great art gallery were saved. The castle of Rosenborg (1610-1624), where the regalia are kept, contains interesting collections of objects of art; and the palace of Charlottenborg (1624), is now used as an academy of arts. The university was founded by Christian I. in 1479, has five

geographical, and other societies. The royal library contains 500,000 volumes, besides great treasures of Sanskrit and other MSS. The Museum of Northern Antiquities in Prindsens Palais, is unrivaled in its kind, having been made what it is mainly by Worsaae. The Thorwaldsen Museum, opened in 1846, consists of works of art by that sculptor himself, and others left by him to the Danish nation, for which a separate building has been erected. Copenhagen contains also a number of well-supported benevolent institutions, banks, theaters, an exchange, etc. There are stat-

Copepoda

ues of several of the Danish kings, of Tycho Brahe, and of the poets. The chief exports of Copenhagen are grain, rape-seed, butter, cheese, beef, cattle, wool, hides, bones, and grain-spirit. Porcelain, pianos, clocks, watches, mathematical instruments, chemicals, sugar, beer, and tobacco are manufactured.

About the middle of the 12th century, Copenhagen was but a fishing village, in the neighborhood of which Bishop Axel, or Absalon, built a castle. In 1254 the village obtained the privileges of a town, and in 1443 King Christopher made it the capital of the kingdom. It was several times attacked by the Hanseatic League; was besieged by the Swedes in the 17th century; was bombarded by the English, Dutch, and Swedes in 1700; suffered grievously by fires in 1728, 1794, and 1795; witnessed a great sea-fight in its roads on April 2, 1801, when the English, under Sir Hyde Parker, with Nelson as his second in command, destroyed the Danish fleet; and (to prevent the Danish fleet from falling into the power of Napoleon), was bombarded by the English from the 2nd to the 5th of September, 1807, when great destruction was wrought, both in houses and public buildings, and hundreds of persons lost their lives. In 1888 an international exhibition was held here. Pop. (1901) without suburbs, 378,235; with suburbs, 476,806; (1906), without, 426,540.

Copepoda, an order of *Crustacea*, ranked under the sub-class entomostraca and the legion lophyropoda. They are animals of small size, the body divided into two segments, viz., a cephalothorax and an abdomen. There are two pairs of antennæ, two pairs of footjaws, and five pairs of ordinary feet furnished with bristles and adapted for swimming. There is a jointed tail with a tuft of bristles at its extremity. Some are found in fresh water, others are marine. Professor Huxley says that in addition to the species placed under copepoda by Latreille and Milne-Edwards, the order contains some of the epizoa or ichthyophthira. There are two families, the cyclopidae, which have but a single eye; and the cetochilidae, which have two eyes. The English book-name of the Copepoda is oar-footed crustaceans, which is simply the rendering of the scientific name.

Copernicus, or **Koppernigk**, **Nicholas**, founder of modern astronomy; born in Thorn, Poland, Feb. 19, 1473. His father was a Pole and his mother a German. From a school in Thorn Copernicus went to Cracow, where he studied medicine, theology, mathematics, and astronomy. The fame of Peurbach and Regiomontanus, the restorers of astronomy in Europe, excited his emulation. In 1496, at the age of 23, he went to Italy, where the arts and sciences were

Copernicus

beginning to flourish after the fall of the Byzantine empire. At Bologna he resided about two years, studying canon law and astronomy. In 1497 while in Italy, he was appointed a canon of the Cathedral of Frauenburg. In 1500 he went to Rome, where he lectured on mathematics and astronomy. Subsequently he studied medicine at Padua, and canon law at Ferrara, where he graduated as doctor in this subject. He returned to Prussia in 1505, and lived for some years at Heilsberg, but his subsequent life was mostly spent at Frauenburg.

He now applied his whole strength to the study of astronomy, which at this time was dominated by the system of Claudius Ptolemy. Copernicus doubted whether the motions of the heavenly bodies could be so complicated as this hypothesis would make them. He found that some of the ancient Greeks had thought of the possibility of a motion of the earth. This induced him to examine the subject more fully, and he latterly came to the following conclusions: That the sun was the center of the system; that the earth was a planet like Mars and Venus; and that all the planets revolve round the sun in the following order: Mercury in 87 days, Venus in 224, the Earth in 365, Mars in one year and 321 days, Jupiter in 11 years, and Saturn in 29 years. Although Copernicus knew that the planetary orbits are not circles having the sun in the center, he was not able to determine exactly their form. This was reserved for Kepler, who completed what may be called the natural history of the subject, and stated his three celebrated laws in the end of the 16th century. Thus Copernicus stands as it were, on the boundary line of a new era. He commences his labors at a time when the belief in the immobility of the earth is universal. He conceives the idea of its motion, and pursues it with unwearied diligence, not for a few years, but through the greater part of his life, constantly comparing it with the appearances in the heavens. He at last confirms his idea, and thus becomes the founder of a new system of astronomy. All this he did 100 years before the invention of telescopes, with miserable wooden instruments on which the lines were often only marked with ink. His great countryman, Kepler, has described his character in the following words: "*Copernicus vir maximo ingenio, et quod in hoc exercitio magni momenti est, animo liber.*" In his immortal work, dedicated to the Pope, Paul III., "*De Orbium cœlestium Revolutionibus*," libri vi. (which was completed in 1530, although first published at Nuremberg, 1543, folio; later editions appeared at Basel, 1566, at Amsterdam, 1617, at Warsaw in 1851, at Berlin in 1873), his system is developed. Prohibition, however, was issued from the Vatican in 1616 against Copernicus' book,

Coppee

and it was not till 200 years after its publication, in 1757, that the papal court annulled the decree. He died in Frauenburg May 24, 1543.

Besides his principal work, we have also by him a work on trigonometry, "*De Lateribus et Angulis Triangulorum*." The first biography of Copernicus was written by the mathematician Gassendi (published in 1654), and for 200 years this work served as the basis of all subsequent biographies of the great astronomer; but in more recent times the labors of Prowe and others have helped us to a better acquaintance with the facts of his life. Count Sierakowski erected a monument to his memory in St. Anne's church at Cracow, with this inscription: "*Sta, sol, ne moveare*" ("Stand, Sun, do not move"). Thorwaldsen executed a colossal statue of Copernicus for the city of Cracow, which is one of the noblest specimens of modern art. Another statue of him by F. Tieck has been erected in his native town.

Coppee, François (ko-pā), a French dramatist; born in Paris Jan. 12, 1842. He was trained for what the Parisians call a ministerial career, but wrote "*The Reliquary*" and "*Intimacies*," books of verse. In "*Modern Poems*," "*The Benediction*," and "*The Strike of the Smiths*," we have a very modern note. He died May 23, 1908.

Coppee, Henry, an American educator; born in Savannah, Ga., Oct. 13, 1821; served in the Mexican War (1846-1848); was instructor at West Point (1848-1849, 1850-1855); Professor of English Literature and History at the University of Pennsylvania (1855-1856); president of Lehigh University (1866-1875); Professor of History there (1875-1895). Besides various educational and military works, he wrote: "*Grant and his Campaigns*" (1866); "*History of the Conquest of Spain by the Arab-Moors*" (2 vols., 1881). He died in Bethlehem, Pa., March 21, 1895.

Copper (Greek, *chalkos*; Latin, *æs Cyprium*), a metal that has been known from the earliest times; it is regularly referred to by ancient writers, and articles made of it and its alloys—weapons, tools, domestic utensils, coins, ornaments, etc., from all countries and apparently of all dates—remain abundantly to this day. It has been commonly asserted that copper was known and used in the manufacture of articles and implements before iron; but there is no conclusive proof of this. In classical times large supplies of the metal came from Cyprus (whence the name copper); in other countries remains of old copper workings have been met with.

Copper is an abundant and widely distributed element. It occurs both native and combined in a large number of minerals, some of which constitute its ores, and these

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are found in all countries. It has also been detected in the ash of certain plants, in crabs, snails, and some other lower animals, in the feathers of birds, in eggs, blood, and milk, and in the liver and other parts of man. In some of these cases its presence is accidental, but in the lower animals it seems to be normal.

ORES OF COPPER.—1. Native copper is of a red color, but frequently tarnished. Its luster is metallic; it is flexible, ductile, and malleable; its fracture is hacky; sp. gr., 8.9. It occurs in branched pieces, dendritic, in thin plates, and rarely in regular crystals, under the form of the cube or octahedron, in the primitive and older Secondary rocks. One of the largest masses of this substance ever noticed, supposed to have come from Bahia in Brazil, and now in Lisbon, weighs 2,616 pounds; another, brought from the vicinity of Lake Superior and now in Washington, weighs 3,704; a third mass, from the same district, weighed 80 tons, and blocks weighing 400 tons have also been cut. Native copper occurs in large quantities on the shores of Lake Superior in North America, where it is extensively worked. It is also found in grains mixed with quartz in Chile. The native copper of Chile and of Lake Superior contains a considerable quantity of native silver.

2. The most important ores of copper are the sulphides. Copper combines readily with sulphur, forming sulphide, and also with the sulphides of other metals, forming a series of double sulphides, some of which are of great importance. While these double sulphides form distinct minerals, most ores are mixtures of these. The most important sulphide minerals are copper glance, purple copper ore, copper pyrites, and gray copper ore.

a. Vitreous Copper, or Copper Glance (Cu_2S), is of a lead or iron-gray color. It occurs crystallized in regular six-sided prisms, mostly modified on the terminal edges, and in acute double six-sided pyramids with triangular planes. It also occurs massive. The fracture of the crystallized variety is often conchoidal with a vitreous luster: the massive varies greatly in respect of hardness and color. It is sometimes sectile and soft. The fracture is even, or flat conchoidal; sp. gr., 4.8 to 5.8. It consists of 79.85 copper and 20.15 sulphur. It occurs in veins and beds in primitive and early Secondary rocks, and is found with other ores of copper in Cornwall and many European countries. In the United States it has been met with very often in the old red sandstone, but rarely in sufficient quantity for profitable working.

b. Purple Copper, or Erubescite (Cu_3FeS_3), occurs both massive and crystallized. Its color is brownish red, and is often possessed of an iridescent tarnish, in which blue is apt to prevail. The general form of the

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crystal is that of a cube, of which the solid angles are replaced. It is soft, easily frangible, and sectile in a slight degree; sp. gr., 5.033. That of Norway consists of copper 69.50, sulphur 19, iron 7.50, and oxygen 4. It is fusible into a globule, which acts powerfully upon the magnetic needle. The purple copper is found in Norway, Saxony, and England, and occurs under similar circumstances with the other ores of copper.

c. The *Gray Copper*, *Fahlerz*, or *Tetrahedrite*, is of a steel-gray or iron-black color. It occurs crystallized in the form of the tetrahedron, in which no regular structure is visible; it also occurs massive and disseminated. Its fracture is uneven or imperfectly conchoidal, with a shining or glistening metallic luster. It is brittle; sp. gr., 4.5. It consists of sulphide of copper with sulphide of arsenic or antimony, and frequently sulphides of other metals, such as zinc, lead, antimony, and silver, in very variable proportions. It occurs in Cornwall, Bavaria, Hungary, Saxony, Colorado, and many other localities. It is difficult to work for copper, but very often contains enough silver to make it very valuable.

d. *Yellow Copper Ore*, *Copper Pyrites*, or *Chalcopyrite* (CuFeS_2), occurs of various shades of yellow, often with lively iridescence, crystallized in the form of a tetrahedron, having the solid angles replaced, and massive. It is also stalactitic and botryoidal. It is brittle, yields to the knife, and may thereby easily be distinguished from iron pyrites, which it often much resembles. It has metallic luster, and is opaque; sp. gr., 4.3. It contains copper 34.57, iron 30.54, sulphur 34.89 when pure, but impurities are often present. It is the most abundant of all the ores of copper, and affords a large proportion of the copper of commerce. It exists both in primitive and Secondary rocks, and is accompanied by most of the other ores of copper, sometimes galena, oxide of tin, and several of the ores of iron. It is found in North and South America, most European countries, Japan, and Africa. The copper produced in the United Kingdom is mainly obtained from pyrites which occurs in Cornwall and Devon, usually associated with other sulphides of copper and iron. The amount of copper now produced from British ores is, however, small.

3. a. *Red Oxide of Copper* (Cu_2O) is of a red color, varying greatly in its shades, and by transmitted light, often of a crimson red. It occurs crystallized in the form of the octahedron, and its varieties, which are very numerous. The crystals are externally splendid, but sometimes of a lead-gray color, with a metallic luster. The cross fracture is sometimes uneven; oftener conchoidal with a splendid and somewhat adamantine luster. It is transparent or translucent, yields easily to the knife, and

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is brittle; sp. gr., 5.6 to 6.15. It consists of 88.8 copper and 11.2 of oxygen. Red oxide of copper is also found in delicate capillary crystals, as well as massive, when it is opaque, and frequently granular in its fracture. The brick-red or tile copper ore, which occurs earthy, or a little indurated, appears to be a mixture of oxide of copper and oxide of iron. This species is found in the primitive and transition rocks, associated with the other ores of copper. It is found finely crystallized at Chessy, in France; also in Cornwall and in Australia.

b. *Black Oxide of Copper*, *Melaconite* and *Tenorite*, are two forms of cupric oxide (CuO) which differ in crystalline form. They occur only in small quantities, and are met with in Cornwall, in France, in Chile and at Lake Superior. They are black and pulverulent or massive, but sometimes crystallized, and seem to be the result of the weathering of purple copper and other ores.

4. *Carbonate of Copper*.—Oxide of copper, combined with carbonic anhydride, forms two species—the blue and the green carbonate.

a. *Blue Carbonate*, *Azure Copper Ore*, or *Chessylite* ($2\text{CuCO}_3, \text{CuOH}_2\text{O}$), is found in shining translucent crystals, whose figure is that of oblique rhombic prisms, variously acuminate, and modified by secondary planes. The color is azure-blue, frequently of great intensity, and the luster vitreous. It sometimes occurs in an earthy form as an incrustation, and is occasionally massive, without luster. It consists of 69.21 oxide of copper, 25.57 carbonic anhydride, and 5.22 water. It occurs in the copper mines of England, and of European countries generally; also in South America, and the Burra Burra mines in Australia, and especially at Chessy, near Lyons, in beautiful crystals.

b. *Green Carbonate of Copper*, or *Malachite* ($\text{CuCO}_3, \text{CuOH}_2\text{O}$), occurs massive, disseminated, and crystallized in capillary and acicular crystals. Its color is green, and the luster of the fibrous varieties silky and pearly. It is usually in reniform or botryoidal masses. It is soft and brittle, but admits of a beautiful polish, and is highly esteemed in inlaid work. It occurs along with the other ores of copper. The finest specimens are brought from Siberia. This ore was at one time largely worked in South Australia.

Among other copper minerals the following may be referred to:

Phosphate of Copper, a rare ore, which was formerly regarded as malachite. It occurs massive, disseminated in minute prismatic or octahedral crystals, of a green color. It is found in Hungary and in the Ural. There are several varieties.

Oxy-chloride of Copper, or *Atacamite* ($\text{CuCl}_2, 3\text{CuO}$), is another rare species,

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which occurs in angular grains, of a bright green color, among the sands of the Lipas river in the desert of Atacama, separating Chile from Peru, and in South Australia; and it has been met with in the lava which buried Herculaneum and Pompeii. Its color is various shades of green, varying from nearly black to grass-green. It is soft and brittle; sp. gr. about 4. It tinges the flame of the blowpipe of a bright green and blue, hydrochloric acid fumes are evolved, and a bead of copper remains on the charcoal.

Arseniate of Copper.—Copper, combined with arsenic acid, forms several species. One, lroconite, occurs crystallized in the form of an obtuse octahedron. Its usual color is sky-blue, sometimes apple or grass-green. It is translucent, shining, and brittle; sp. gr. 2.8. It contains oxide and arseniate of copper, phosphate and oxide of alumina, and water. A second, chalcophyllite, copper mica, is crystallized in hexahedral tables, beveled on the terminal planes. Its color is deep emerald-green, with considerable luster and transparency. It is less hard and less heavy than the foregoing species, but its composition is not constant. A third, olivenite, the right prismatic arseniate of copper, is crystallized in the form of an acute octahedron, the crystals being sometimes capillary, in some specimens appearing as delicate fibers, and sometimes in layers, flat or mammillated, and of a fibrous texture. The color in these is dark olive-green, passing into brown or yellow, or greenish white. It is often transparent; it is harder than the preceding species, and is much heavier. It consists of 56 parts of oxide of copper, from 30 to 40 of arsenic acid, with 3 or 4 of water. A fourth, abichite or clinoclase occurs crystallized in trihedral prisms, generally extremely small; they are of a beautiful bluish green color, but from decomposition, often black; when unaltered they are transparent. It consists of 62 oxide of copper, 30 arsenic acid, and 7 water.

Besides these there are minerals containing copper combined with selenium, with vanadic, silicic, and sulphuric acids, etc.

METALLURGY OF COPPER.—Copper is extracted from its ores either by the dry or the wet process.

The simplest form of the dry process consists in reducing the ore, which must consist of pure oxide or carbonate, by heating it with carbon. But as the most abundant ores contain sulphur and iron, and generally arsenic, with other metals, and are not amenable to direct reduction, a different process has to be resorted to. It falls into two parts: (1) the separation of pure sulphide of copper from the ore; (2) the reduction and purification of the copper.

1. The ore is first ground to a coarse powder, and different qualities are select-

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ed and mixed so that the different earthy matters of the ores shall act as fluxes for one another. It is then roasted for about 12 hours in a reverberatory furnace, heated by a mixture of bituminous coal and anthracite, the ore being turned over from time to time to prevent it fusing and to expose fresh surfaces to the air. In this operation oxidation takes place, the sulphur is partially oxidized to sulphur dioxide, which escapes, the iron and copper sulphides being at the same time partially converted into oxides, the arsenic is partially volatilized as arsenious oxide. The roasting must not be carried too far, as only enough sulphur must be removed and oxygen taken up to form a good slag in the next process. The calcined ore is transferred to another reverberatory furnace, where it is mixed with silicate ores free from sulphur, slags, consisting of oxide of iron, oxide of copper, and silica, from a subsequent process, and fluorspar, if the earthy matter do not readily fuse. The heat being raised, the slag and then the metallic compounds begin to fuse, a complex set of reactions takes place, any oxide of copper formed is converted into sulphide, all the oxygen goes over to the iron, and the oxide of iron combines with the silica to form a slag. The slag is raked out the end door of the furnace, and the regulus (matte) or coarse metal is run into sand molds. The coarse metal is a compound of copper, iron, and sulphur, containing about 30 per cent. of copper. The slag is black silicate of iron (clean slag), and is thrown away. The coarse metal is next ground, and roasted in a reverberatory furnace to expel sulphur and convert the iron into oxide. After 24 hours, during which time the charge becomes less fusible, the operation is finished, and the charge is transferred to a furnace resembling the second, and is there subjected to a process similar to that of coarse metal. The roasted ore, consisting of oxide of iron, sulphide of iron, and sulphide of copper, is mixed with slags from other parts of the operation and some pure ores of copper consisting of carbonate or oxide. The mixture is heated for about the same time as the mixture for coarse metal, when it divides into a slag of silicate of iron and a matte of tolerably pure sulphide of copper, called white metal, which is either granulated by running into water or cast into ingots. As the slag contains a considerable proportion of metallic copper oxide, it is used in the preparation of a fresh quantity of coarse metal. The white metal varies in its composition; it should be nearly pure cuprous sulphide. If the roasting has not been carried sufficiently far "blue metal" is produced, which is ground and again roasted and run down.

2. Reduction and purification of the copper: The conversion of the white metal

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into metallic copper is effected by heating the white metal in a furnace, first with free contact of air until part of the sulphur is burned off and the copper is converted into oxide. When this action has gone on long enough, and the oxide and sulphide are in the right proportion, the furnace is closed and the heat raised to the fusion point, when a reaction takes place between the two. The sulphur and oxygen combine, sulphurous anhydride escapes, and metallic copper is left. A little slag containing copper is also produced, which is used in the fusion for white metal. The copper is cast into slabs, and constitutes blister copper, its appearance being caused by the escape of sulphurous acid gas.

The blister copper is finally refined. The slabs are built up in a furnace and roasted for several hours, and the heat is then raised to the melting-point. Sulphur, arsenic, and other volatile impurities are burned off, while iron, lead, and other metals, and part of the copper, are oxidized; the oxides combine with the silica, forming a slag which is raked off. When the charge is sufficiently roasted, a layer of charcoal or anthracite is spread over it, and the operation of poling is begun. This consists in stirring the molten copper with the green stem of a young birch tree, the effect being to make the copper quite tough. The explanation given is that the copper contains some oxide, which renders it brittle, and that this is removed by the carbon of the wood. If the poling be too long continued the metal becomes brittle again, and in this condition it is said to be overpoled, but this may be remedied by allowing the air to act on it.

The quality is ascertained by taking a sample out of the furnace, cooling it, cutting it half through, and breaking it across. If the color is a fine red, and the structure is finely fibrous or silky, the operation is concluded, and the copper is cast into ingots; but if not, the toughening process has to be repeated. Even after all these operations the copper is not chemically pure, but contains traces of arsenic, lead, and other metals, which can only be removed by complex operations on the small scale.

The preceding is the Welsh process of copper-smelting, and is that by which a large proportion of copper is manufactured in Great Britain. It is very elaborate, because it deals with complex ores, and it has the advantage that it can be modified to suit ores of almost any kind. The amount of fuel required is very large.

Modifications of the process are used in other districts. In Mansfield, blast-furnaces are used for some of the operations, and in Chile a much richer regulus than coarse metal is made at first, so that copper is obtained in two operations.

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In 1883 M. Manhés took out a patent for an improvement in the smelting of copper ores, the improvement consisting in blowing air through the molten matte in a converter similar to that used in the Bessemer steel process, instead of roasting it in a reverberatory furnace; and this process has now come very largely into use, chiefly in the United States.

The ore is smelted in a blast-furnace, and is mixed so as to produce a matte or regulus containing about 50 per cent. of copper, and therefore intermediate between the coarse metal and the white metal of the Welsh smelters. This regulus is melted in a cupola and runs into a converter, where air is blown through. The sulphur is partially oxidized, and the resulting oxide acts on the sulphide exactly as in the Welsh process, copper being separated, a considerable quantity of slag consisting of silicate of iron with some copper being formed at the same time. The converter is then turned over, the slag poured off, and the copper poured into molds.

The converter is lined with a siliceous material, which is rapidly attacked and therefore needs frequent renewal, and the air is blown in by horizontal tuyeres about 6 or 8 inches above the bottom, as if the air had to pass through the separated copper this would be chilled and solidified.

In a few cases, where the copper in an ore is soluble, it can be at once extracted by dilute acid and the copper then precipitated by iron.

The wet process is now used on a very large scale for the treatment of burnt Spanish pyrites. The ore is imported, and is burnt for the manufacture of sulphuric acid. The residue, or burnt ore, which contains 2 to 3½ per cent. of copper and a trace of silver, is mixed with about 5 per cent. of salt and ground to a coarse powder, which is then roasted on the hearth of a reverberatory furnace. A complex series of reactions take place, by which copper and silver present are converted into chlorides, and the salt is partially converted into sodium sulphate.

The roasted charge is raked out of the furnaces, allowed to cool somewhat, and is then transferred to vats and washed with acidified water. The residue left after treatment is called "purple ore"; and is nearly pure oxide of iron. The solution, containing the copper in solution as chloride, and the silver in solution as chloride in the excess of salt, is treated with sodium or other iodide, which throws down the silver as silver iodide. The precipitate is allowed to settle, the clear solution run off, and the silver iodide treated with zinc, which forms metallic silver mixed with other impurities and which is sold as silver precipitate; and zinc iodide which is used over again. The solution containing the

copper is treated with scrap-iron, which throws down the copper, steam being blown in to warm the solution and facilitate the action. The copper is thrown down as a crystalline mass. The precipitate is passed through a grating to remove undissolved lumps of iron, dried in a warm shed, and is ready for the market as copper precipitate. This is subsequently melted and refined in the usual way.

Copper is sold in various forms—in ingots of different sizes, in square plates or slabs, and in small grains, produced by pouring the metal into water.

Copper is the only metal which has a red color. Its sp. gr. is 8.96. It is moderately hard; very malleable, ductile, and tenacious; and its conducting power for heat and electricity is inferior only to that of silver. It has a distinct odor, and a nauseous metallic taste. Its compounds are poisonous. It melts at a full red-heat, and crystallizes from a fused mass in octahedrons. Heated to redness in the air it oxidizes, and becomes black and scaly. It is attacked readily by nitric acid, dissolves in boiling sulphuric acid, but is acted on by hydrochloric acid with difficulty.

Copper forms two classes of compounds—the cuprous and cupric, of which the second is the more important.

The cupric oxide occurs native, and it is formed when copper is heated in the air. It is more conveniently prepared by heating the nitrate until nitrous fumes cease to be evolved. It is a bluish black powder, insoluble in water, but hygroscopic, which fuses at a higher temperature, and becomes crystalline on cooling; with proper precautions distinct crystals can be obtained. It is soluble in acids, forming cupric salts which have a green or blue color, and from which the oxide can be reprecipitated by an alkali in the form of a greenish blue hydrate which loses water and becomes brown if the liquid be heated.

The cuprous oxide also occurs native, and is easily prepared from a cupric salt, such as the sulphate, by heating the solution with grape-sugar in presence of potash. A yellow precipitate forms, and this by continued heating becomes red, which is the true color of the oxide. It is quite permanent at the ordinary temperature, but if heated in the air it absorbs oxygen and passes into cupric oxide. When fused with glass it gives it a fine ruby-red color. Both oxides are readily reduced to the metallic state if heated in contact with hydrogen or with carbonaceous matter.

The other cuprous compounds, such as the chloride, bromine, iodide, sulphide, are prepared from this oxide, or from the corresponding cupric compound, by the addition of metallic copper, or by the action of some reducing substance. Hydride of copper, having the formula Cu_2H_2 , is a reddish

brown powder decomposing readily into copper and hydrogen, and yielding cuprous chloride and hydrogen with hydrochloric acid. It is usually very impure. As a general rule the cuprous compounds are colorless or pale; they are unstable in solution, and are apt to absorb oxygen from the air and pass into the cupric state.

Of the other cupric compounds the following may be mentioned: The chloride (CuCl_2), formed when a slip of metallic copper is acted on by excess of chlorine gas. It forms a brown sublimate, with a disagreeable taste, deliquescent, and soluble in water with a green color, forming the hydrated chloride. It also, like the hydrate, is soluble in alcohol, to the flame of which it imparts a fine green color. The hydrate can be obtained also by dissolving the oxide or carbonate in hydrochloric acid, and the solution yields on evaporation green deliquescent prisms, which become brown even at 212° . At a higher temperature water of crystallization is all expelled.

The commonest of all the salts of copper is the sulphate, or blue vitriol. This is prepared on a large scale by the treatment of copper or cupric oxide with sulphuric acid. When metallic copper is boiled with strong sulphuric acid the solution becomes blue, sulphurous anhydride is evolved, and the solution yields crystals of the cupric sulphate ($\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$). It crystallizes in doubly oblique prisms, which have a blue color and glassy luster, but are apt to become white and opaque on the outside. It dissolves in four parts of cold water and two of hot. It is insoluble in alcohol. It has a very offensive styptic taste, and is extremely poisonous. At a low temperature it readily loses part of its water of crystallization, but the last part is only expelled at a dull red-heat. The anhydrous salt is pulverulent and almost white. When thrown into water it reassimilates water of crystallization, heat being evolved. Heated to a sufficiently high temperature, the salt is completely decomposed. The sulphate of copper is largely used in the arts for making green paints, for telegraph batteries, for calico printing, and other purposes. It is also used in medicine.

The nitrate of copper, $\text{Cu}(\text{NO}_3)_2 \cdot \text{H}_2\text{O}$, obtained by dissolving the metal, or its oxide or carbonate, in nitric acid. It is soluble in water, from which it deposits in fine blue crystals. It is very corrosive, and acts readily as an oxidizing agent. Thus when wrapped in tin-foil, the tin is oxidized with such rapidity that it sometimes catches fire. The nitrate of copper in solution is used by dyers and printers for dyeing black, brown, and other tints, with certain coloring matters.

The arsenite of copper is a bright green powder, better known as Scheele's green. There are other green copper paints,

Copper

Schweinfurth green, verdigris, verditer, of varying composition.

The native sulphides of copper have been already referred to. The cupric sulphide is thrown down when sulphuretted hydrogen or an alkaline sulphide is added to a salt of copper. It is a blackish-brown amorphous powder, insoluble in water and dilute acids, but readily attacked by nitric acid.

Copper is acted on more or less rapidly by organic acids and vegetable juices containing acids. As the compounds formed are somewhat soluble, and, like the other compounds of copper, poisonous, great care is necessary in the employment of copper and brass vessels for culinary purposes.

The presence of copper in a substance is easily detected. If it be a solution, a slip of iron or zinc immersed in it will acquire a red color from the deposition of the metal. It is also readily detected by the deep blue color produced when a slight excess of solution of ammonia is added. This blue solution is formed even with solid copper, if only air and ammonia act on it conjointly. Copper is peculiar in its relations to ammonia. Its salts absorb the gas, forming crystalline compounds in which the copper and ammonia have combined with each other to form what modern chemistry terms a metallammonium.

The chief copper producing countries of the world are the United States, Spain, Chile, New South Wales, South Australia, Germany, South Africa, Venezuela, Sweden, etc. The annual production of the United States is about 220,000 tons of metal. The production of copper in the United Kingdom has long been declining, but much metal and ore are imported from the United States, Spain, Chile, Australia, and South Africa, large quantities being smelted in Great Britain.

ALLOYS OF COPPER.—Of these bodies a great number are known. Aluminum bronze contains 90 per cent. of copper and 10 per cent. of aluminum. It is very tenacious, hard, and malleable. It has a golden yellow color, which does not easily tarnish, and the alloy is otherwise not readily affected by chemical reagents. With metallic arsenic copper forms white bodies, which, however, have more the character of definite compounds than alloys. One of them is employed for making candlesticks, dials, and such like articles. Another occurs native in Chile, and is called domykite by mineralogists. When alloyed with gold and silver, copper communicates hardness to them without much impairing their ductility or debasing their color; hence it is employed in the standard alloys, that of gold containing one-twelfth, that of silver one-sixteenth of the mass. With platinum it forms a ductile alloy susceptible of a fine polish. But the most numerous and varied

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alloys of copper are those containing tin and zinc, and sometimes other metals, lead, etc.

Bronze is an alloy of copper with about 8 or 10 per cent. of tin, together with small quantities of other metals, which are not essential to the compound. Cannon were cast with an alloy of a similar kind, and the ancient bronze statues were of nearly the same composition. The modern British bronze coinage consists of copper 95, tin 4, zinc 1 (see BRONZE). Bell-metal is composed of 80 parts of copper and 20 of tin (see BELL).

Brass.—Copper and zinc unite in all proportions, forming alloys many of which are of great importance in the arts. Among the most important are: Red brass, 80 per cent. copper and 20 per cent. zinc; the ordinary brasses used for boiler tubes, etc., containing from 66.6 to 70 per cent. copper; Muntz metal, largely used for sheathing ships, containing 60 per cent. copper and 40 per cent. zinc; and common yellow brass, which contains 50 per cent. of copper. When the copper is as low as 40 per cent. the metal is almost silver-white, and is called white brass. The brothers Keller, who were very celebrated statue-founders, used an alloy, 10,000 parts of which contained 9,140 of copper, 553 of zinc, 170 of tin, and 137 of lead. Their castings are famous and some were of very large size, as the equestrian statue of Louis XIV., cast at a single jet by Balthazar Keller in 1699, which was 21 feet high, and weighed 53,263 French pounds. These statues are usually called bronze statues, although made of brass (see BRASS).

Copper does not make good castings, as the molten metal absorbs gases, which, being given off on solidification, make the casting porous. This difficulty has been to a large extent overcome recently, however, by the addition to the molten metal of a small quantity of phosphorus, usually in the form of phosphor-copper.

Copper, being ductile and easily wrought, is applied to many useful purposes. It is formed into thin sheets by being heated in a furnace and subjected to pressure between iron rollers. These sheets being both ductile and durable are applied to a variety of uses, such as the sheathing of the bottoms of ships, the covering of roofs and domes, the constructing of boilers and stills of a very large size, etc. Copper is also fabricated into a variety of household utensils, the use of which, however, for preparing or preserving articles of food, is by no means free from danger, on account of the oxidation to which copper is liable. It has been attempted to obviate this danger by coating the copper with tin. This method answers the purpose as long as the coating of tin remains entire. Copper may be forged into any shape, but will not bear

more than a red heat, and, of course, requires to be heated often. The bottoms of large boilers are frequently forged with a large hammer worked by machinery. The bolts of copper used for ships and other purposes are either made by the hammer, or cast into shapes and rolled. The copper cylinders used in calico printing are cast in molds; they are then hammered under a steam hammer to make the metal solid, and the surface is turned off till it is true and free from defects.

Copper, Electrolytic Refining of. On the banks of the Raritan river and on the outskirts of the thriving town of Perth Amboy, N. J., there is located the largest copper refining works in the world. Here, in the course of every month, some 10,000,000 to 12,000,000 pounds of refined copper are deposited in the tank house; while the monthly output from the refining furnaces varies from 15,000,000 to 18,000,000 pounds. The Raritan Copper Works are devoted extensively to the electrolytic refining of the product of the great smelters of the West.

The Furnace House.—The raw product comes to the works in the shape of copper pigs, which measure about 5 inches by 8 inches by 16 inches in length, and whose quality ranges from 95 to 99 per cent. pure copper. It receives its first treatment in the furnace house, which consists of three buildings, the first of which measures 80 by 600 feet and contains four 50 ton anode furnaces and five refining furnaces of the same capacity. The second building measures 80 by 200 feet and contains four 25 ton furnaces; and there is also a blast furnace building. The anode furnaces, as the name applies, are used for melting down pig copper in order that it may be cast into the large flat plates which form the anodes in the depositing tanks. The copper pigs are charged into large reverberatory furnaces, each charge weighing about 100,000 pounds. After about six or seven hours in the furnace the charge is melted, and then for 13 or 14 hours more it is thoroughly worked by methods similar to those used by the puddlers in some systems of iron making. The effect of the furnace treatment is to work off some of the impurities, the copper being advanced from 98½ per cent. of purity to about 99½ per cent. The slags formed in the furnace treatment by the oxidation of the copper and the impurities combined with the silicious materials forming the sides and bottoms of the furnaces float as scum on the surface of the molten metal. It is skimmed off and sent to the blast furnace to recover the 55 per cent. of copper which it contains. After 18 hours' treatment in the anode furnace, the copper is drawn off into a casting machine, which consists of an endless chain of molds, each mold being pivotally

carried in and forming part of a conveyer. The tap hole of the furnace discharges into a ladle, from which the metal is poured into the mold. This ladle has a transverse tipping motion and is of large enough capacity to hold a charge for one mold, and as much more metal as may run into the ladle while that charge is being poured. The anodes are one inch in thickness, 24 inches in width and 36 inches in depth. Each is provided on its upper edge with two projecting lugs, which extend over the edge of the depositing tank and serve to support the plate in the electrolyte. We present an illustration showing a similar casting machine in operation before a refining furnace, from which wire bars are being cast for the wire mills. The anodes are now loaded on cars and drawn into the tank building. Here they are loaded into frames, each of which holds 22 anodes, which is the total number necessary for each tank.

The Tank House.—The tank house contains the whole of the electrolytic plant. It consists of one large building measuring 200 feet in width by 600 feet in length. The main floor space is given up to 1,600 depositing tanks, which are arranged in four groups of 400 each; while in small additions at the end of the main building there are 32 liberating tanks. Four powerful electric cranes for handling the electrodes run the length of the building, each crane serving 400 tanks. The tanks are operated on the regulation multiple system, the tanks arranged electrically in series and the electrodes in each tank are parallel. The latter are about 2 feet wide by 8 feet long, and 3 feet deep, and each contains 22 anode and 23 cathode plates arranged in multiple. They are filled with dilute sulphuric acid and sulphate of copper electrolyte, and with a view to securing a constant circulation of the electrolyte the tanks are arranged in sets, with a solution well and a pump to each set. The liquor is drawn from the bottom of one tank and flows over to the next tank below it, the electrolyte being thus brought in thorough contact with the whole surface of the plates in the series of tanks.

The thin cathode sheets which are used in the depositing tanks are formed in what are known as "stripping" tanks, of which there are 180. The cathodes in the stripping tanks consist of rolled plates of pure copper, smeared with grease or plumbago, with their edges protected against the formation of copper by grooved wooden strips. After the cathodes have been in the stripping tanks for 36 hours, they are removed, and the thin sheet of copper is peeled from the plates, the grease serving to prevent any close adhesion of the surfaces. The thin cathode sheets are then flattened out by beating with wooden paddles, and are hung by means of two thin copper loops, riv-

eted to the plates, from copper rods, the ends of which rest on the edges of the depositing tank. The anodes as they are brought to the tank house from the casting furnace, are hung on special iron frames, on which they are so placed that they will have the proper spacing in the depositing tanks. The traveling crane picks up the frame with its complete set of anodes (22) and places them in position in the tanks, the total weight of the complete set being between 4 and 5 tons, while the 23 cathodes together weigh 160 pounds. The action of the current is to transfer pure or practically pure copper from the heavy anode plates and deposit it upon the thin cathode sheets. The latter increase in weight from 6 to 8 pounds to 75 to 80 pounds during the seven days that they are in the tank. At the end of seven days they are withdrawn, loaded on cars, and taken to the refining furnaces. Fresh cathodes are supplied, until the anodes, at the end of 42 or 43 days, have been so reduced as to have to be themselves replaced with fresh anodes.

Refining Furnaces.—The product of the tanks, in the shape of heavy deposited cathodes, is taken to the 50 ton refining furnaces, where it is melted down and brought to "pitch," that is to a purity of 99.88 per cent. In the process of melting the copper takes up a certain amount of oxygen, and this is removed by introducing into the bath of molten metal a pole of green wood the carbon of which combines with the oxygen, and passes off as carbon dioxide. From the refining furnaces the copper is cast into the various forms required by the mills to which the copper is to be shipped. One of our illustrations shows the mechanical conveyor of one of the "wire-bar" furnaces, that is to say, a furnace which is occupied in casting bars of copper for shipment to the wire works. The molten metal flows from the taphole into a ladle and from the ladle is poured directly into the molds, as they are brought successively beneath it. The molds are pivoted at their ends to the links of a conveyor. After each mold is filled with metal, it is drawn through a bath of water, and then tipped over to discharge its contents. The conveyor is operated by a 10 horse power electric motor, and the ladle is operated by a hydraulic plunger which is under the control of the ladler.

Treatment of the Slimes.—The first process in the treatment of the slimes is to extract the copper, and this is done by boiling the slimes in concentrated sulphuric acid and blowing air through the liquid during the process. The slimes are then washed, dried, and smelted on the hearth of a cupel furnace, and a bullion of gold and silver is recovered. The silver and gold bullion is boiled in large kettles filled with sulphuric acid, where the silver is dissolved and forms

sulphate of silver, while the insoluble gold collects on the bottom of the kettle. The sulphate of silver solution is siphoned off into tanks, the bottom and sides of which are lined with copper plates. Here the sulphate is reduced, the silver being precipitated on the copper plates as "sponge silver," which is collected, washed, dried, melted in crucibles, refined, and cast. The gold is collected from the bottom of the kettles and is also washed and refined and cast, the pure silver and gold thus obtained being shipped to the mint.

The power house for the supply of the large amount of current necessary for the depositing of 12,000,000 pounds of copper a month is, as may well be imagined, a large one. The boiler room contains eight 400 horse power and two 200 horse power Babcock and Wilcox water-tube boilers, equipped with the Murphy automatic stoker. The fuel is brought to the boilers and the refuse, ashes, etc., removed by mechanical conveyers. The engine room contains five vertical cross-compound condensing engines, each direct-connected to a General Electric generator, the largest of which delivers 4,500 amperes at an efficiency of 93.5 per cent.

Copperas, sulphate of iron or green vitriol ($\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$), a salt of a peculiar astringent taste and of a fine green color. When exposed to the air it assumes a brownish hue. It is much used in dyeing black and in making ink, and in medicine as a tonic. The copperas of commerce is usually made by the decomposition of iron pyrites.

Copper Nickel, or **Kupfernickel**, an ore of nickel, an alloy of nickel and arsenic, containing about 60 parts of the former and 40 of the latter, of a copper color.

Copper Poisoning, poisoning caused by some form of copper. Pure copper is innocuous, but alloys of copper, or salts of copper, are poisonous. The poisonous alloys are those with zinc and tin, known as brass and bronze respectively, and compounds of copper with lead or arsenic. The most important salts are the sulphate, blue vitriol, or bluestone; the acetates (basic and neutral) constituting artificial verdigris, and the carbonate or natural verdigris. **Acute Copper Poisoning.**—When sufficient quantity is taken at once, the symptoms are those of an irritant poison; coppery taste, colic, vomiting and purging followed.

Copper Pyrites, or yellow copper ore, a double sulphide of copper and iron composed in equal parts of copper, sulphur, and iron. It occurs mostly in Primary and metamorphic rocks, and is the chief copper ore of England.

Coppice, or **Copse Wood**, a wood in which the trees are cut over periodically as

they attain a certain size. In Great Britain many forest trees, and in particular the oak, the chestnut, the ash, the birch, and the maple, are dealt with in this way. The period for cutting varies with the soil and the tree. The oak usually requires from 15 to 25 years' growth, while the willow is cut regularly every year. The term is also used in a general sense for a wood of small growth, or consisting of underwood and brushwood.

Coppinger, John J., an American military officer; born in Ireland, Oct. 11, 1834. After obtaining a military education in Ireland he went to Rome, serving in the Papal army as aide-de-camp to Pius IX. He came to the United States in 1861 and was given a commission in the Union army, rising to the rank of Brigadier-General in the regular army in 1895. In the war with Spain, as Major-General of volunteers, he commanded the 4th Army Corps in Porto Rico. He married Alica, daughter of the late James G. Blaine. He was retired in 1898; died Nov. 4, 1909.

Copra, the dried kernel of the cocoanut, from which the oil has not yet been expressed, a considerable article of commerce in some tropical regions.

Coprolite, the dung of various animals found fossil, and sometimes so perfect as to indicate, not merely what the several species fed upon, but also the dimensions, form, and structure of their stomach and of their intestinal canal. On the shore at Lyme Regis, England, they lie thickly in some parts of the Lias like potatoes on the ground; they abound also in the estuary of the Severn. They tend to occur in all formations, specially where vertebrates are found. Some are of fishes, some of reptiles, and magnificent coprolites originating from the hyena were found in Kirkdale Cavern and other places. Dana gives as a synonym of the coprolites phosphatic nodules, and associates them, but as a distinct species, with apatite. But some phosphatic nodules once believed to be coprolitic, such as those of the Upper Greensand, though apparently of organic origin, are not now believed to be the dung of any animal.

Copt [said to have been derived from Kupt (Coptos), a city in Upper Egypt, now Ckooft or Gooft, to which the Christians sometimes fled during persecution by the Romans; but Renaudot shows that this derivation is not satisfactory. The Rev. Dr. John Wilson considers that the Arab Gubt or Gibt is simply Gr. *Aiguptos* = Egypt], one belonging to the Coptic Church; one of the old Egyptian race, though perhaps with a dash of Greek, Nubian, or Abyssinian blood.

Coptic, pertaining to the people called Copts, or to their sect; the remnants of the once numerous Church of Egypt — that which had the celebrated school at Alexandria. It broke off from the body Catholic in embracing the Monophysite doctrine, viz., that not two natures, but only one, existed in Christ, a view from which it has never since departed. When Jacob Baradaeus formed a slightly modified Monophysite sect, most of the Egyptian Christians became Jacobites. Being tyrannized over by the Greeks, they cheerfully submitted to the Mohammedans, under Amru ben Elaas, in A. D. 638, and aided him, in 640, to take Alexandria. Since then they have been trodden under foot by the Mohammedans. About 250,000 Copts still exist in Egypt, mostly in its upper province. They have a patriarch, bishops, presbyters, archdeacons, deacons, sub-deacons, lectors, cantors, and exorcists. They have two regular convents, those of St. Anthony and St. Paul, with a number of secondary monasteries.

The Coptic language was the language not of the old Egyptians who built the pyramids and covered monuments and temples with hieroglyphics, but of their successors subsequent to the introduction of Christianity. Theirs bore to the old Egyptian language a relation like that of the Italian to the Latin — *i. e.*, the nucleus came from the old language, but there was an increasing ingress of foreign words. It continued till the 10th century, when it was in large measure superseded by Arabic. By the 17th it had ceased to be spoken, and existed only as a written dialect. While it lived three dialects were recognized, the Sahidic, in Upper Egypt; the Bahiric or Memphitic, in Lower Egypt; and the Bashmuric, in the Delta.

Coptine, a colorless alkaloid which is found along with berberine in the root of *Coptis trifolia*. Coptine dissolves in sulphuric acid, the solution becoming purple-red when heated; it gives a crystalline precipitate with a solution of mercuric potassium iodide.

Coptis, a genus of plants, order *Ranunculaceæ*, tribe *Helleboreæ*, sepals 5 or 6, colored petaloid, petals small cucullate, capsules 6–10 on long stalks, 4–5 seeded. *C. trifolia*, Gold-thread, is a bitter, given in the United States as a cure for aphthous affections of the mouth in children. It yields a yellow dye. The plant is not confined to this country, but grows also in Norway, Siberia, Kamtchatka, etc.

Copway, George, native name, Kah-gagaw-bowh; an Indian journalist; born in Michigan in 1818. He belonged to the Ojibway tribe and was settled in New York. He wrote: "Recollections of a For-

Copyhold

est Life"; "The Ojibway Conquest," a poem; "Running Sketches of Men and Places in Europe," etc. He died about 1869.

Copyhold, in English law, a tenure of land by copy from the court rolls belonging to a manor. Copyhold property cannot be now created, for the foundation on which it rests is that the property has been possessed time out of mind by copy of court roll, and that the tenements are within the manor. In 1858 Parliament passed a law which enables either the lord or tenant of any copyhold lands to compel enfranchisement of the land and convert it into freehold, either in consideration of a fixed sum or of an annual rent.

Copying, a term in general use for a great many different processes, but may be described generally as the reproduction, usually either on an enlarged or reduced scale, of any drawing, map, or other work of art. A few of the methods employed may be shortly described. If the copy is to be the same size as the original, the easiest way is to trace it. A piece of tracing-paper is put over the drawing, and the principal lines gone over with pencil. The back of the tracing is then rubbed with black lead or ruddle, and put on the clean paper on which the copy is to be made; the traced lines are gone over with a hard point, and thus indicated faintly on the paper. Guided by the traced lines, the copy can then be drawn in. It is usual to have the ruddle or black lead on a separate piece of thin paper, and interposed between the tracing and the paper. When the copy is required of a different size from the original, the simplest way is to sketch it by hand and eye, but where more mechanical accuracy is required, the method of squares is very useful. The original is covered with squares of any convenient size by pencil lines or threads; a piece of paper for the copy is prepared with a corresponding number of squares, of a smaller or larger size, according as the copy is wanted smaller or larger. These squares must bear the same proportion to the squares on the original as the copy is to bear to the original. It is then a comparatively easy matter to copy in each square the part of the original in the corresponding square. To avoid confusion if the squares are small, it is well to number them along each side of the drawing. If it is not convenient to cover the original drawing with pencil lines, or to tie threads over the face of it, a very good way is to draw the squares on a piece of tracing-paper, and put that over the original; the same tracing-paper will do any number of drawings. A pair of proportional compasses will be found very useful for fixing the proportional sizes of the squares. Any drawing

Copyright

consisting principally of straight lines, such as a plan, can be conveniently reduced by constructing a scale to suit the reduced size required. The lines of the original are measured by its scale, and the same proportion of the smaller scale gives the necessary measurements. The pantograph is another means of making a reduction or enlargement, but is very seldom used now. It is only accurate in a general way. Perhaps the simplest and most exact method is to get the original photographed to the required size; the copy can then be traced on to clean paper as already described.

The copying of letters and other documents for commercial purposes is usually done by means of the ordinary copying-press, which is so familiar in every counting-house as to need no detailed description. A letter written with specially prepared ink is transferred to another piece of paper by means of damp and pressure. Common ink thickened with a little sugar will serve as copying-ink. Many modifications of this arrangement have been devised for producing a number of copies of circulars, etc., from one written copy, and are known as "graphs." A document written with the ink prepared for the purpose is transferred by pressure with the hand to a gelatinous slab, from which as many as 50 or 60 copies, more or less distinct, can be retransferred by rubbing with the hand. A very useful method of manifold writing is largely employed in telegraphic news work, and for duplicating invoices by retail tradesmen. Carbonized paper is put between two, three, or more sheets of thin paper, and thus whatever is written on the top sheet by a hardish pencil is duplicated on the others. When an indefinite number of copies of any drawing or other subject is required, there are many printing processes which may be employed. Letters or circulars, if written with lithographic ink, can be transferred to stone, and any number printed. Engineers' or architects' drawings, or any other drawing executed in line, can be very successfully reproduced in any size by the photo-lithograph process. If required for block or letterpress printing, then any of the zincotype processes may be employed. By this process, also, plates to reprint steel-engravings can be produced from any printed engraving. For reproducing drawings executed otherwise than in line, photographs from nature, or paintings, there are many processes which will also be described in their respective articles.

Copyright, the exclusive right of property in any intellectual production; the protection afforded by the law for a limited number of years to the originator of any written or printed composition or work of art, or to his heirs and assigns, whereby

Copyright

persons unauthorized are prevented from multiplying and selling copies, or, in case of dramatic works, from representing them on the stage. Such rights were claimed by authors before the introduction of printing. After the invention of the printing press, the right to publish books became the subject of licenses and patents. In Chambers's "Domestic Annals of Scotland," under date of Nov. 9, 1699, may be seen a warrant of the Privy Council authorizing George Mossman, stationer in Edinburgh, "to print and sell the works of the learned Mr. George Buchanan, in one volume in folio, or by parts in lesser volumes, and forbidding all others to print, import, or sell the whole or any part of the said Mr. George Buchanan's works, in any volume or character, for the space of 19 years." Similar privileges were granted in England; but all such monopolies were regarded with suspicion by common lawyers. The common law affords a certain measure of protection to works unpublished or published only for a limited purpose. The writer of a letter, for example, transfers his property in it to the receiver; but the receiver has no right to print it for sale or distribution without the writer's consent. The copyright in published works is the creation of statute; the first Copyright Act was passed in 1709; and by virtue of its provisions authors acquired the sole liberty of printing their books during a term of 14 years from first publication, and, if the author should be living at the end of that time, during a further term of 14 years.

While this act was in force, Thomson sold the copyright of his poems to Millar, a London bookseller. Millar claimed the right to prevent the issue of reprints by Donaldson (of Edinburgh) and others, even after the statutory term had expired, on the ground that an author had, at common law, the sole right of printing his works. Out of this dispute arose the famous cases of *Millar vs. Taylor*, and *Donaldson vs. Beckett*, which led to a remarkable difference of opinion among the judges. The House of Lords decided that, if any common-law right existed, it had been taken away by statute.

At the Union with Ireland, the Copyright Act was extended to that country, and the trade in cheap editions, printed in Dublin and secretly imported into Great Britain, came to an end. In 1814 the term of copyright was extended to 28 years, and the residue of the author's life if he were living at the end of the term. The impetus given to literature at the beginning of the 19th century, and especially the popularity attained by the works of Scott and Byron, greatly increased the market value of copyright, and ultimately

Copyright

led to further legislation in the interest of authors and publishers. The basis of the existing law is the Copyright Act of 1842, commonly known as Talfourd's Act, or Lord Mahon's Act. Macaulay's speech in the House of Commons on the second reading of this measure is one of his most successful parliamentary efforts. In Great Britain the term of copyright in a book is 42 years, or the life of the author and seven years, whichever of the two terms is the longer. No copyright can be enjoyed in seditious or immoral publications, or in books first published out of the United Kingdom. Articles contributed to encyclopædias and periodicals and books published in parts or series belong to the proprietor; but he may not publish them separately without the writer's consent, and after 28 years the copyright reverts to the author. Dramas and musical pieces, if first published in book-form, are subject to the same rules as books; but if they are performed in public before appearing in print, the author retains the sole right of permitting them to be represented during the term of copyright; and this right is distinct from the copyright he acquires if his drama or piece is published as a book. By an Act of 1882 the proprietor of a piece of music, desiring to reserve the right of performance, must give notice to that effect on the cover. Verses may not be taken from a copyright work and set to music for sale, without permission. A novel may be dramatized without the author's permission; but if copies of the drama are published containing passages borrowed in substance from the novel, the author of the adaptation is liable to an action. The right to dramatize can only be exercised with precautions which must greatly restrict it in practice.

Copyright in engravings, maps, etc., is secured by several Acts; the term is 28 years. Each plate and print must bear the name of the proprietor. Copyright in paintings, drawings, and photographs is secured to the artist during his life and seven years after by an Act of 1862. In 1874 the Canadian Copyright Act enabled a British author to obtain copyright in Canada for 28 years, provided his work be published in the colony. This right is concurrent with and in addition to the rights given by the imperial Act of 1842. In accordance with the Copyright Law known as the Mouskwell Bill, pending (1900) in the House of Lords, the term of copyright in England will be extended to that in force in Germany, Austria, Hungary, and Portugal—that is to say, the life of the author and 30 years.

Section 4,952 of the "Revised Statutes" of the United States, in force Dec. 1, 1873, as amended by the Act of June 18, 1874,

Copyright

as amended by the Act of March 3, 1891, provides that the author, inventor, designer, or proprietor of any book, map, chart, dramatic or musical composition, engraving, cut, print, or photograph, or negative thereof, or of a painting, drawing, chromo, statuary, and of models or designs intended to be perfected as works of the fine arts, and the executors, administrators or assigns of any such person, shall upon complying with the provisions of this chapter have the sole liberty of printing, reprinting, publishing, completing, copying, executing, finishing, and vending the same; and in the case of a dramatic composition, of publicly performing or representing it, or causing it to be performed or represented by others. And authors or their assigns shall have exclusive right to dramatize or translate any of their works for which copyright shall have been obtained under the laws of the United States.

A printed copy of the title of the book, map, chart, dramatic, or musical composition, engraving, cut, print, photograph or chromo, or a description of the painting, drawing, statue, statuary, or model or design for a work of the fine arts, for which copyright is desired, must be delivered to the Librarian of Congress or deposited in the mail, within the United States prepaid, addressed "Librarian of Congress, Washington, D. C." This must be done on or before day of publication in this or any foreign country. Not later than the day of publication in this country or abroad, two complete copies of the best edition of each book or other article must be delivered or deposited in the mail within the United States, addressed "Librarian of Congress, Washington, D. C.," to perfect the copyright. The freight or postage must be prepaid or the publications enclosed in parcels covered by printed penalty labels, furnished by the Librarian, in which case they go free by mail (not express), without limit of weight, according to the rulings of the Postoffice Department. Books must be printed from type set in the United States, or plates made therefrom; photographs from negatives made in the United States; chromos and lithographs from drawings on stone or transfers therefrom made in the United States. Without the deposit of copies above required, the copyright is void and a penalty of \$25 is incurred. The law requires one copy of each new edition wherein any substantial changes are made to be deposited with the Librarian of Congress.

No copyright is valid unless notice is given by inserting in every copy published, on the title-page, or the page following if it be a book; or if a map, chart, musical composition, print, cut, engraving, photograph, painting, drawing, chromo, statue,

Copyright

statuary, or model or design intended to be perfected as a work of the fine arts, by inscribing on some portion thereof, or on the substance on which the same is mounted, the following words, viz.: "Entered according to Act of Congress in the year —, by —, in the office of the Librarian of Congress, at Washington," or at the option of the person entering the copyright the words: "Copyright, 18—, by —." The copyright law secures to authors and their assigns the exclusive right to translate or to dramatize any of their works; no notice is required to enforce this right. The original term of copyright runs for 28 years. Within six months before the end of that time, the author or designer, or his widow or children, may secure a renewal for the further term of 14 years, making 42 in all. In the case of books published in more than one volume, or of periodicals published in numbers, or of engravings, photographs, or other articles published with variations, a copyright must be entered for each volume or part of a book, or number of a periodical, or variety as to style, title, or inscription, of any other article. To complete the copyright on a book published serially in a periodical, two copies of each serial part, as well as of the complete work (if published separately), should be deposited.

To secure copyright for a painting, statue, or model, or design intended to be perfected as a work of the fine arts, a definite title and description must accompany the application for copyright, and a mounted photograph of the same, as large as "cabinet" size, mailed to the Librarian of Congress not later than the day of publication of the work or design. The fine arts, for copyright purposes, include only painting and sculpture, and articles of merely ornamental and decorative art should be sent to the Patent Office; as subjects for Design Patents. Copyrights are not granted on trade-marks or on names of companies, libraries or articles, or on an idea or device or on prints or labels intended to be used for any article of manufacture. If protection for such names or labels is desired, application must be made to the Patent Office.

Until 1891 copyright could be acquired only by a citizen of, or permanent resident in, the United States. British authors had much reason to complain of this state of the law; and American authors were injured by having to compete with cheap unauthorized reprints of British works. There was at one time an understanding that the American publisher who first placed a British work on the market obtained copyright by courtesy; and considerable sums were paid for "advance

sheets" in order to obtain this advantage, but the "courtesy of the trade" came to be disregarded. In December, 1887, the convention of Berne brought nearly all the States of Europe into copyright relations with one another. This was the most important step ever taken in the history of the world's literary dealings, for it secured an almost universal recognition of the rights of authors. The rights of citizens or subjects of a foreign nation to copyright in the United States extend by Presidential proclamations to Great Britain, France, Belgium, Switzerland, Germany, Italy, Spain, Denmark, and Portugal, and Americans can secure copyright in those countries. For this direct arrangements must be made abroad. For an American citizen to secure copyright in Great Britain the title should be entered at Stationers' Hall, London, the fee for which is 5 shillings sterling, and 5 shillings additional if a certified copy of entry is required. The work must be published in Great Britain or in her dominions simultaneously with its publication in the United States, and five copies of the publication are required, one for the British Museum and four on demand of the Company of Stationers for four other libraries. Copyright may be secured in France by a foreigner by depositing two copies of the publication at the Ministry of the Interior at Paris. No fee or entry title required. To secure copyright in Belgium a foreigner may register his work at the Department of Agriculture, Industry and Public Works, at Brussels. In Switzerland, register of title at the Department of Commerce and Industry at Berne is optional, not obligatory; fee, 2 francs. If registered, deposit of one copy is required. Copyright in Canada is to be registered with the Minister of Agriculture at Ottawa; fee, \$1 for registry and 50 cents for certificate, and the work to be published in Canada and two copies deposited. In Greece the period during which an author can hold a copyright is restricted to 15 years. The Swiss grant copyright during the life of the author or his heirs during 30 years from the date of publication of his work. In Brazil the author enjoys a copyright for life, and it is extended for 10 years after his death. In Venezuela the copyright endures for the life of the author and 14 years after his death. In Holland and Belgium the copyright lasts during the life of the author and during 20 years after his death. In Germany, Austria, Hungary, and Portugal copyright endures during the life of the author and during 30 years after his death. The duration of copyright in Italy is regulated in a peculiar manner. It endures for the life of the author and 40 years after his death, or for 80 years after the pub-

lication of the work, the term of years being divided into two periods of 40 years each. If the author dies within the first period of 40 years the remainder of the term is enjoyed by his heirs or assigns. The second period of 40 years begins at the death of the author, if he has died after the first period of 40 years has elapsed; or if he has died before them, at the end of the first period of 40 years. During the second period any one is at liberty to republish the work on payment to the owner of the copyright of a royalty of 5 per cent. on the price which must be marked on the book. France, Norway, Sweden, and Denmark accord a copyright during the life of the author and 50 years after his death. Russia not only gives copyrights for life and 50 years after death, but also for 10 additional years if an edition of the work is published within five years from the end of the first copyright term. The law of Spain accords a copyright during the life of the author and for 80 years thereafter. Only in Mexico is copyright perpetual, but at the present time an effort is being made to have copyrights perpetual in various countries.

GEORGE HAVEN PUTNAM.

Coquelin, Benoit Constant, a French actor; born in Boulogne, Jan. 23, 1841; was admitted to the Conservatoire in 1859; and having gained the second prize for comedy, made his début at the Théâtre Français, Dec. 7, 1860, as Gros-René in the "Amourous Veration." For over a quarter of a century he played there with unbroken success, both in classical pieces and in roles created by himself; in the broader aspects of comedy standing without a rival. He left there in 1886, and appeared in London, South America and the United States. He wrote (with Coquelin the younger) "The Art of Monologue." He died Jan. 26, 1909.

Coquelin, Ernest Alexandre Honore, a French actor; brother of Benoit; born in Boulogne, May 16, 1848. He was educated at the high school of his native city; played important parts on the stage of the Théâtre Français; and wrote monologues, including "The Horse," "The Art of Monologue," etc. He died Feb. 8, 1909.

Coquilla Nut, the seed of the piassava or piacaba palm, one of the cocoanut group, a native of Brazil. The nuts are 3 or 4 inches long, oval, of a rich brown color and very hard, and are used in turnery for making umbrella handles, etc.

Coquimbo, also called La Serena, capital of the Chilean province of the same name; near the mouth of the river Coquimbo, on three terraces. It is a handsome town, with a new cathedral, seminary, lyceum, and hospital. Pop. (1903)

Coquito

19,876. The port of Coquimbo is on a bay, 6 miles S. W., and has a population of 5,000. It exports copper, silver, and manganese ores, wool, cattle, hay, and cobalt. The province of Coquimbo occupies the entire breadth of the country from the sea to the Andes. Its area is 13,457 square miles; pop. (1903) 193,193. The rainfall is small, save in the S., where some farming is carried on. The main occupation is mining of copper, as also silver and gold.

Coquito, a beautiful Chilian palm, of which the sap is boiled down as syrup.

Coracias, the typical genus of the family *Coraciidæ* and the sub-family *Coracinæ*. *C. garrula* is the common roller. It has the head, neck, breast and belly various shades of verditer-blue changing to pale green, the shoulders azure-blue, the back reddish-brown, the rump purple, the primaries of the wings dark bluish-black with a lighter edge, the tail-feathers greenish-blue, the outer ones tinged with black. The length is about 13 inches. The common roller is found throughout Europe, but its special habitation is in Africa. Its favorite habitats are forests of oak and birch.

Coracle, a kind of boat in use among fishermen, from the earliest times, in Wales and parts of Ireland, and composed of a frame of wicker-work covered with leather or oiled cloth. It is light and capable of being carried on the shoulder by one man.



CORACLE.

Coracoid, an important paired-bone in the breast-girdle, forming along with the scapula, the articulation for the forelimb, and always lying ventrally. In the lower fishes the entire girdle is cartilaginous; in the bony fishes distinct coracoids first appear; they are well seen in Amphibia and in all reptiles except snakes; they are very large and strong in birds; but become mere processes of the scapula in mammals. They very often exhibit a special anterior portion known as the pre-coracoid.

Coral, the name applied to the calcareous stony structures secreted by many of the actinozoa, which form one of the divisions of the cœlenterate zoöphytes, and also applied to the animals themselves. Two kinds of corals are distinguished by naturalists, *sclerodermic* and *sclerobasic*, or those in which the calcareous skeleton is

Coral

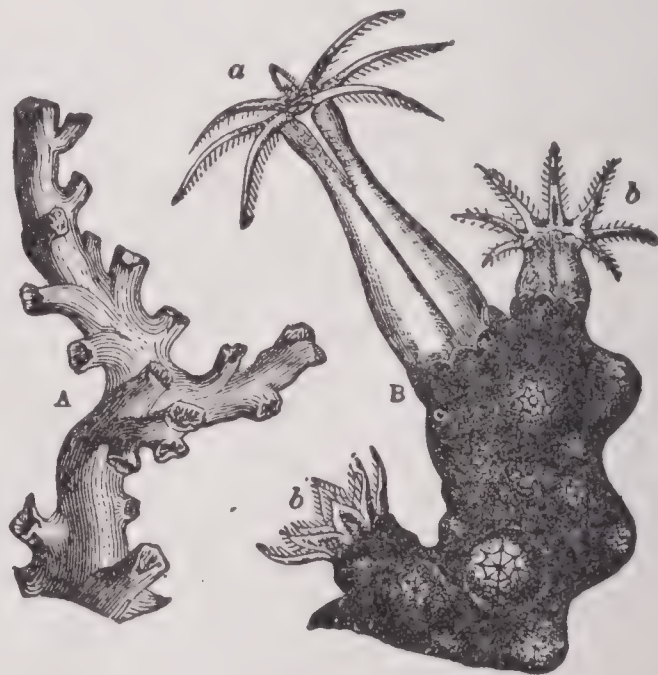
developed in the walls of the body, as in the reef-building corals, and those in which (as in the red coral of commerce) the skeleton is external or cuticular. Reproduction takes place by ova, but chiefly by budding, the new individual remaining in organic union with the old. The coral masses grow



CORAL.

Caryophyllia borealis. single individual.

not merely by the multiplication of individuals, but by the increase in height of each of the latter, which, as they grow, become divided transversely by partitions. The animal, distended with ova, collapses on their discharge, and thus becomes too small for the cup which it formerly occupied; it cuts off the waste space by a horizontal layer of coral, and the repetition of



CORAL.

A, branch of *Dendrophyllia*; B, part of a stock of red coral, with (a) fully extended polyp, and (b, b) two polyps, partly extended.

this process gradually adds to the height of the mass. It is in this way that the coral reefs and islands, occurring in such abundance in the Pacific, the Indian Ocean, and the Red Sea, are built up—works of such stupendous and astonishing bulk when

Coral

compared with the tiny creatures that produce them.

These coral reefs appear under three principal types, namely, the fringing reef, the barrier reef, and atoll or lagoon reef. According to Darwin's theory the latter two are merely developments of the first. The fringing reef on the margin, say, of a South Sea island is the work of corals living near the shore. This island is supposed gradually to subside into the sea, but so slowly as to allow the coral polyps, which cannot exist at a greater depth than between 20 and 30 fathoms from the surface, to add to the height of the reef and keep themselves always at the same level. Thus, in the course of time, as the island sinks in the constantly receding margin, the coral formation will no longer be a fringing reef, but will stand out at sea, with water on all sides betwixt it and the island. In this way the barrier reef is formed. But should the island continue to sink till it disappear altogether, the reef is then left as a huge circle inclosing a lagoon and constituting the atoll. By accretions of various kind this finally rises above the surface of the sea, is taken possession of by a tropical vegetation, and at length becomes the habitation of man. Darwin's theory is by many not considered satisfactory, however, and the formation of the coral reefs is explained without the theory of subsidence.

The coral of commerce is the production of various polyps, and is of different colors and internal structure. The red, pink, and black sorts are the most highly prized. The red coral has a branching shrub-like form, and, as well as other sorts, is found abundantly in the Mediterranean. The coral fishery, as it is called, is carried on in various parts of the Mediterranean, the principal localities being the S. W. coast of Corsica, where the finest quality is found, the coast of South Italy, and the N. coast of Africa (Algeria and Tunis). The raw coral is wrought chiefly in Leghorn, Genoa, and Naples. The coral is brought up from the bottom by means of net-work bags with wide meshes, attached to cross-beams of wood that are let down from a vessel by a line. Italy takes the leading part both in fishing for coral and in its preparation for the market. Coral is capable of taking a good polish, but is not susceptible of receiving the finer execution of a gem. In composition it consists chiefly of carbonate of lime.

Coral Fishes, a name given to several fishes of different genera, belonging to the *Chætodontidæ*. They are found in all tropical seas, especially about coral reefs, and are all brilliantly colored. The most important is the *holocanthus imperātor*, the "emperor of Japan," which measures about

Coram

15 inches in length, and is the most esteemed of all the Indo-Pacific fishes.

Coralline, a term popularly applied both to sea-weed with rigid calcareous fronds and to many of the zoöphytes.

Coralline, an orange red color, prepared by the action of ammonia at about 300° F. upon rosolic acid, or upon the washed residue of the action of a mixture of sulphuric, oxalic, and carbolic acids. It is used for dyeing silk, and is also printed upon cotton.

Coral Rag, a limestone of middle Oölitic age, so called because it consists in parts of continuous beds of fossil coral, for the most part retaining the position in which they grew at the bottom of the sea. Sometimes the mass is 15 feet thick. Leading genera: *Caryophyllia*, *Agaricia*, and *Astrea*. The coral rag extends through the calcareous hills of the N. W. of Berkshire and the N. of Wiltshire, recurring at Scarborough in Yorkshire, England.

Coral Sea, that section of the Pacific which stretches between Australia on the W. and the New Hebrides on the E. In 1874 the "Challenger" expedition found parts of it to be 14,700 feet deep.

Coral Snake, small venomous snakes in the same family (*Elapidæ*) as the cobra. The typical species (*E. corallinus*) frequents woods and thickets in South America. Their very small mouth makes them less dangerous. The usual color is rich red with black and yellow transverse bands, and it is an interesting fact that besides the venomous elaps, at least two other genera occur which are quite harmless.

Coral Tree, a name for *Erythrina*, a leguminous genus. The species occur in the tropics. The resemblance to red coral is in their blood red flowers.

Coram, Thomas, an English philanthropist; born in Lyme Regis, Dorsetshire, in 1667 or 1668. He was bred a seaman, and rose to be a merchant captain. In 1694 he settled in Taunton, Mass., and engaged in benevolent work of various kinds. A few years after he returned to sea, and settled in London, after suffering shipwreck off Cuxhaven in 1719. In London he interested himself in the settlement of Georgia, and in planting English artisans in Nova Scotia; but he soon began his long agitation for the foundation of a foundling hospital. Children were first admitted in 1741. Coram's portrait was painted by Hogarth, a warm patron of his scheme. More thoughtful for others than for himself, Coram fell into poverty, from which he was relieved in 1745 by an annuity of £161 contributed by his friends. He died March 29, 1751.

Cor Anglais

Cor Anglais, a wind instrument of the reed species, similar in construction to the oboe, to which it has the same relation as the basset horn has to the clarinet. It is usually made in the key of F, a fifth lower than the ordinary oboe, and has the same range—viz., from E in the bass stave to B flat, above the treble stave.

Corbel, a form of bracket used in Gothic architecture for the purpose of supporting the ends of timbers, arches, parapets, floors, cornices, etc. It consists of a projecting block of stone, usually carved in a fantastic manner, and having a receding face.

Corbel, Richard, an English poet; born in Surrey, in 1582. A noted ecclesiastic and disposed to be gay, he wrote a "Journey to France" and a "Farewell to the Fairies," poems in which is revealed a jolly parson and the maker of some tolerable verse. He died in Norwich, July 28, 1835.

broad

Corbin, Henry Clark, an American military officer; born in Clermont county, O., Sept. 15, 1842. He was educated in the common school, studied law, and entered the Union army in 1862 as lieutenant of volunteers rising for gallantry to the brevet rank of Brigadier-General. Entering the regular army as lieutenant in 1866 he advanced through the grades to that of Adjutant-General in 1898 with rank of Brigadier-General; was appointed a Major-General of volunteers the same year; and was promoted to Major-General, U. S. A., in 1899. He died Sept. 8, 1909.

Corchorus, the genus of plants to which jute belongs, order *Tiliaceæ* (the lime-tree). They are herbs or small shrubs with serrated leaves and small yellow flowers.

Corcoran, Michael, an Irish-American soldier; born in Carrowkeel, Sligo, Sept. 21, 1827. He was the son of a captain in the British army, received a good education, and came to the United States in 1849. He entered the 69th Regiment, N. G. S. N. Y., as a private and rose through its grades to the colonelcy. He was court-martialed for refusing to parade his troops in honor of the Prince of Wales in 1860; but before the case was decided the Civil War broke out. He commanded his regiment at Bull Run, was wounded, captured, exchanged in 1862, and organized the Corcoran Legion in 1863, with which he held the enemy in check at Norfolk. He was commissioned a Brigadier-General and transferred to the Army of the Potomac. He was killed by the fall of his horse near Fairfax Court House, Dec. 22, 1863.

Corcoran, William Wilson, an American banker; born in Georgetown, D. C., Dec. 27, 1798. He engaged in the banking business and accumulated a large fortune.

Cordage

His charities are estimated to exceed \$5,000,000. He founded the Corcoran Art Gallery at Washington, where he died Feb. 24, 1888.

Cordage. The word "cordage" is used in a comprehensive sense to include all sizes and varieties of the article from binder twine to a cable 15 inches in circumference, though strictly speaking the term is hardly applicable to a rope that is less than half an inch in diameter.

The materials employed for rope making are various, embracing hemp, flax, manila, sisal, jute, and other vegetable fibers. Sisal from Yucatan and East Indian jute are largely used for the manufacture of cheaper grades of rope and for binder twine. Russian and American hemp are preferred for standing rigging, owing to their ability to absorb a great amount of tar. Manila hemp is more extensively used in the manufacture of cordage than any other material, as its great pliancy and strength adapt it to a multitude of uses. Manila hemp is obtained from a species of wild plantain belonging to the banana family and is a native of the Philippine Islands. Its stem has a height of from 15 to 20 feet, is of a dark green color and very smooth on the surface. The fiber is round, silky looking, white and lustrous, easily separated, stiff, and very tenacious and also very light. These fibers, although in themselves not very large, are composed of very fine and much elongated bast cells. The length of the cells is about a quarter of an inch, and they are not, as commonly supposed, held together by an intercellular tissue or mucilaginous substance. The characteristic roughness possessed by Manila fiber is due entirely to mechanical causes, such as, for instance, the laceration of a cell in the separation from the leaf-stalk, or the subsequent opening out of the ends of the cells. While the fibers are weak transversely, they have great strength in the direction of their length. The tensile strength of Manila fibers will average over 30,000 pounds per square inch of section. The plantain is cut near the roots when from two to four years old, and the leaves cut off just below their expansion. The outer leaf is then stripped off, and the fibrous coats are left for a day or two in the shade to dry and then divided lengthwise into strips 3 inches wide. They are then scraped by an instrument made of bamboo until only the fibers remain. Bundles of fibers are shaken into separate threads, after which they are washed, dried, and separated according to quality and shipped in bales. From 150 to 200 trees are required to produce 140 pounds of fiber.

Sisal hemp is the product of the agave, a large genus of fleshy-leaved plants found chiefly in Mexico and Yucatan. The fiber is yellowish white, straight, smooth and

clean, and is about 25 per cent. weaker than Manila fiber. Much of the sisal hemp is prepared for export to the United States by machinery. Its consumption is fully as large as that of Manila, and it is chiefly used for binder twines.

The preliminary treatment of the fiber after it arrives at the cordage mill is approximately the same whether it be Manila or sisal, so that a description of one fiber will practically answer for the other. In one of the largest plants in the United States, taken as an example, there are a number of buildings devoted to the manufacture of various classes of cordage, and the ropewalk is two blocks in length. The binder twine mill is separate and is not run at all times of the year, as the work ceases in the spring when the orders for twine have been filled; the rest of the plant runs throughout the year. The bales of Manila hemp, averaging about 270 pounds each, are opened in the basement of the Manila twine mill, and after the material has been lightly shaken apart it is placed in layers which are sprinkled lightly with oil to soften and lubricate the fibers previous to their passage through the machinery. The first mechanical operation consists in passing the hemp over roughing cylinders bristling with sharp steel prongs or teeth which straighten out the fibers and remove the tow and fine broken particles, dirt or other foreign substances. It then passes to the breakers, which are large frames about 25 feet long, consisting of two endless chains studded with steel pins. The first chain runs slowly and feeds the fibers to the second, which runs much faster, the effect being to comb or straighten out the fibers and draw them into a "sliver" or ribbon. The hemp is then hoisted on elevators to the top of the building. Following this operation comes the passage of the hemp through the spreaders and drawing frames. These machines are similar to the breakers, but are smaller and furnished with steel pins and teeth of gradually increasing fineness which still further comb and straighten out the fibers, a number of slivers being put together behind each machine and drawn down to one sliver again at the end of each machine. One of our engravings shows a finisher which illustrates the type of all three machines. It will be seen that a number of slivers are being fed from the cans onto the drawing pins. This drawing is repeated a number of times with machines of various degrees of fineness, in order to make the sliver even, without which it would be impossible to spin fine, even yarn. The process is completed in a very fine drawing frame, called a "finisher," and from this the material finally emerges in complete readiness for spinning, having been drawn into slivers or small, soft ribbons in readiness for the spinning frames.

The small sliver is fed from one of the cans of the spinning jenny over the endless belt provided with needles, as in the breakers, spreaders, and finishers. These needles carrying the fiber move toward a conductor or "nipper" carrying the sliver with it. The sliver is by this time exceedingly small and is capable of passing through a small hole in the face plate of the nipper, where it is compacted in passing through the orifice. A jaw is controlled by a spring which can be regulated so as to adjust the size of the feed. As it leaves this part of the machine the twisting begins. The speed is 1,500 revolutions per minute. The yarn is twisted in a direction called right-handed, and feeds through a pulley by passing through the head block and moving face plate, and is finally warped around grooved pulleys in order to give the necessary strain to pull the compacted fibers through the nipper. It is then wound on the bobbin seen to the extreme left, about 1,000 yards being wound on it. A special mechanism traverses the bobbin in order that the yarn may be evenly wound. The attendants see that the sliver is regularly supplied and that any accidental breakages in the thread are repaired. The yarn is placed in small cars and sent to the various rope making departments. If a rope is to be tarred, the yarns are run through copper tanks filled with heated tar. The yarns enter through holes in an iron plate and are drawn through the tank by machinery. As the yarns emerge, the superfluous tar is removed by means of pressing rollers and the yarn is wound on bobbins. If the yarn is to be used for binder twine, the sisal hemp is spun finer than Manila, and after being spun the yarn, which is now on bobbins, is carried to the twine balling and packing room, where balling machines wind the yarn into balls of proper size.

Rope making is accomplished in various ways and is all done by machinery. The yarn is twisted into strands by means of machines called "formers," and the strands are twisted into rope by means of machines called "layers." If the rope is to be of moderate size, not exceeding one inch in diameter, the formers and layers are combined in one machine. The large machines are very impressive on account of their great size and the rapidity with which the finished product is turned out. In the Farmer machine there are many bobbins, which are arranged in three frames, each of which revolves independently around its own axis, and they are all carried around while in motion by a large frame which supports all three smaller frames. The threads from the various bobbins are passed through apertures in an iron plate, and the motion of each small frame serves to twist the yarn drawn from the bobbins into a strand. The three strands pass upward through

a "top" at the upper portion of the machine. As the strands come together they are twisted to form a rope by the movement of the entire machine carrying the three sets of bobbins, which are each rotating separately. The result is a finished rope. The new rope is rotated around several pulleys in order that the proper pull may be obtained to draw the rope tightly through the "top," and it is then wound on one of the reels. This rope can, of course, be used for any purpose and can be made of large size. For well-drilling and other purposes where rope of great strength but little flexibility is required, cables are used. Cables vary from 1,400 feet in length up and usually measure from $1\frac{7}{8}$ to $2\frac{1}{2}$ inches in diameter. They are composed of three Manila ropes instead of strands, and the ropes are twisted together with a very hard "lay," so that they will not untwist when used for drilling and so that they will resist wear in the continuous rubbing against the side of the casing and the wall of the wells. Owing to their length and construction, cables are always made on machines and not in ropewalk. On one of the machines in the factory under consideration, it is possible to make cables 15 inches in circumference. The reel containing the rope that has just been made, is now placed on a cable making machine. The principle of cable making is the same as rope making, only that actual ropes are used instead of strands. Each reel is turned around on a horizontal plane by means of gears, while it is paying out its rope. The entire machine carrying the three reels is turned simultaneously on a horizontal plane; the ropes are roved around various pulleys, and finally as they pass through a "top" at the upper part of the machine they are twisted together to form the cable, and then after being roved around grooved sheaves to obtain the necessary pull are reeled up by a power reel. When a sufficient length of cable is obtained, it is ready for shipment. In this plant there is a large horizontal rope and drilling cable laying machine, but the principle does not differ materially from the vertical machine.

Ropes of considerable size, towing lines and ships' cables of the largest dimensions are made on the ropewalk, which is 1,100 feet long and which passes under one cross street. The yarn is rewound on larger bobbins, and the number used depends on the size of the rope. These bobbins are put on a framework of wood, located near one end of the ropewalk, and the ends of the yarn are passed through holes in an iron gauge-plate, known as the face plate. It then passes through cast-iron tubes, and the yarn is fastened on hooks of the forming machine, which consists of a truck which travels on a track the entire length of the walk. There are as many hooks as there

are strands. As the former moves away from the face plate it draws the yarn with it, and at the same time each hook revolves by means of gears, twisting the yarn left-handed into a strand. The machine is actuated by a cable which lies along the floor of the ropewalk. The cable passes over a large wheel at the left and serves to operate the mechanism which turns the hooks, and at the same time winds up a cable attached to the end of a ropewalk, thus making its motion positive. When the forming machine has reached the upper end of the ropewalk, the strands, each 1,100 feet in length, are completed. They are now taken and laid over on the other side of the walk, and the strands are then ready to be "laid" or made into rope. Two laying machines are required, one at each end of the walk, and are known as the "upper" and "lower" machines. They also give the rope what is known as a fore turn and an aft turn. As many of these strands as are required for the rope are stretched to full length and are attached to hooks on the laying machine. The upper machine has several hooks, but only one is used. All the strands are fastened to this hook and they turn left-handed in laying, and the lower machine has as many hooks as there are likely to be strands and operates in the opposite direction. The strands are meantime placed in the grooves of a conical wooden block called a "top," through which is passed an iron bar which is fastened to an upright post of a car called a "top sled." Pieces of rope called "tails" are fastened on the bar and wound round the rope to be laid. They help regulate the lay and assist in giving the rope a finish-gloss. The top having been mitered between the strands as closely as possible to the top, the sled is gradually forced along as the twisting proceeds in a right-handed direction. The lower machine keeps all the strands from untwisting. The top sled finally arrives at the lower end of the walk, with the full length of completed rope behind it. It is then compactly coiled by a reeling machine, covered with burlap and shipped to its destination.

Corday, or Corday d'Armans, Marie Anne Charlotte, a young Frenchwoman of great beauty and courage, who became the murderess of the revolutionist Marat. She was born in St. Saturnin, near Seez, in Normandy, in 1768, was the granddaughter of the poet Corneille, and was gifted with superior understanding and a warm heart, glowing with the passion for liberty. Marat appeared to her the master-spirit of the atrocities perpetrated or threatened, and she determined to rid the country of him. She left her home, and on arriving in Paris (July 12, 1793), she went to Marat's house, but was not admitted. On Saturday, the 13th, she purchased a large knife, and at 7

Cordelier

o'clock in the evening procured admittance to Marat, with this weapon concealed under her garments. She had obtained this interview by writing to him that she was from the seat of rebellion, and would "put it in his power to do France a great service." Marat was in his bath. She, with desperate



CHARLOTTE CORDAY.

determination, plunged her knife into his bosom, and he instantly expired. She was condemned, and guillotined, July 17, 1793.

Cordelier, a fraternity of monks belonging to the Order of St. Francis. They arose in the 13th century. They wore a brown or black habit with a mantle and hood of the same color, and around their waist a cord of three knots. They are called also Friars Minor, and were the strictest branch of the Franciscans. They are mentioned in the "Romaunt of the Rose."

The word was also given to a political club which during the first French Revolution met in a chapel which had been built by the Cordeliers. It was formed in December, 1790, Danton being its first president. It took part in executing all the violent measures to which the extreme revolutionists had recourse, and in some cases was the first public body to demand them. It was dissolved in 1794, and several of its members executed.

Cordiaceæ, an order or sub-order of perigynous exogens, alliance *Solanales*. It is most closely akin to the *boraginaceæ*, and next to the *convolvulaceæ*. It consists of trees with alternate harsh scabrous exstipulate leaves; calyx inferior 4-5 toothed; corolla monopetalous 4-7 cleft; stamens 4-5; ovary 4-8 celled, each with 1 pendulous ovule. Fruit, a drupe 4-8 celled. The species are found in the tropics of both

Cordoba

hemispheres, in South America straggling into more temperate latitudes. Lindley enumerated eleven genera, and estimated the known species at 180. But 200 species of cordia itself are now known, Mr. Caruthers, F. R. S. makes the *cordiaceæ* a sub-order of *boraginaceæ*.

Cordierite, **Dichroite**, or **Iolite**, a natural silicate of magnesia, alumina, and ferric oxide. It crystallizes in stout orthorhombic prisms, and is of various shades of blue, sometimes with a tinge of gray or brown. It exhibits the property of dichroism very clearly, often appearing deep blue when viewed in the direction of the vertical axis, but red or yellow when seen by transmitted light at right angles to that direction.

Cordilleras, a name applied in America to various chains of mountains. The Cordilleras of South America are described under **ANDES**; and the Rocky Mountains are the Cordilleras of North America. Those of Central America extend from Darien to the N. of Mexico, and gradually increase in elevation from the Isthmus of Panama until they form magnificent plateaus and reach a height of more than 17,000 feet in Mexico.

Cordite, an explosive, the component parts of which are nitroglycerin, 58 per cent.; gun cotton, 37, and mineral jelly, 5. Acetone dissolves this combination, but evaporates in drying. One of the features that makes cordite valuable is that its two ingredients, which by themselves are dangerous to handle, are almost harmless combined. It can hardly be exploded by accident. While in a plastic state it is pressed through a die in the form of a thread or cord and wound upon reels to dry. This cord is made of various thicknesses to suit the arm for which it is designed, and is cut in lengths and tied in bundles to fit the cartridges. The machinery used in manufacture turns out the threads so true that the weighing of a charge is unnecessary.

Cordoba, a central province of the Argentine Republic, mostly pampa land, rising to the Sierras de Cordoba and de Pocho in the W. Area, 62,160 square miles; pop. (1905) 487,435. Copper and silver are mined, but cattle-raising and agriculture are the chief industries. The climate is healthy, but very dry; the temperature ranges from 18° to 107° F. The capital, Cordoba, lies in the valley of the Rio Primero, 246 miles W. N. W. of Rosario. It is regularly built, with open water-courses running through the streets, has street railways, a cathedral with a fine Moorish exterior, numerous other churches, a handsome city hall, the old university building, with walls from 4 to 6 feet thick, a na-

Cordoba

tional observatory, and noble baths. The university (1613) sank greatly after the expulsion of the Jesuits (1767), until in 1870 several German professors settled here. The town possesses also a national college, a school of art, and an academy of sciences, which publishes a valuable "Boletin." Founded by Cabrera in 1573, the town was famous during the Spanish occupation as a seat of learning and the center of the Jesuit missions in South America. Pop. (1906) 53,000.

Cordoba, a town of Mexico, 66 miles W. S. W. of Vera Cruz; in a fruitful valley, 3,045 feet above the sea. Formerly important, it sank greatly after the revolution; but in later years it has recovered its trade. It is surrounded by rich coffee-plantations. Pop., about 12,000.

Cordoba, an ancient city on the Guadalquivir, in Andalusia, Spain; capital of a province of the same name. A part of the town is of Roman, a part of Moorish origin; the streets are narrow and crooked; the principal square, however, is distinguished for its size and the beauty of its colonnade. The cathedral is a splendid building, originally a mosque, erected in the 8th century by King Abderahman. The city is well supplied with schools, hospitals, and other institutions. It has always carried on considerable trade; and under the Moors the leather exclusively manufactured there (cordovan) was exported in all directions. Cordoba, which was founded by the Romans, became the capital of Arabian Spain and the center of Arabian splendor and science under the caliphs of the West. At this time it is said to have had a population of 1,000,000. With the decay of the Moorish empire it fell into the hands of Ferdinand III. of Castile. The province includes the valley of the Guadalquivir. Pop. (1900) province, 455,859; city, 58,275.

Cordon, the coping of the escarp or inner wall of the ditch. It is usually rounded in front, and projects one foot over the masonry. Cordon sanitaire, a series of military posts stationed to cut off communication with a district or country where epidemic disease is raging.

Cordon Bleu, a knight of the ancient French Order of the Holy Ghost, at one time the most aristocratic order in the kingdom, whose decoration was attached to a blue ribbon or baldric. The knights frequently met in club form, and were noted for their excellent dinners, whence the term came to be applied to a cook of superior skill.

Cordon Grand, a term applied to a member of any grade of the French Legion of Honor, because the cross of the order is always suspended from a broad ribbon.

Cordova, **Francisco Hernandez de**, a Spanish soldier and explorer; born about

Corfu

1475. In 1514 he went to Panama with Pedrarias and was sent by him to take possession of Nicaragua. He founded Granada, Leon, and other towns, and discovered the outlet of the lake. He was afterward accused of disloyalty in trying to set up an independent government, and was seized by Pedrarias and beheaded, in March, 1526.

Corea. See KOREA.

Coregonus, a genus of abdominal fishes, family *Salmonidæ*. The teeth are very small or wanting, the scales very large, the height or front of the first dorsal greater than its breadth.

Corelli, Arcangelo, an Italian musician; born in 1653. By his sonatas for the violin, and by his concerti, he may be considered, as it were, the creator of a new species of harmony, especially for his own instrument, the violin. He died in 1713.

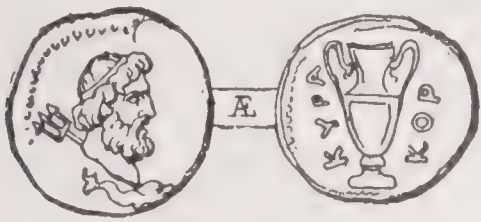
Corelli, Marie, an English author; born in Italy in 1864. In infancy she was adopted by Dr. Charles Mackay, the author, and at his death was left in the guardianship of his son, W. S. Eric Mackay, also an author and poet. She was educated in London, and on beginning her literary career adopted as a pen name that which subsequently became her legal name. Her writings were greatly admired by Queen Victoria, and to the former she sent by request an advance copy of each of her books. She has published "A Romance of Two Worlds"; "Vendetta"; "Thelma"; "Ar-dath, the Story of a Dead Self"; "Worm-wood"; "The Soul of Lilith"; "Barab-bas"; "The Silence of the Maharajah"; "The Sorrows of Satan" (the last two in 1895); "Cameos" and "The Mighty Storm" (both 1896); "The Master Christian" (1900), etc.

Corfe Castle, a village-borough of Dorsetshire, in the "Isle" of Purbeck, 4 miles S. E. of Wareham. Its famous castle, dating from early Norman times, is the traditional scene of the murder of King Edward the Martyr, by his stepmother, Elfrida (979); and more than 20 knights, "most noble and valorous in arms," were put to death within its walls by King John. In 1643 it was gallantly defended by Lady Bankes for six weeks against 600 Round-heads. Taken through treachery two years later, it was dismantled; and its beautiful ruins, with their "hanging towers," cover nearly 3½ acres.

Corfu (anciently *Corcy'ra*), a Greek island in the Mediterranean, the most northerly of the Ionian Islands, at the mouth of the Adriatic, near the coast of Albania, about 40 miles long, and from 15 to 20 wide; square miles, 431. The surface rises at one point to the height of 3,000 feet, the scenery is beautiful, the climate pleasant and healthy, the soil fertile. Oranges, cit-

Coriander

rons, grapes, honey, wax, oil, and salt are abundant. A Corinthian colony settled in the island in the 8th century B. C. The Venetians possessed Corfu from 1386 to 1797, the British from 1815 to 1864. Pop. (1896) 124,578. Corfu, the capital, is finely situated on a promontory which terminates in a huge insulated rock crowned



COIN OF CORCYRA.

by the citadel; the streets are Italian in style; chief edifices, the cathedral, government palace, and Ionian academy. There is a good harbor and considerable trade. Pop. (1896) 17,918.

Coriander, an umbelliferous plant, *Coriandrum sativum*. It has an erect, leafy stem, the lower leaves bipinnate, the upper more divided, the uppermost of all nearly setaceous. Fruit globose, nearly undivided, with 10 obscure lines or ribs. It has escaped from cultivation and become wild in many places. It is a native of Southern Europe and the Levant.

The word occurs in Exod. xvi: 31, and Num. xi: 7. It is the rendering of the Hebrew word *gad*, and the translation is probably correct, for Celsus says that *goid* is coriander.

Corigliano (kō-rēl-yē-a'nō), a town of Southern Italy, in the province of Cosenza, on a hill above the right bank of the Corigliano, near the site of the ancient Sybaris, of which no vestiges remain. Pop., 13,272.

Corinna (kō-rin'ä), a Greek poet; born in Tanagra, Bœotia, about 500 B. C. She was a contemporary of Pindar, sometimes his competitor for poetical prizes. She was celebrated for her beauty, and nicknamed "The Fly" to distinguish her from another poet called "The Bee." Only fragments of her poems have been preserved.



COIN OF CORINTH.

Corinth, a famous city of Greece within the Morea (ancient *Peloponnesus*), near the isthmus of the same name, between the gulfs of Lepanto (*Corinthiacus Sinus*) on the W., and of Ægina (*Saronicus Sinus*)

Corinth, Isthmus of

on the E., 48 miles W. of Athens. Corinth was destroyed by an earthquake in 1858, and has now but few remains of its ancient splendor. The traces of the ancient walls are still discernible, but the principal and only interesting monument of antiquity is the citadel or Acrocorinthus. Corinth was first founded by Sisyphus, son of Æolus, A. M. 2616, and received its name from Corinthus, the son of Pelops. It was totally destroyed by L. Mummius, the Roman consul, and burnt to the ground, 146 B. C. The government of Corinth was monarchical till 779 B. C., when officers, called Prytanes, were instituted. Its inhabitants formed numerous colonies, and Paul preached the Gospel in it for upward of a year. After the taking of Constantinople, it fell into the hands of the Turks, from whom it was retaken in 1687, by its former possessors, the Venetians. In 1715 it was again possessed by the Turks, who held it till 1823. As it now stands, the town is still of considerable extent, but the houses are placed wide apart, much space being occupied by gardens, and the population is not above 4,500.

Corinth, a city and county-seat of Alcorn county, Miss., on the Mobile and Ohio and the Memphis and Charleston railroads, 93 miles E. of Memphis, Tenn. It has machine shops, woolen mills, and other industries. During the Civil War Corinth was the scene of many battles. Brisk skirmishes were fought April 24 and 29, 1862, and on the 30th its railroad communications N. were cut by the Union forces. During May of the same year several encounters took place here. Early on the morning of Oct. 4, the combined Confederate forces, under Van Dorn, Price, and Lovell, attacked the Union lines at Corinth. The fight lasted until night closed the contest. The Union army was driven back into the town. The battle was renewed next morning, and raged fiercely till noon, when the Confederates were repulsed and retreated. The Confederates numbered in this fight 38,000 men; while General Rosecrans, who commanded the Union army, had not over 20,000. The Union loss was 315 killed, including General Hackelman, 1,812 wounded, and 232 missing; the Confederate loss was 1,423 killed; wounded estimated at 5,692; 2,248, including 137 officers, taken prisoners; and 3,300 stand of arms, 14 stand of colors, together with vast quantities of stores of all kinds. Pop. (1900) 3,661; (1910) 5,020.

Corinth, Gulf of, a beautiful inlet of the Mediterranean, about 80 miles long, between the Peloponnesus and Northern Greece, having the Isthmus of Corinth closing it in on the E.; also known as the Gulf of Lepanto.

Corinth, Isthmus of, the isthmus which connects the Morea (Peloponnesus) with

Northern Greece, varying in width from 4 to 8 miles. A canal, about 4 miles long, was constructed across the isthmus in 1882-1893, which enables vessels to sail from the Archipelago to the Adriatic without rounding Cape Matapan.

Corinthian Order, that order of Grecian architecture of which the most characteristic feature is the capital of the column, which is adorned with beautifully carved acanthus leaves, but varies considerably in minor details. The column is generally fluted, with a fillet between the flutings, and stands upon a base. The entablature is variously decorated, especially the cornice; the frieze may be quite plain, or sculptured with foliage and animals. The Corinthian order was not very common in Greece before the time of Alexander the Great; among the Romans it was much employed.

Corinthians, Epistles to the, two epistles addressed to the Church at Corinth about A.D. 57 or 58, which have been admitted as genuine writings of St. Paul by even the most critical assailants of the New Testament canon. They are most instructive from the insight which they furnish into the character of St. Paul himself, and the constitution, parties, and heresies of the apostolic Church.

Coriolanus, Caius, or Cnæus Marcius, a Roman patrician, surnamed Coriolanus from his heroism at the capture of the Volscian town of Corioli (493 B. C.). Of a proud and haughty spirit, he was strongly opposed to the plebeians, who refused to elect him when a candidate for the consulship. After this, during a time of famine, he argued in the Senate against a gratuitous distribution of corn which had arrived from Sicily unless the plebeians should give up their tribunes, but lately instituted. For this he was impeached and banished. He took refuge among the Volscians, whom he aided in their war with the Romans. His victories at the head of his Volscian troops alarmed the Romans, who, on his approach to their city, sent a variety of deputations to plead with him. He was deaf to every entreaty. At last, the noblest matrons of Rome, headed by his old mother Veturia, and his wife Volumnia, leading her two children, came to his tent. (Shakespeare follows Plutarch in calling the mother Volumnia, while the wife is Virgilia.) Their tears cooled his fierce desire to be revenged on those who had dishonored him, and he led back the Volsci to their own territories.

Cork, a city in the S. of Ireland, capital of the county of Cork, situated on the river Lee. It is 15 miles from the sea, and besides an upper harbor at the city itself, and quays extending over 4 miles in length, there is a lower harbor at Queenstown, 11 miles below. The entrance, deep and nar-

row, is strongly fortified on each side. Cork is the third city in Ireland, and exports great quantities of grain, butter, bacon, eggs, and live stock. The principal industries are tanning, distilling, brewing, and the making of tweeds and friezes. There are also iron foundries and yards for the building of iron ships. The principal buildings are the Protestant and Roman Catholic cathedrals, exchange, custom-house, chamber of commerce, court-house, Queen's College, etc. There is a naval dockyard at Haulbowline, an island within Cork harbor. Pop. (1901) municipal borough, 76,122; Parliamentary borough, 100,022.

Cork, the outer layer of bark of the cork oak. It is a very elastic tissue consisting of thin-walled nearly cubical cells. It does not peel off, but often contains long clefts. It forms a protection to the subjacent cells from injurious influences.

In chemistry, cork twice boiled with alcohol has about 10 per cent. dissolved. The extract deposited is first Cerin, $C_{17}H_{28}O$, a white substance melting at 100° , then an amorphous acid melting at 86° , called decacrylic acid, $C_{10}H_{18}O_2$; afterward, on further evaporation, a fatty substance melting at 150° is deposited, called eulysin, $C_{24}H_{36}O_3$. The remainder of the liquid, evaporated to dryness, leaves a mass which, repeatedly boiled with water, yields to that liquid a tannic acid, separating from the aqueous solution in dark red flocks. Its solution forms with gelatine a yellow, with tartar emetic a brown, precipitate, and reduces an ammoniacal silver solution in the cold. Potash and ammonia color its solution red, baryta water gives a dark-colored precipitate. The calcium salt has the formula $(C_{27}H_{21}O_{17})_2 \cdot Ca + 8H_2O$. The aqueous extract when further evaporated deposits a red brown precipitate called corticic acid. The portion insoluble in water of the residue obtained by evaporating the original alcoholic extract has nearly the appearance of the original cork substance; it dissolves easily and almost completely in boiling alcohol, and partly separates on cooling as a jelly. Its alcoholic solution evaporates on paper, and penetrates the paper like fat. The portion of cork insoluble in alcohol is called suberin, which is a modified form of cellulose. Cork oxidized with nitric acid yields oxalic, suberic, and ceric acids.

Cork, Fossil, a kind of mineral, a species of asbestos.

Cork, Great Earl of. See BOYLE, RICHARD.

Corking Pin, a pin of a large size, formerly used for fixing a lady's head-dress.

Corliss, George Henry, an American inventor; born in Easton, N. Y., June 2, 1817. The construction of stationary steam-engines was revolutionized by his

improvements and a single engine made by him moved all the machinery in the Centennial Exposition of 1876. He died in Providence, R. I., Feb. 21, 1888.

Cormorant (a corruption of the French words *corbeau marin*), the trivial name of a genus of aquatic birds included by Linné under *Pelecanus*, but properly removed thence by Brisson, to form a distinct genus, denominated *Phalacrocorax*. The cormorants belong to the family *Totipalmati* of Cuvier, *Steganopodes*, Illig. They are aquatic birds, having the great toe united to the others by a common membrane, and their feet are thus most admirably adapted for swimming; yet they are among the very few web-footed birds capable of perching on the branches of trees, which they do with great ease and security. The feet are short, robust, and rather turned outward; the legs are wholly feathered, and closely drawn toward the belly; the tarsus is naked, one-third shorter than the outer toe, much compressed, and carinated before and behind. The outer toe is the longest, and edged externally by a small membrane; the webbing membrane is broad, full, and entire; the hind toe is half as long as the middle, and all are provided with moderate-sized, curved, broad, bluntish nails, the middle one being serrated on its inner edge, and equal to the others. The wings are moderate and slender, with stiff quills, of which the second or third primaries are longest; the tail is rounded, and composed of 12 to 14 rigid feathers.

About 15 species of cormorant are at present known, and are distributed over the whole world, engaged in the same office—that of aiding to maintain the due balance of animal life, by consuming vast numbers of the finny tribes. Like the pelicans, to which they are closely allied in conformation and habits, the cormorants reside in numerous families near the waters whence they obtain fish. It is scarcely possible to imagine any animal better adapted to this mode of life, since they dive with great force, and swim under water with such celerity that few fish can escape them. While engaged in this chase they not only exert their broadly-webbed feet, but ply their wings like oars to propel their bodies forward, which, being thin and keel-shaped, offer the least degree of resistance to the water. They swim at all times low in the water, with little more than their head above the surface, and, therefore, though large birds, might easily be overlooked by one unaccustomed to their habits. Should a cormorant seize a fish in any other way than by the head he rises to the surface, and tossing the fish into the air, adroitly catches it head foremost as it falls, so that the fins, being properly laid at the fish's sides, cause no injury to the throat of the bird. When standing on shore the

cormorant appears to very little advantage, both on account of the proportions of its head, neck, and body, and because of its awkward manner of keeping itself erect, being under the necessity of resting upon its rigid tail feathers. But, mounted in air, these birds are of swift and vigorous flight, and when desirous of rest alight on the branches of tall trees or the summits of rocks, where they delight to spread their wings and bask for hours in the sun.

That the services of birds, which are such excellent fishers, should be desired by man, is by no means surprising, and it is well known that the Chinese have long trained cormorants to fish for them. This training is begun by placing a ring on the lower part of the bird's neck to prevent it from swallowing its prey. After a time the cormorant learns to deliver the fish to its master without having the ring on its neck. It is said to be a very interesting sight to observe the fishing boats, having but one or two persons on board and a considerable number of cormorants, which latter, at a signal given by their master, plunge into the water, and soon return, bringing a fish in their mouths, which is willingly relinquished. The male and female resemble each other in size and plumage, but the young especially when about a year old, differ greatly from the adult birds. The common cormorant of Europe, *P. carbo*, which is found over the greater part of the world, is not uncommon on the British coasts. It is larger than a goose, but has a smaller extent of wing. It has been trained in England to catch fish. Another British cormorant is the green cormorant or shag (*P. graculus*). It is smaller than the common cormorant. The little cormorant (*P. Pygmaeus*) is another European species, but has not been met with in the British Isles. It is common in Hungary and other parts of Eastern Europe. Four or five species of cormorants are known to be inhabitants or occasional visitors of the American continent; but with the exception of *P. graculus* which is very common and breeds in Florida (though also abundant within the Arctic and Antarctic circles), they are rather rare, and only seen during winter in the United States. In some parts of Europe frequented by species of the cormorant, they commit great depredations on the fish ponds which are kept for the purpose of supplying the tables of the proprietors, and in Holland they are said to be especially troublesome in this way, two or three of these greedy birds speedily clearing a pond of all its finny inhabitants. From their great voracity and entirely piscivorous regimen, it will readily be inferred that their flesh promises very little to gratify the epicure. It is so black, tough, and rankly fishy, that few persons venture on it more than once,

where anything else can be had. Nevertheless, naval officers, and others, condemned by the nature of their service to situations where they are long debarred from fresh provisions, sometimes have the cormorant served at their tables, after skinning it, and endeavoring by the artifices of cookery to disguise its peculiar flavor.

Corn, Indian, also known as MAIZE, a genus of grasses having monœcious flowers; the male flowers forming a loose panicle at the top of the culm; the female flowers in axillary spikes, inclosed in large, tough spathes, from which only the extremely long styles—in the common species six to eight inches in length—hang out like tufts of feathers or silken tassels. The grains are large, roundish, compressed, naked, and arranged in parallel rows along the upright axis of the spike. The Common Indian Corn is generally believed to be a native of the warmer parts of America, where it was cultivated by the aborigines before the discovery by Columbus; but a representation of the plant found in an ancient Chinese book in the royal library in Paris, and the alleged discovery of some grains of it in the cellars of ancient houses in Athens, have led some to suppose that it is a native also of the East, and has, from a very early period, been cultivated there, and even that it is the “corn” of Scripture; although, on this supposition, it is not easy to account for the subsequent neglect of it until after the discovery of America, since which the spread of its cultivation in the Old World has taken place with a rapidity such as might be expected from its great productiveness and other valuable qualities. Columbus himself took it to Spain.

The principal corn-producing countries of the world are the Argentine Republic, Austria-Hungary, Bulgaria and Eastern Rumania, Canada, Egypt, Italy, Rumania, Russia, the United States, and Uruguay. The combined production in the calendar year 1906 was reported at 3,832,775,000 bushels, the yield of the United States alone being 2,927,416,091 bushels, valued at \$1,166,626,479. In the calendar year 1909 the United States production was 2,772,376,000 bushels, valued at \$1,652,822,000.

Cornaceæ, cornels, an order of epigynous exogens, alliance *Umbellales*. They are mostly trees or shrubs with opposite exstipulate leaves, capitate, umbellate, or corymbose flowers, with four sepals, four stamens, a filiform style, a simple stigma, a two-celled drupe, with a solitary pendulous seed in each. They are found in Europe, Asia, and the United States. In 1844 Lindley enumerated nine genera, and estimated the known species at 40.

Corn Cockle, the common name of *Agrostemma* (*Lychnis*) *Githago*. When its seeds

become mixed with those of the grain among which they grow, and are ground with them, it is said the effect is to render the grain unwholesome.

Cornbury, Edward Hyde, Lord, English governor of New York, was the son of the Earl of Clarendon, and one of the first officers who deserted the army of King James. King William, in gratitude for his services, appointed him governor of New York. He began his administration as a successor of Lord Bellamantin, 1702. He was a bigot in religion, and oppressive and unjust in his administration of the government. He died in London, April 1, 1723.

Corncracker State, Kentucky; whose people are often called “Corncrackers.”

Corn Crake, or Landrail, a species of bird of the order *Grallæ*, or waders, and of the family *Rallidæ* or rails. The crakes differ from the rails proper in having the bill shorter. The common crake of Great Britain is of a reddish brown color. It lives in fields and meadows, and nestles and runs among the long grass. The name is expressive of its cry. It feeds on worms and insects. It is a bird of passage, frequenting the northern parts of Europe during summer, and the southern, including the Mediterranean coasts of Africa in winter.

Cornea, one of the coats of the eye, a transparent membrane in the forepart of it.

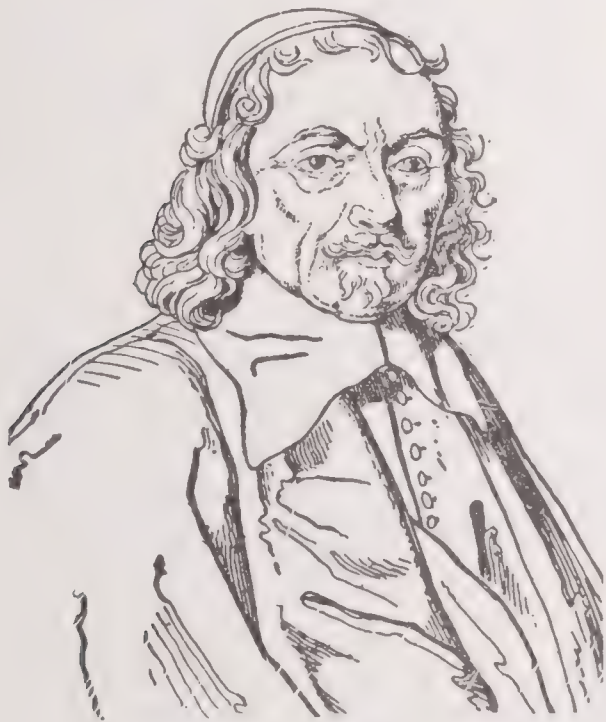
Corneille, Pierre, the father of French tragedy and classic comedy; born in Rouen in 1606, at which place his father was advocate-general. He began his dramatic career with comedy, and a series of vigorous dramas, “*Mélite*” (1629), “*Clitandre*,” “*La Veuve*,” “*La Suivante*,” etc, announced the advent of a dramatist of a high order. In 1635 he entered the field of tragedy with “*Medea*,” but it was not till the appearance of his next work, the famous “*Cid*,” that Corneille’s claim was recognized to a place among the great tragic poets. The “*Cid*” was an imitation of a Spanish drama, and though gravely defective in the improbabilities of the plot and other respects, achieved an immense success for a certain sublimity of sentiment and loftiness of ideal, which are the native characteristics of Corneille’s poetry. After the “*Cid*,” appeared in rapid succession “*Horace*” (1639); “*Cinna*” (1639), his masterpiece, according to Voltaire; and “*Polyeucte*” (1640); works which show Corneille’s genius at its best. Besides his dramas he wrote some elegies, sonnets, epistles, etc., as well as three prose essays on dramatic poetry. As a dramatist his merits are loftiness of sentiment and conception, admirably expressed in a bold and heroic style of versification and language. But in this constant straining after a heroic ideal he was apt to fall into an inflated style. He died in 1684.

Corneille

Corneille, Thomas, a French dramatist, brother of Pierre; born in 1625. He made his first success with a comedy, "Chance Engagement" (1647), after Calderon, and continued for a while to follow Spanish models. Some of his tragedies were much admired; and one, "Timocrates," held the boards for six months. In Voltaire's judgment "Âriana" is the best of his tragedies; both that play and "The Earl of Essex" are still seen on the French stage. By his "Dictionary of Arts and Sciences" and other similar works, he was a forerunner of the French Encyclopedists. He died in 1709.

Cornel, a tree (*Cornus sanguinea*) called the corne-tree, the female cornel, prickwood, dogberry-tree, dogwood-tree, hounds-tree, gaten, and gaten-tree. Its seeds furnish lamp-oil.

Cornelia, an illustrious Roman lady; a daughter of Scipio Africanus, wife of Tiberius Sempronius Gracchus, and mother of the two famous tribunes. She was of a grave and dignified deportment, and possessed so great a control over her feelings, that when a friend condoled with her on the death of her sons, she replied, "The woman who had the Gracchi for sons cannot be considered unfortunate." Her literary talents must have been considerable, as Cicero very highly commends some of her epistles. She lived in the second century B. C., and after her death the Romans erected a statue to her memory, bearing the inscription, "To Cornelia, the mother of the Gracchi."



PIERRE CORNEILLE.

Cornelian, a cornel cherry (*Cornus mas* or *mascula*). It has little clusters of yellow, starry flowers studding its naked branches in early spring. It was formerly cultivated for the sake of its fruit, which is like a small plum, very sour till over-ripe, but then becoming more grateful to

Cornelius

the palate, being only sub-acid. The Turks use it as an ingredient in sherbet. The fruit and leaves were formerly employed as astringents. It is sometimes called also the male cornel.

Cornelius, Peter, a German musician and writer; born in Mayence, Dec. 24, 1824.



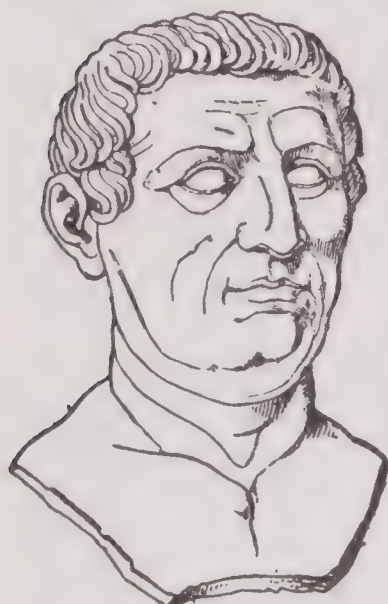
THE CRUCIFIXION, BY CORNELIUS.

He was first an actor, but became a follower of Wagner and wrote "The Barber of Bagdad," "The Cid," and other successful operas. He also brought out a volume of "Lyric Poems." He died in Mayence, Oct. 26, 1874.

Cornelius, Peter von, a German painter; born in Düsseldorf, Sept. 23, 1783. He early exhibited a taste for art, and studied the great masters, especially Raphael. In 1811 he went to Rome, where, in conjunction with Overbeck, Veit, and other associates, he may be said to have founded a new school of German art, and revived fresco-painting in imitation of Michael Angelo and Raphael. He left Rome in 1819 for Düsseldorf, where he had been appointed director of the academy, but he soon settled in Munich to give his whole attention to the painting of the Glyptothek and the Ludwigskirche there. In these two great works he was assisted by his Munich pupils. In 1833 he made another visit to Rome, and in 1839 he visited Paris. In 1841 he was invited to Berlin by Frederick William IV., who intrusted him with the painting of the royal mausoleum or Campo Santo. The most celebrated cartoon in this series is the Four Riders of

the Apocalypse. The series consists of twelve paintings, which have been engraved. Cornelius, a true representative of modern German thought, introduced into art a metaphysical and subjective element which is easily liable to be abused; and in his work grandeur of conception and elevation of tone have to make up for the want of the finest natural effects. He died in Berlin, March 6, 1867.

Cornelius Nepos, a Roman author of the first century B. C., the contemporary of Cicero and Catullus. The only extant work



CORNELIUS NEPOS.

attributed to him is a collection of short biographies, probably an abridgement of a work written by Nepos. These biographies have long been a favorite school-book, and popular editions of them are very numerous.

Cornell, Ezra, an American philanthropist; born in Westchester Landing, N. Y., Jan. 11, 1807. He accumulated a large fortune and

is best known as the founder of Cornell University. He began life as a mechanic and miller at Ithaca, N. Y., and subsequently became a contractor for the erection of telegraph lines. He was a member of the State Assembly in 1862-1863 and of the State Senate in 1864-1867. He died in Ithaca, N. Y., Dec. 9, 1874.

Cornell College, a co-educational institution in Mt. Vernon, Ia.; organized in 1857, under the auspices of the Methodist Episcopal Church; has grounds and buildings valued at over \$275,000; scientific apparatus, etc., \$32,000; productive funds, over \$650,000; volumes in the library, about 32,000; average ordinary income, about \$65,000; number of faculty, about 40; average student attendance, about 735.

Cornell University, a non-sectarian, co-educational institution, at Ithaca, N. Y., owing its origin to the Land Grant Act of Congress of 1862, "donating public lands to the several States and Territories which may provide colleges for the benefit of agriculture and the mechanic arts." It is named in honor of the late Ezra Cornell, who promised the State \$500,000 with which to erect buildings for the new university, the terms of the land grant forbidding the use of its proceeds for that particular purpose, on condition that it should be

located at Ithaca. His gifts amounted in all, however, to about \$750,000. The University received besides Mr. Cornell's endowment, 990,000 acres of public domain, and large gifts from Henry W. Sage for a women's dormitory, a chapel, a library, a school of philosophy, a museum of archaeology, etc., all generously endowed, John McGraw for a building devoted to museums and scientific laboratories, Hiram Sibley for a college of mechanical engineering and mechanic arts, Andrew D. White a priceless historical library, etc., Hiram W. Sibley for extending and enlarging the Sibley College of Mechanical Engineering, Dean Sage a fund for supplying the college pulpit, etc., A. S. Barnes a Christian Association building, William H. Sage for the chapel organ, the purchase of the great Zarncke library, a stone bridge, and in conjunction with Dean Sage, an endowed infirmary for sick students, Oliver H. Payne for the Cornell Medical College, and others. The total property valuation of Cornell in 1900 was \$10,420,222.29. The total invested funds were \$7,327,506.48, total income for 1900, \$841,288.55, of which \$191,191.83 represented tuition fees. Grounds, buildings, equipment, and other property used by the University were estimated at \$3,092,715.81, not including the new Medical College in New York, estimated at \$1,000,000, but not then entered on the books. The library comprised 238,676 volumes and 39,000 pamphlets. The book funds were \$300,000, and the average annual growth of the library was about 13,000 volumes. The instructing staff numbered 366, including 51 non-resident lecturers. The total attendance during 1899-1900, after deducting for duplications, was 2,766, of whom 174 were candidates for advanced degrees, A. M. and Ph. D., 680 for A. B., 178 for LL. B., 333 for M. D., 88 for B. S. A., 30 for D. V. M., 20 for B. S. F., 43 for B. Arch, 203 for C. E., and 571 for M. E. In all 5,632 degrees had been granted, and there were about 5,000 living graduates.

The broad scope and many-sidedness of Cornell are based on Ezra Cornell's proposition, "I would found an institution where any person can find instruction in any subject," in which the more specific purpose of the national donors was absorbed and included. Since provision was made for women in the early seventies they have formed from 10 to 15 per cent. of the student body. The University annually grants free tuition to 600 students of New York State, also to students in Agriculture, and to New York State students in Veterinary Medicine.

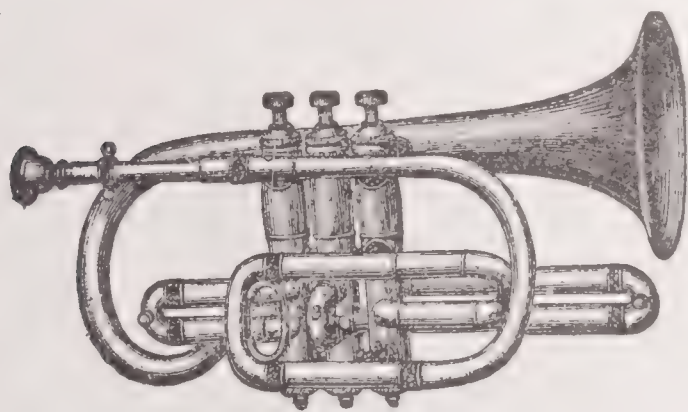
The property valuation of the university now exceeds \$15,000,000. It includes the aggregate of its endowment funds, over \$8,800,000; the value of its buildings, over

Cornet-a-Piston

\$4,000,000; value of its grounds, \$300,000; value of its scientific apparatus, machinery, and furniture, \$1,215,000; and value of its library, which contains nearly 400,000 bound volumes, and over 40,000 pamphlets and MSS., over \$720,000. The faculty numbers about 575, and the average student attendance, including the summer school, is over 4,800.

Jacob Gould Schurman, LL.D., became president of the university in 1892, and among the famous professors on its past and present faculty lists are Goldwin Smith, English History; Burt Green Wilder, Neurology; Thomas Frederick Crane, Romance Languages; Hiram Corson, English Literature; John Henry Comstock, Entomology; Moses Coit Tyler, American History; Robert Henry Thurston, Mechanical Engineering; Edward Leamington Nichols, Physics; Liberty Hyde Bailey, Horticulture; Jeremiah Whipple Jenks, Political Science and Civil and Social Institutions; George Lincoln Burr, Mediæval History; Francis Miles Finch, History and Evolution of the Law; Henry Morse Stephens, Modern European History; James Edwin Creighton, Logic and Metaphysics; Harris Joseph Ryan, Electrical Engineering; William Frederick Durand, Naval Architecture; Edward Bradford Titchener, Psychology; Ralph Stockman Tarr, Geology; Veranus Alva Moore, Bacteriology; Walter Francis Willcox, Social Science and Statistics; Charles DeGarmo, Education; and Lewis Atterbury Stimson, Surgery. H. C. HOWE.

Cornet-a-Piston, a metallic wind-instrument of the trumpet class, furnished with valves and stoppers. It was formerly called a cornopean. Its quality is midway between that of the bugle and the trumpet.



CORNET.

It is frequently used in orchestras where a trumpet is not obtainable, and also in church service in conjunction with the organ.

Corneto, a picturesque, medieval-looking town of Central Italy, 12 miles N. of Civita Vecchia, 3 miles from the Mediterranean. Corneto rose out of the ruins of the Etruscan city of Tarquinii, whose remains, within a mile and a half of Corneto,

Corning

are among the most important for the student of Etruscan history. The painted tombs, of which some 20 are specially interesting, were known in the 18th century; but it is mainly since 1842 that they have been examined; valuable new discoveries were made during excavations in 1881-1882.

Corn Flour, a name applied to the finely ground flour of maize or Indian corn; also known in the United States as corn meal.

Corn Flower, a well-known composite weed of cornfields, universally known and admired for the beauty of its wreath-like



CORN FLOWER.

circle of outer barren florets, and the splendid deep azure of their hue. It was formerly of some little medicinal repute, and its blue flowers were used in domestic dyeing; from early times, too, it has been used for decoration in wreaths and garlands. This use became specially prominent in Germany after 1870, on account of its being the Emperor William's favorite flower.

Cornice, or **Cornice Road**, a famous highway between France and Italy skirting the Mediterranean throughout the length of the Riviera. The word cornice means literally "shelf," in allusion to the fact that for miles the road is cut in the face of the cliffs. The modern road was a work of formidable difficulty; it was begun by the French, and finished by the Sardinian government after the fall of Napoleon.

Corniferous Period, in geology, the second of the five divisions of the Devonian age, sometimes included with the first under the name of Lower Devonian. It contains the earliest discovered remains of fishes.

Corning, a city and county-seat of Steuben county, N. Y.; on the Chemung river and several railroads; is widely known for its extensive foundries, glass factories, railroad car works, and the coal mines in its vicinity. Pop. (1910) 13,730.

Corning

Corning, Erastus, an American merchant, born in Norwich, Conn., Dec. 14, 1794. He became clerk in his uncle's hardware store in Troy when 13 years old, and in the business house of James Spencer in Albany when 20, where he was afterward admitted to partnership; engaged in the banking business, and applied much of his time and means to the development of the railroad system of New York State. He effected the consolidation of various roads into the New York Central Railroad, and was its president 12 years; was State Senator in 1842-1845, member of Congress in 1857-1859 and 1861-1863; member of the Peace Congress in 1861, regent of the University of New York in 1833, and vice-chancellor of the board. He died in Albany, N. Y., April 9, 1872.

Cornish Diamond, a variety of quartz found in Cornwall, and employed even in the 16th century for personal ornaments. This variety being now scarce, ordinary rock-crystal is often used instead.

Cornish Engine, a single-acting steam-engine used for pumping water. The pump-rods, appended to one end of the beam, are loaded so as by their gravity to have sufficient force to raise the water, and the downstroke of the steam piston at the other end of the beam is used to raise them.

Cornish Language, a Celtic dialect spoken in Cornwall, which died out in the 18th century, though isolated words or terms are still in use, and some fragments of literature are still extant. It is allied to the Welsh and Breton.

Corn Laws, various enactments of the British Parliament. The exportation of corn from England, except in certain cases, was prohibited by 34 Edward III. c. 20, 1361. The law was modified, and, in 1436, exportation was permitted by 15 Henry VI. c. 2, provided the home-price did not exceed 6s. 3d. per quarter. The importation of corn, unless the price of wheat exceeded 6s. 3d. per quarter, was prohibited by Edward IV. c. 2, 1463. The importation of corn was heavily taxed by 22 Charles II. c. 8, 1670, and also by 1 William and Mary, c. 12, 1689. The rapid increase of population, however, led to successive alterations in the regulations respecting importation. Mr. Robinson's Act, 55 George III. c. 26 (March 23, 1815), removed all restrictions on foreign corn imported in order to be warehoused, and permitted its importation for home consumption when at 80s. per quarter. This bill was very unpopular, and occasioned serious riots in London and Westminster, March 6-9. By 3 George IV. c. 60, 1822, the importation price was reduced to 70s. per quarter. Mr. Canning's Corn Bill, proposed March 1, 1827, passed the House of Commons, but was rejected by the Lords.

Cornus

Several modifications were embodied by 9 Geo. IV. c. 60, 1828, which is known as the sliding-scale, because the duty varied, and by 5 Victoria c. 14, 1842. Sir Robert Peel's Corn Importation Bill, 9 and 10 Victoria c. 22, 1846, reduced the duty on all corn imported at from 53s. per quarter to 4s. till Feb. 1, 1849, when the duty was reduced to 4s. per quarter. Since 1869 there has been no duty on corn.

Corn Salad, or **Lamb's Lettuce**, a genus of *Valerianaceæ*, humble annual weeds, of which some are used as spring salads, especially in France and Germany. The commonest species is *V. olitoria*, which is naturalized in the United States, and often called fetticus or vetticost. There are several native American species.

Corn Sawfly, a *hymenopterous* insect, family *Tenthredinidæ*. The eggs are deposited on the stalks of wheat and rye, to which they are very destructive.

Cornstone, an arenaceous or siliceous limestone, often mottled, and not infrequently concretionary. It usually occurs in those systems which are largely composed of reddish sandstones.

Cornucopia, the horn of plenty, a horn wreathed and filled to overflowing with flowers, fruit, corn, etc. It was the symbol of plenty, peace, and concord. It was fabled to have been a gift from Jupiter to his nurse, the goat Amalthæa. It was a frequent attribute of Ceres.

In botany, *Cornucopiæ* is a genus of grasses, tribe *Phalereæ*. The only known species is the *C. cucullata* (horn of plenty grass), often cultivated in gardens. It is a native of Greece and Asia Minor.

Cornus, a genus of plants, the typical one of the order *Cornaceæ*. Calyx, four-toothed; petals, four superior; stamens, four. Fruit, drupaceous, two-celled, two-seeded. *C. sanguinea* has an aborescent stem, five to six feet high, with straight branches, the older ones dark red, the strongly-nerved leaves, which are opposite, at first green on both sides, becoming dark red before they fall; the inflorescence consisting of cymes studded with numerous white flowers; no involucre. It is found in woods and thickets, especially on a chalk or limestone soil. The dwarf cornel, *C. suecica*, is a herbaceous plant about six inches high, with opposite sessile leaves, inflorescence umbellate, with few flowers. Four-leaved petaloid involucre present. A creeping plant, growing in alpine pastures. Its berries are said to be tonic and to have the quality of increasing the appetite. The barks of *C. florida*, *C. sericea*, and *C. circinata* are used in the United States as substitutes for Peruvian bark in intermittent fevers; the young branches of the first-named plant stripped of their bark and rubbed with their ends against

Cornwall

the teeth make them very white, and are used in this capacity in connection with snuff by some of the women of North Carolina, while the Indians extract a scarlet color from the bark of the fibrous roots. *C. officinalis* is cultivated in Japan, where its fruits are an ingredient in the fever drinks of the country.

Cornwall, a port of Ontario, Canada; at the mouth of the Cornwall canal, and on the St. Lawrence river, 67 miles S. W. of Montreal. Among numerous other factories it contains the principal woolen mill of the Dominion. The Cornwall canal gives the town exceptional water facilities. There are Episcopal, Presbyterian, Roman Catholic, and Methodist churches. Pop. (1901) 6,704.

Cornwall, Barry. See PROCTER.

Cornwallis, Caroline Frances, an English author; born in Kent, July 12, 1786. She acquired a thorough knowledge of Latin and Greek, and making herself conversant with nearly every study which occupies thoughtful men, from an early age she carried on a correspondence with many eminent persons. Her refusal to accept the hand of Sismondi did not forfeit his friendship, and she lived much in Italy. Her first work "Philosophical Theories and Philosophical Experience, by a Pariah" (1842), was the first of a series of 20 "Small Books on Great Subjects," the said subjects including the Connection of Physiology and Intellectual Science, Ragged Schools, Criminal Law, Greek Philosophy, and the History and Influence of Christian Opinions. She also published in 1847, "Pericles, a Tale of Athens." She died in Kent, Jan. 8, 1858.



LORD CORNWALLIS.

Cornwallis, Charles, Marquis, an English military commander; born in Brome, Suffolk, Dec. 31, 1737. He acted a conspicuous part in the American war. After gaining the battles of Camden and Guil-

Corolla

ford, he determined to invade Virginia; but, being surrounded by the American and French forces, he and his army were made prisoners at Yorktown. In 1786 he was made Governor-General of India. The government of Bengal found it necessary to uphold the Rajah of Travancore against the Sultan of Mysore, and the first campaign being unsuccessful, in 1791 Cornwallis invaded the Mysore, besieged Seringapatam, and compelled Tippoo Saib to submit on humiliating terms. Having performed this importance service, Lord Cornwallis returned to England, was raised to the rank of marquis, and made Master-General of Ordnance. In 1798 he was sent to Ireland as Lord-Lieutenant; and in the trying and terrible scenes of the rebellion so conducted himself as to gain the good opinion of the public, while vigorously upholding and vindicating the laws. In 1801 he was sent on a mission to France, where, in 1802, he signed the peace of Amiens. In 1804, he was a second time appointed Governor-General of India; but soon after his arrival in India he died in Ghazepore, Oct. 5, 1805.

Cornwallis, Kinahan, an English-American novelist; born in England in 1835. He came to the United States about 1860. He has written: "Yarra Yarra, or the Wandering Aborigine" (5th ed. 1855), in verse; "Howard Plunkett" (1857); "My Life and Adventures" (1860); "Pilgrims of Fashion" (1862); "The Gold Room and the New York Stock Exchange" (1879); etc.

Coræbus, a native of Elis, who was the conqueror at the Olympic games in 776 B. C., from which period the Olympiads are reckoned.

Corolla, the inner whorl of two series of floral envelopes, occurring in the more highly developed plants. It is situated within the outer of these envelopes called the calyx, and exteriorly to the stamens and pistils. In all cases its divisions, which are called petals, alternate with those of the calyx. They are generally colored—*i. e.*, in botanical language, they are some other color than green. The corolla is, as a rule, larger than the calyx, but in some plants this is not the case. When the petals of a corolla are all distinct, they are said to be polypetalous, which is the normal type of a corolla. When they cohere continuously by their margins they are generally called monopetalous (one-petaled), which is not a quite accurate term; a better one is gamopetalous, meaning that the petals have in a certain sense contracted what may be poetically called a marriage union. The petals of a corolla are really only modifications of leaves. The corolla is not essential to the reproduction of a plant. It shades the pro-

Corollary

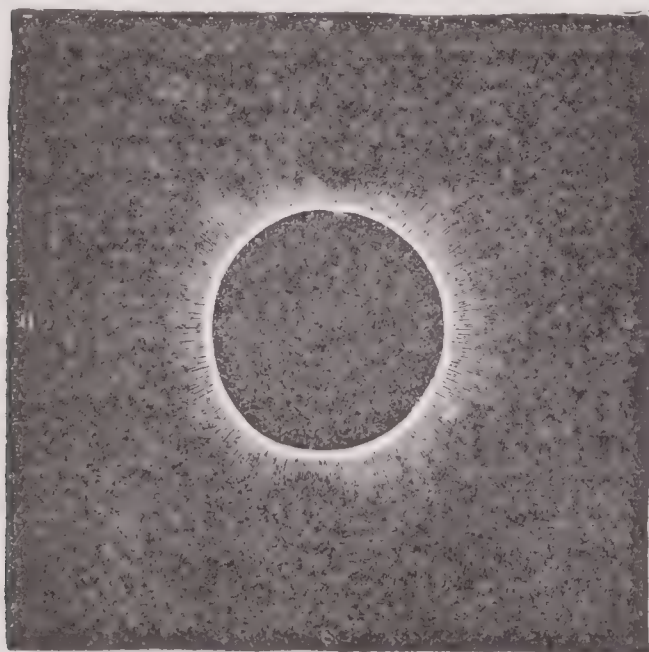
ductive organs inside it from injury, and, in some cases, by secreting honey attracts bees and other insects to aid in their fertilization.

Corollary, a proposition the truth of which appears so clearly from the proof of another proposition as not to require separate demonstration.

Coromandel Coast, the E. coast of the Indian peninsula, Madras Presidency, or that portion of it between Palk's strait and the Pennar river. It is open, sandy, and has no secure harbors, and the surf renders landing difficult and often impossible except to the native catamaran.

Coromandel Wood, the wood of *diospyros hirsuta*, a tree found in Ceylon. Its ground color is chocolate brown, with black stripes and marks; it is hard, turns well, and makes very handsome furniture.

Corona (a crown), in astronomy, a halo or luminous circle round one of the heavenly bodies; specifically the portion of the



CORONA OF THE SUN.

aureola observed during total eclipses of the sun, which lies outside the chromosphere or region of colored prominences. In botany the corona is an appendage of the corolla in some flowers, coming as it were between the corolla and the stamens, well seen in the cup of the daffodil. In architecture it is the lower member of the projecting part of a cornice. See HALO.

Corona Australis (the southern crown), one of Ptolemy's southern constellations, containing 12 stars.

Corona Borealis (the northern crown), one of Ptolemy's northern constellations, containing 21 stars.

Coronach, a name formerly used for the funeral dirge among the Irish and Scottish highlanders. The dirge, disused in Scotland, is in Ireland now commonly known as the *keen*.

Coroner

Coronation, act or solemnity of crowning a sovereign; the pomp or assembly attending the investiture of a monarch. Justin II., who succeeded Justinian I. A. D. 565, was the first emperor crowned with ceremony by the Patriarch of Constantinople. Charlemagne adopted the custom, and was crowned by the Pope, at Rome, 800. Edward I. (the Elder), crowned in 902, is said to have been the first English monarch to adopt the ceremony. The custom for the queen to be crowned originated in England before the Conquest. The French queens were for a long time crowned at the abbey of St. Denis, near Paris. Edward the Confessor fixed the monastery founded by him at Westminster as the place for the coronation of the English monarchs. "The legends of the old historians," says Taylor in his "Glory of Regality," concerning the coronation-stone, "inform us that this is the very stone on which the patriarch Jacob laid his head in the plain of Luz; that it was brought from Egypt into Spain by Gathelus, the supposed founder of the Scottish nation; that it was thence transported into Ireland 'amongst other princelie jewells and regall monuments,' by Simon Brech, who was crowned on it, about B. C. 700, and that it was thence carried to Scotland by King Fergus, B. C. 330." The real history is that it was transferred from Ireland to Scotland at an early period, and was placed in the abbey church of Scone in 850. The Scottish kings were crowned here till 1296, when Edward I. carried it to England. It was agreed by the treaty of Northampton, in 1328, that the stone should be returned to Scotland, but this was not done. It is called the "Stone of Destiny," and is fixed under the seat of the coronation chair, which is made of oak, and is now kept in the abbey of Westminster.

Coronea, a small town of Bœotia, S. W. of Lake Copais, where in 447 B. C. the Bœotians defeated the Athenians, and in 394 Agesilaus defeated the allied Greeks.

Coronella, a genus of *ophidians*, the typical one of the family *Coronellidæ*. *C. austriaca* is common in Europe.

Coronellidæ, a family of *ophidians*, suborder *Colubrina*. They are broad snakes, flat beneath, with the shields of the head regular.

Coroner, a functionary whose name coroner—anciently coronator, from Lat. *corona*—a crown—implies that he has principally to do with pleas of the crown or in which at least the crown is concerned. His office is very ancient, mention being made of it in A. D. 925. His court is a court of record in which, after sight of the body of one who has died in prison, or so suddenly that suspicions of violence may be excited, a jury summoned for the purpose pro-

nounce a decision as to the cause of death. "Accidental death" is a frequent verdict, but there are cases in which it is "Willful murder against some person or persons unknown," or an individual is named. In this the proceedings under the auspices of the coroner prepare the way for a criminal prosecution. He also officiates as a sheriff's substitute when the sheriff himself is interested in a suit, and cannot therefore act in it himself. From four to six are appointed for each county in England. In the United States the coroner is an elective county officer. His duties are similar to those of a coroner in England.

Coronet, an inferior kind of crown worn by the nobility. The coronet of the Prince of Wales consists of a circlet of gold, on the edge four crosses *pattée* or between as many fleur-de-lis; and from the center crosses rises an arch surmounted by an orb and cross. The coronet of a duke is adorned with strawberry leaves; that of a marquis with leaves and pearls interposed; that of an earl has the pearls raised above the leaves; a viscount's coronet is surrounded with pearls only, as is also that of a baron; but in the case of the latter the number is restricted to four.

Coronis, the daughter of King Phoroneus, whom Neptune loved, and who was changed into a crow by Minerva.

Coronium, the name given to an element which is thought to be a substance with a vapor density far smaller than that of hydrogen, which is by far the lightest body with which we are familiar. It is supposed to be a permanent component of the solar system, totally distinct from any element known to terrestrial chemistry. French and Italian scientists in experimenting on gases emanating from volcanoes claim to have discovered this coronium, probably associated with other gases as yet unnoticed.

Corot, Jean-Baptiste-Camille (kō-rō), a French artist; born in Paris, July 20, 1796; studied under Michallon and Victor Bertin and afterward in Italy. He exhibited for the first time in the Salon in 1827, but some years elapsed before the high qualities of his work were recognized. The fortune which he inherited from his father enabled him, however, to follow out the bent of his genius, and the last 25 years of his life were a continuous triumph. He frequently painted figure subjects, including the large sacred pictures, the "Flight Into Egypt" and the "Baptism of Christ"; but his most characteristic and successful work was in landscape. His woodland scenes, painted for the most part at dawn or twilight in a scheme of pale greens and silvery grays, show a singularly subtle feeling for this phase of nature, and are undoubtedly among the most important

contributions of the century to landscape art. Few artists have been so successful in painting light and air, or in infusing work manifestly closely studied from nature with an ideal charm. His defect is one of limitation in range, but within this limit he has no rival. He died in Paris, Feb. 23, 1875.

Corozo Nut, the seed of a palm, *phytelephas macrocarpa*, a native of tropical America, the hardened albumen of which is used by turners under the name of vegetable ivory.

Corporal, formerly a kind of brigademajor, who commanded skirmishing parties detached from the other forces. This was the meaning of the word in the reigns of Queen Mary and Queen Elizabeth. As now used it means a petty non-commissioned officer ranking immediately under a sergeant, and just above the ordinary rank and file. He has charge of one of the squads of the company, places and relieves sentinels, and keeps good order in the guard. The corporal of a ship is an officer in charge of setting the watches and sentries, and relieving them; who sees that all the soldiers and sailors keep their arms neat and clean, and teaches them how to use them. He has a mate under him.

Corporal, a name given to the linen cloth, also called pall and chalice-veil, with which the celebrant covers what is left of the consecrated elements in the Holy Communion till the service is concluded.

Corporation, a corporate body legally empowered to act as a single individual, and having a common seal. A corporation may be either aggregate or sole. Corporations aggregate consist of two or more persons legally incorporated in a society, which is kept up by a succession of members, either in perpetuity or till the corporation is dissolved. A corporation sole consists of a single individual and his successors, the intention being to perpetuate a function or office which cannot be done in any man in his personal or bodily capacity. Thus in Massachusetts certain church property is vested in a corporation sole composed of the pastor of the church. To render valid a transfer of lands to such a corporation, the phraseology must always include the words "and his successors." In England the king or a bishop is a corporation sole, as the office is immortal though the man may die.

Corporations are liable to the ordinary laws and treaties of the country, but are not citizens in the sense of exercising a political or municipal franchise. United States law has also had occasion to emphasize the distinction between a public corporation which may be affected by legislation, and a private corporation. Further, according to United States law, the fran-

chises of a corporation are treated as realizable assets for creditors. The amount of property which may be held by a corporation in the United States is frequently limited in the act or charter. In the United States less importance is attached to the use of the common seal of a corporation than in Great Britain.

Corps (kōr), a body; a word often used as a military and a political term. A *corps d'armée*, or army corps, one of the largest divisions of an army. *Corps diplomatique*, the body of ministers or diplomatic characters. *Corps législatif* (kōr lā-zhis-lā-tēf), the lower house of the French legislature in 1857-1870. Its members were elected for six years in the proportion of one to 35,000 electors.

Corpulence, or Corpulency, grossness or fleshiness of body; excessive fatness; a state of being loaded with flesh. It is impossible to define exactly the limit beyond which the body can be said to be corpulent, depending, as it does, very much on the general habit and the state of health of the individual. It most commonly takes place after the age of 40, but is not confined to any particular period of life, being found also in childhood and youth. The causes of corpulence are both natural and acquired. There are some persons who have a natural tendency to corpulence; in others it may be induced by modes of life, indolent and sedentary habits, and the use of certain kinds of food. The undue accumulation of fat produces a variety of effects, interfering with the vital energies of the body, and incapacitating for exertion. The chances of life are not so great among persons of a corpulent habit as among those of a normal condition. All sudden or violent measures to get rid of corpulence are attended with harm; and not the least dangerous is the popular remedy of vinegar, which has the effect of destroying the digestive powers.

Attention to diet, and the avoidance of such articles as tend to generate fat, together with active exercise, and the counteracting of indolent habits, are among the best means that can be employed. Dr. Chalmers, in his small treatise "On Corpulence," gives a variety of cases in which *liquor potassæ* was used with great effect; but this remedy should not be resorted to without sanction of a medical adviser. There are numerous very remarkable cases of corpulence, but not one, we believe, may compete with that of a certain Daniel Lambert, who died in England, 1809, and who, a few days before his death, weighed 739 pounds. It is curious to record that in Sparta, citizens who grew too fat were soundly whipped. Naucelis, the son of Polytus, was brought before the Ephori, and his excessive corpulence was exposed to the public. He was, moreover, threat-

ened with perpetual banishment if he failed to reduce his body within reasonable dimensions.

Corpus Christi, city and county-seat of Nueces county, Texas; on Corpus Christi bay, at the mouth of the Nueces river, and on the Mexican National and the San Antonio & Aransas Pass railroads, 140 miles S. S. E. of San Antonio. It is the stock-raising and farming center of the county, and has an extensive fish and oyster-packing business, several daily and weekly newspapers, a Catholic convent, several churches, a National bank, and an assessed property valuation of \$2,000,000. Pop. (1900) 4,703; (1910) 8,299.

Corpus Christi Festival, the most splendid festival of the Roman Catholic Church. It was instituted in 1264, in honor of the Consecrated Host and with a view to its adoration, by Pope Urban IV., who appointed for its celebration the Thursday after the festival of the Trinity, and promised to all the penitent who took part in it indulgence for a period of from 40 to 100 days. The festival is chiefly distinguished by magnificent processions. In France it is known as the *Fête Dieu*; in German, as the *Fronleichnamfest*.

Corpuscle, minute solid microscopic bodies found in the blood. They are of two kinds, (1) colored corpuscles, known also as the red particles or the red globules; and (2) the colorless, known also as the white or pale corpuscles. The former are the more numerous. The colored corpuscles are not really globular; they are flattened or discoidal, the outline being circular. On the sides constituting the disks there is sometimes a concavity. Their average size is from $\frac{1}{3500}$ to $\frac{1}{3200}$ of an inch in diameter, their breadth $\frac{1}{4}$ of that amount.

In most mammals the corpuscles are like those of man. In the camel, however, they are elliptical in outline. In birds, reptiles, and most fishes they are oval disks with a central elevation on each side. Those of the invertebrata are, as a rule, not colored, the annelids alone being an exception. They are, as a rule, disk-shaped, with a circular or an oblong outline.

Corpuscular Theory of Light, the older theory, which explained the phenomena of light by supposing that a luminous body emits excessively minute particles of matter, corpuscles as they were called, which striking the eye produce the sensation of light. Newton held the corpuscular theory, and supported it with great ingenuity. This theory has long been displaced by the undulatory theory.

Corpus Juris (body of law), a name given to certain collections of laws. The name of *Corpus Juris Civilis* (body of civil law) in particular was bestowed in the

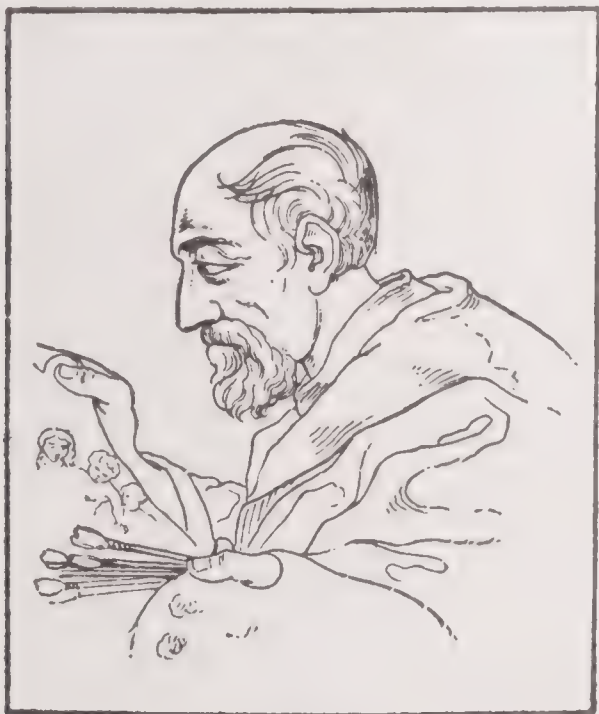
Corral

12th century on the general body of legal works drawn up at the orders of Justinian, viz., the Institutes, Pandects, Code and Novels; together with the collections bearing on the feudal law appended to them. With the canonical or papal laws the same mode of proceedings has been adopted, and the Corpus Juris Canonici compiled.

Corral, in South America and elsewhere, a yard or stockade for cattle.

Corregidor, the name given in Spain to the principal magistrate of a town, appointed by the king. Readers of "Gil Blas" will remember his functions and the terror of his name to evil-doers. The Portuguese corregidor has administrative but not governing powers.

Corregidor, a small island commanding the entrance to Manila bay, P. I. It is 3 miles long by 1 mile wide, rising abruptly from the sea to a height of 635 feet. There is a lighthouse at the summit. The island was strongly fortified by the Spaniards in the 18th century, but the defenses were not kept up. When Admiral Dewey made his dash into Manila bay, May 1, 1898, he steamed past this island, which was supposed to be very strongly fortified, and the base of operations for the mines and torpedoes with which the bay was declared to be thickly strewn. The forts have been strengthened by the United States government, which established an arsenal here in 1900. Pop. (1900) about 2,000. South of Corregidor is the smaller island of Caballo, separated by a narrow strait.



CORREGGIO.

Correggio, Antonio Allegri, frequently called ANTONIO DA CORREGGIO, from the place of his birth; an Italian painter; born in Correggio, Modena, in 1494; was intended for a learned profession, but nature had designed him for an artist. It has not been ascertained how much he was indebted to

Corrib Lough

his first instructor, who was probably his uncle Lorenzo Allegri. His genius pointed out to him the way to immortality. It is related that once, after having seen the "St. Cecilia" of the great Raphael, which was placed in the Church of San Giovanni, in Monte, in Bologna, he exclaimed, "*Anch'io son pittore*" (I also am a painter). Correggio, without seeing either the works of the ancient masters or the *chefs-d'œuvre* of the moderns who preceded him, became a model for his successor, by the unassisted energies of his genius. Three qualities will always be admired in him — grace, harmony, and a skillful management of the pencil. There is a peculiar grace in the movements of his figures, and a loveliness in their expression, which takes possession of the soul. These attitudes and movements could not be executed by any artist without his masterly skill in foreshortening, which not only gives greater variety to a piece, but is also favorable to gracefulness. Avoiding all roughness and hardness, Correggio delights us by mild and almost effeminate beauties. He strove to obtain this object also by harmony of coloring, of which he may be called the creator. He is unrivalled in the chiaroscuro, in the grace and rounding of his figures, and in the faculty of giving them the appearance of advancing and retiring which is the distinguishing excellence of the Lombard school, of which he may be considered the head. In his drapery, he calculated with extreme accuracy all the effects of the chiaroscuro. He possessed the power of passing by the most graceful transition from the bright colors to the half tints. It was ever his object to make the principal figure prominent, that the eye, after gazing till it was satisfied on the bright colors, might repose with pleasure on the softer masses. He made a skillful use of this art in his "Night," which is to be seen in the gallery in Dresden where there are seven pictures in which his progress in the art may be recognized. Among his best pictures, besides the "Night," are the "St. Jerome," which has kindled the admiration of several distinguished painters to such a degree as to render them unjust toward Raphael; the "Penitent Magdalene"; the altar-pieces of St. Francis, St. George, and St. Sebastian; "Christ in the Garden of Olives"; "Cupid"; the fresco painting in Parma; and above all, the paintings on the ceiling of the cathedral in the same city. He died in Correggio March 5, 1534. The story of his extreme poverty, and of his death in consequence of it, has been long since disproved, yet Oehlenschläger has made it the subject of a tragedy.

Corrib Lough, a large lake, the second in size in Ireland. It receives the waters of Lough Mask, at its N. end, and

Corrichie

those of the Clare and other smaller rivers. It contains many islets, and to the W. are mountains 3,000 feet high, while near it are many stone-circles.

Corrichie, a moor on the borders of Kincardine and Aberdeen shires, 15 miles W. of Aberdeen, Scotland. Here on Oct. 28, 1562, Queen Mary's half-brother, the Earl of Moray, defeated the Catholic Gordon, Earl of Huntly, who himself fell in the battle, while his two sons were taken prisoners. There is a ballad on the subject, in broad Aberdeenshire dialect, quite at variance with the facts of history, and first printed in Evans's "Old Ballads" (1777).

Corrientes (kor-yen'tēs), a province of the Argentine Republic, between the Paraná and Uruguay rivers, extending from Entre Rios to Misiones territory, with an area of 32,580 square miles. The surface is generally flat, with numerous lakes and swamps, but has undulating stretches along the Paraná and in the E., and is heavily wooded in parts. Lake Iberà, a group of lakes and swamps covering some 1,800 square miles, is surrounded with a jungle, in which the *tacuara* bamboo (30 feet) is conspicuous; and here jaguars and alligators abound. The mean temperature (72° F.) is the highest in the republic, but the extremes (44° — 98°) are not so excessive. As in Paraguay, Guarani is the common language, Spanish being employed only by the official and educated classes. Cattle-raising is the chief occupation; agriculture is very backward. Pop. (1905) 304,583. The capital, Corrientes, is almost hidden among orange groves, 15 miles below the confluence of the Parana and the Paraguay, and takes its name from seven currents formed by points of rock above the city; vessels of nine feet draught can reach the town at all seasons. Steamers from Buenos Ayres (832 miles) touch here almost daily, and in 1887 a railway was begun to Monte Caseros (235 miles). Pop. 18,000.

Corrigan, Michael Augustine, an American clergyman; born in Newark, N. J., Aug. 13, 1839. He was educated at the Roman Catholic Theological Seminaries of St. Mary's and Mount St. Mary's and at the American College in Rome, where he was ordained to the priesthood in 1864. He became president of Seton Hall College, 1868; Bishop of Newark, 1873; Archbishop of Petra and coadjutor to Cardinal McCloskey, 1880; Archbishop of New York, 1885. He died in New York city May 5, 1902.

Corrodi, August (kor-rö'dē), a Swiss poet; born in Zürich, in 1826. Till 1881 he was an artist-painter, and for some time was Professor of the Arts of Design at Winterthur. His first volume of "Songs" (1853), exhibited graceful versification and deep sympathy with nature. His songs and

Corrugated Metal

dramatic compositions in all local dialect. "Mr. Professor, an Idyll of Zürich"; "The Vicar, a Winter Idyll," etc., had extraordinary success. He translated several of Burns's songs into the Swiss-German dialect, and published "Shakspeare: Life Wisdom from his Works." His works are very numerous and possess enduring merit. He died in 1885.

Corrosives, in surgery, substances which eat away whatever part of the body they are applied to; such are glacial acetic acid, burned alum, white precipitate of mercury, red precipitate of mercury, butter of antimony, etc.

Corrosive Sublimate, also called mercuric chloride, HgCl₂, bichloride of mercury, perchloride of mercury; prepared by heating mercuric sulphate with dry sodium chloride; the mercuric chloride sublimes as a white transparent crystalline mass. Sp. gr., 5.43. It is dissolvable in about 20 parts of cold water, and very soluble in alcohol and ether. It precipitates albumen, hence white of egg is an antidote. It is very poisonous, and is used to preserve both animal and vegetable substances. It is used in pharmacy as *Liquor Hydrargyri Perchloridi*, and as *Lotio Hydrargyri Flava* when mixed with lime. Corrosive sublimate is a powerful irritant, and is used externally in skin diseases. It is administered internally in syphilis, usually in conjunction with iodide of potassium. It is also much in use by surgeons in an antiseptic spray and as a cleansing agent for sterilizing their operating instruments. As an antiseptic wash for wounds or sores its strength is generally used in proportion of one part of the salt to 5,000 of the solvent.

Corrugated Metal, metal that has been corrugated to give it increased rigidity and power to resist buckling and collapse. The process is merely an application to metallic substances of the old contrivance of "goffering" or "piping," by means of which frills are stiffened and kept in shape. The metal to be corrugated is passed between pairs of rollers with ridged surfaces, the ridges of one fitting into the hollows of the other, and the sheets or plates operated on are bent and compressed into the wavy outline of the rolls. Walls and roofs of light and temporary buildings are extensively made of corrugated galvanized iron — *i. e.*, sheet-iron first corrugated and subsequently coated with zinc by dipping the sheets into a bath of the liquid metal. The most important mechanical application of corrugated metal has been for the flues of large steam-boilers. About 1878 a system of annular corrugated iron flues was introduced, which increased the resistance of the flue to collapse, and saved fuel because of the greater heating surface presented by the corruga-

tions. A spiral corrugated flue gives the greatest amount of strength.

Corruption of Blood, in law, the incapacity to inherit, or pass an inheritance, in consequence of an attainder to which the party has been subject. In the United States it was abolished by the Federal Constitution.

Corsair, a pirate; one who cruises about with an armed vessel, seizing and plundering merchant-vessels, without any commission or authority from any government.

Corse, John Murray, an American military officer; born in Pittsburg, Pa., April 25, 1835. He was a cadet at West Point for two years, and in 1860 became a lawyer, but enlisted in the Union army at the outbreak of the Civil War. He was a Brigadier-General in 1864; commanded a division in Georgia, and upon the advance of the Confederates against Allatoona, Sherman telegraphed him, "Hold the fort for I am coming," which inspired Ira D. Sankey to compose the famous hymn beginning with these words. General Corse repulsed the enemy and accompanied Sherman on the march to the sea. After the war he was successively collector of internal revenue in Chicago and postmaster of Boston. He died in Winchester, Mass., April 27, 1893.

Corset, an article of dress laced closely round the body; a bodice; stays. The corset is one of the most useful and necessary articles of female dress, and though many of the worst diseases of the chest have been developed and are frequently greatly exaggerated by tight lacing, the indiscriminate warfare carried on by medical men and public writers against the use in any form of a garb that confines the motions of the thorax is marked by as much cant as ignorance. No medical man whose experience has lain largely among women, and who has studied the requirements of the female system at different periods of life, would risk to condemn the use of corsets. That stays are as necessary to a woman, after a certain stage of life, as a bandage is for a sprain, no man who is qualified to speak on the subject will deny. Stays, or rather corsets, however, are quite uncalled for with growing girls, unless, indeed, there should be some natural deformity or weakness to correct. The idea that such a rigid encasement is requisite to give contour to the bust, and impart a graceful carriage to the figure, is equally erroneous. Up to 17 or 18, or perhaps till her marriage, no young female, if she takes due care of her person, and does not acquire bad habits, has any occasion to wear a corset for the mere sake of support and strength. Whatever is worn up to that time around the chest requires neither whalebone nor steel, nor any tension more rigid than that afforded

by strings or straps. But to the mother who has domestic duties to perform, and children to nurse and suckle, the corset becomes an absolute necessity; and that it may effectually serve the purpose for which it is demanded—support and comfort—it must be laced with sufficient tightness to insure those objects. That tight lacing is injurious, especially with young girls, and more particularly with those of naturally narrow chests, and in whose families there are seeds of consumption, no one will deny: but the tight lacing which a married woman employs is never of a nature likely either to develop or aggravate pulmonary disease. It is against the universal employment of steel-ribbed stays and tightly-drawn corsets in young women under 20 years, that both authority and reason should be directed to urge the discontinuance of a system decidedly hurtful.

Corselet, a light cuirass or armor worn to protect the front of the body.

In entomology, the thorax; part of the body to which the wings and legs are attached.

Corsica, an island in the Mediterranean, forming the French department of the same name. It is separated from the island of Sardinia, on the S., by the Strait of Bonifacio, about 10 miles wide; length, N. to S., 110 miles; breadth, near its center, 53 miles; area, 3,377 square miles. The E. coast is almost unbroken, but on the W. coast a number of deep bays, St. Fiorenzo, Calvi, Porto, Liscia, Ajaccio, and Valinco, follow in rapid succession. The interior is traversed by a mountain chain, the culminating point of which, according to the latest surveys, is Monte Cinto, 8,891 feet high, Monte Rotondo coming next with 8,775 feet. From the E. and W. side of the chain numerous streams flow to opposite sides of the coast, generally mere torrents. With the exception of some marshy districts on the E. coast, the climate is very fine. There are fine forests containing pines, oaks, beeches, chestnuts, and cork-trees, and the mountain scenery is splendid. In the plains and numerous valleys the soil is generally fertile; but agriculture is in a backward state. Mules, goats, horses, cattle, and sheep, and among wild animals, the boar, the fox, and the deer, are common. There are good fisheries. In minerals Corsica is not rich. The chief exports are wine, brandy, olive-oil, chestnuts, fruits, and fish. The chief towns, Ajaccio and Bastia, are connected by railway. The island was first colonized by the Phœnicians, from whom it got the name of Cynos. The Romans afterward gave it that of Corsica. From the Romans it passed to the Goths, and from them to the Saracens, and in the 15th century to the Genoese. France had

the rights of the Genoese ceded to her, after Paoli had virtually made Corsica independent, and entered on forcible possession of it in 1768. An insurrection in 1794, headed by General Paoli and assisted by the British, for a time restored the island to independence; but in 1796 it again fell under the dominion of France. Pop. (1906) 291,160.

Corsicana, a city and county-seat of Navarro county, Tex.; on the Houston and Texas Central and the Cotton Belt railroads; 180 miles N. E. of Austin. It is a great oil district, having over 199 wells with a daily yield of 12,000 barrels. The city is the seat of the State Orphans' Home and the Odd Fellows' Widows and Orphans' Home, and has street railways, waterworks, daily and weekly newspapers, three National banks, and an assessed property valuation of \$3,000,000. Pop. (1890) 6,285; (1900) 9,313; (1910) 9,749.

Corsned, or **Morsel of Execration**, a form of trial or purgation made use of annually in England. A morsel of bread, or cheese, was consecrated by exorcism, and was administered to a suspected person as a test of his innocence. If the person was guilty, it was held that the morsel would remain in the stomach, and produce pallor and convulsions; if the person was innocent, the morsel would act as a wholesome and nutritious food.

Corso, an Italian term given to a leading street or fashionable carriage-drive.

Corson, **Hiram**, an American educator; born in Philadelphia, Pa., Nov. 6, 1828. He became Professor of Rhetoric and English Literature at St. John's College, Annapolis, in 1866, and of English language and literature, rhetoric, and oratory in Cornell University in 1870. Among his publications are: a "Hand-Book of Anglo-Saxon and Early English" (1871), "An Introduction to the Study of Robert Browning" (1886), "Jottings in the Text of Hamlet," "Lectures on the English Language and Literature," "The Aims of Literary Study," etc.

Corson, **Juliet**, an American cooking reformer; born in Roxbury, Mass., Feb. 14, 1842. She established the New York School of Cookery in 1876 and soon achieved celebrity by her writings on cookery and domestic science, her first success being "Fifteen-Cent Dinners," a manual for the poor. Her other works include "Cooking Manual," "Meals for the Million," and "Family Living on Five Hundred a Year." She died in New York city, June 18, 1897.

Corssen, **Wilhelm Paul**, a German philologist; born in Bremen, Jan. 20, 1820. After studies in philology at Berlin, especially under Boeckh and Lachmann, and two years spent in teaching in a gymnasium

at Stettin, he was called in 1846 to lecture at Schulpforta, and there he remained till 1866, when ill-health compelled him to retire to Berlin. There, however, he continued his arduous studies until his death, June 18, 1875. His earliest great work is his treatise, "On the Pronunciation, Vowels, and Emphasis of the Latin Language" (two vols., 1858-1859; 2d ed., 1868-1870). It was followed by "Critical Contributions to the Latin Etymology" (1863), and "Critical Supplement to the Latin Etymology" (1866). His second masterpiece is "On the Etruscan Language" (two vols., 1874-1875), in which he labors with great ingenuity and vast learning to prove against the world that the Etruscan language was cognate with that of the Romans.

Cort, **Frans de** (kort), a Flemish poet; born near Brussels in 1834. As singer of the quiet joys of home life and conjugal happiness he has few peers in any literature. His original homely lyrics appeared in "Songs" (two vols., 1857-1859), "Zing-Zang" (1886), and another volume of "Songs" (1868). He also translated into Flemish verse "The Finest Songs of Robert Burns" (1862). He died in 1878.

Cort, **Henry**, inventor of the process of puddling and rolling iron; born in Lancaster, England, in 1740. He began business at Gosport, Hampshire; erected iron-works, and studied with great success methods of improving the process of manufacturing iron. By the unfortunate selection of a partner he was involved in a complication of lawsuits, and finally ruined. In 1794, however, he received a pension from the government. He died in 1800.

Cortes, the states or legislative assemblies of the kingdoms of Spain and Portugal, composed of the nobility, clergy, and representatives of cities. They thus correspond in some measure to the British Houses of Parliament.

Cortez, or **Cortes**, **Hernando**, the conqueror of Mexico; born in Estremadura, Spain, in 1485. At the age of 19 he left Spain, to seek fame and fortune in the new world. He distinguished himself under Velasquez in the conquest of Cuba; and after passing several years in that island he obtained leave from Velasquez to conduct a small expedition to the newly-discovered coast of Yucatan and Mexico. With less than 600 soldiers, and 16 horses, 10 cannon, and four falconets, he sailed, in 1519, to conquer the most powerful empire in America. He landed on the Mexican coast on Good Friday, April 21, on the spot where the city of Vera Cruz now stands. He persuaded his followers to destroy their ships, and to march inland, with no prospect but to succeed or perish. The Indian republic of Tlascala lay between him and the Mexi-

Cortez

can capital. He defeated the Tlascalans when they attacked him, and then succeeded in winning their friendship. They acted thenceforth as his zealous and faithful allies. Alarmed by the reports of the prowess of the Spaniards, and of the superhuman terrors of the arms which they wielded, Montezuma, the Mexican emperor, sought to conciliate the strangers, and received Cortez and his troops in the capital. Though they obtained lavish presents, and received courteous treatment, the treasures which they saw around them inflamed more and more the cupidity of the invaders. The sight of the idolatrous rites, and especially



HERNANDO CORTEZ.

of the human sacrifices which the Mexicans practiced, inflamed their religious bigotry; the ambition of Cortez thirsted after absolute conquest, and, by a bold stroke of treachery, he seized the person of the Mexican emperor. Cortez, soon after this, received a material increase of strength from a force which the Viceroy of Cuba had sent to depose him and take him prisoner, but which he partly defeated and partly persuaded to come over to him.

He now found himself plunged into a most desperate war with the native Mexicans, who rose upon the Spaniards, and as-

Cortland

saulted them in their fortified quarters in the capital. The Mexicans strove with equal courage, and infinitely preponderating numbers, against the superior weapons and discipline of the Europeans, who throughout the struggle were gallantly supported by their Tlascalan confederates. Cortez was now, at last, obliged to evacuate the city, July 1, 1520. Encouraged by this success, the Mexicans followed the Spaniards, and fought a pitched battle with them in the open field. In this action (the battle of Otumba), Cortez gained a complete victory, which was mainly due to his own prowess. After receiving some reinforcements, he again advanced upon the Mexican capital. Gautemozin was now Emperor of Mexico, and had learned the inability of his troops to face the Europeans in the open field. He remained within the city, which Cortez besieged. The geographical position of the city, and the great number of native allies who now served under him, enabled Cortez to establish a strict blockade. Many assaults were made, and met with various fortune. Fire and the sword swept away thousands of the Mexicans, but famine was their most fatal foe; and Mexico, on Aug. 13, 1521, surrendered, and the whole of its vast empire became subject to the crown of Spain. Cortez disgraced his triumph by putting the brave Gautemozin to a cruel death, an act of which he is said to have afterward deeply repented. The domestic enemies of the conqueror of Mexico had, meanwhile, been busy in their intrigues against him at the Spanish court, and in 1528 Cortez returned to Spain to face his accusers. He was coldly received, though with apparent honor; and he could not prevail on Charles V. to continue him in the governorship of Mexico. He returned to America in 1530, a powerful and wealthy noble, but without public authority. He now signalized himself in the arts of peace, in the skillful culture of his ample estate, in the introduction of the sugar-cane, and the importation of merino sheep into the province. He made also several brilliant and important voyages of discovery along the Californian and other coasts of the Pacific. In 1540 he finally returned to Spain, where he was treated by his sovereign with ungracious neglect. He died near Seville, Dec. 2, 1547.

Cortland, a village and county-seat of Cortland county, N. Y.; on the Tioughnioga river; and the Lackawanna, the Lehigh Valley, the Erie, and the New York Central railroads; 37 miles S. of Syracuse. It is a farming and manufacturing trade center, and has several wire-works, foundries, machine shops, and manufactories of carriages, stoves, harness, furniture, cash registers, and steel ware. It is the seat of a State Normal School, and has electric lights

Cortona

and railways, several churches, daily and weekly newspapers, three National banks, an annual trade of \$10,000,000; and an assessed property valuation of over \$6,000,000. Pop. (1900) 9,014; (1910) 11,504.

Cortona, Pietro di, properly **Pietro Berretini**, an Italian painter and architect; born in Cortona, in 1596. Pope Urban VIII. employed him to decorate a chapel in the Church of St. Bibiena, and also to execute the frescoes of the grand salon of the Barberini Palace. Many churches of Rome were decorated by him; and at Florence he adorned the Pitti Palace for the Grand-duke Ferdinand II. His easel pictures, although of less value than his larger works, are held in great estimation. As an architect he did some important work in church restoration. He died in Rome, May 16, 1669.

Coruna. See CORUNNA.

Corundum, a rhombohedral transparent or translucent mineral, very tough when compact. Its hardness is 9, its sp. gr., 3.9-4.16. Its luster is generally vitreous; its colors blue, red, yellow, brown, gray, or nearly white; its streak in all cases colorless. It consists of pure alumina—*i. e.*, oxygen, 46.6, and aluminum, 53.4=100. Chemically viewed, it is aluminum-oxide, Al_2O_3 . There are three varieties of it—sapphire, corundum proper, and emery. It includes the species of the genus which are dark in color and only translucent; but its hues may be light blue, gray, brown, or black. It is found in the Carnatic, near Ava, and in China.

Corunna (Spanish, *Coruña*), a seaport of Spain, in the province of the same name in Galicia, on the N. W. coast, on a peninsula at the entrance of the Bay of Betanzos. It consists of an upper and a lower town, the former built on the E. side of a small peninsula, and the latter on the isthmus connecting the peninsula with the mainland. The harbor, which is well protected, is deep, spacious, and safe, and many improvements have lately been made. Cattle form the chief export. There is a government tobacco factory employing 3,000 women and girls. There is a lighthouse, 92 feet high, called the Tower of Hercules, and supposed to be of Roman construction. Corunna was the port of departure of the Spanish Armada (1588), and the scene of the repulse of the French and the death of Sir John Moore (1809). Pop. (1900) 43,971.

Corvee, an obligation on the tenants or inhabitants of certain districts to perform certain services for their lord, such as the maintenance of roads, etc.

Corvette, a term applied to a flush-deck vessel, ship- or bark-rigged, having only one tier of guns, either on the upper or

Corylaceæ

main deck. The term is no longer used in the navy.

Corvey, or **Korvei**, a formerly renowned Benedictine abbey near Höxter in the Prussian province of Westphalia, founded in 816; an early center of German civilization. Wittekind, the historiographer of the convent, Bruno, known afterward as Pope Gregory IV., and many other learned men, were educated here. To its library belonged the only manuscripts of the first six books of the "Annals of Tacitus," discovered here in 1514. The abbey, or castle of Corvey, as it is now called, has a rich and extensive library; but the ancient collection of the Benedictines is no longer in existence.

Corvidæ, a family of conirostral birds containing the crows and their allies. The bill is strong, more or less compressed; the upper mandible to a certain extent curved, the tip notched; the nostrils are covered with stiff bristle-like feathers pointing forward. They can walk, run, or fly with equal ease. Their nest is of sticks, lined with soft materials. They may be divided into five sub-families: (1) *streperinæ*, or piping crows; (2) *garrulinæ*, or jays; (3) *calæatinæ*, or tree crows; (4) *corvinæ*, or true crows, and (5) *pyrrhocoracinæ*.

Corvinus, Matthias. See MATTHIAS.

Corvus, Marcus Valerius, a Roman hero, who, according to the legends, was assisted in killing a gigantic Gaul in single combat by a raven, which picked out the eyes of his antagonist.

Corwin, Thomas, an American statesman and orator; born in Bourbon county, Ky., July 29, 1794. He was a member of Congress in 1831; governor of Ohio, 1840-1842; United States Senator, 1845-1850; Secretary of the Treasury, 1850-1853; member of Congress, 1859-1861, and United States Minister to Mexico, 1861-1864. He died in Washington, D. C., Dec. 18, 1865.

Coryat, Thomas, an English traveler; born in 1577. His wanderings, a great part on foot, were through Europe, Asia Minor, Persia, India, etc. His travels were published under such curious titles as "Coryat's Crudities," "Coryat's Crambe or Colwort Twice Sodden," etc. He acted as a sort of butt or foil to the wits with whom he associated in London. He died in Surat, India, 1617.

Corybantes, certain fabulous beings, said by some to be the children of Apollo and Rhytia. They may be compared with the Curetes, Cabiri, and Idæan dactyli. The name (of which the origin is doubtful) was applied to the frantic priests of Rhea or Cybele, whose extravagances were taken as types of madness or frenzy in general.

Corylaceæ, mastworts; an order of diclinous exogens, alliance Quernales. It con-

Corymb

sists of trees and shrubs with alternate, simple, exstipulate leaves, often with the veins running straight from the midrib to the margin. Male flowers amentaceous, with 5 to 20 stamens; female having the ovary crowned by the rudiments of an adherent calyx, seated within a coriaceous involucre called a cupule; ovary with two or more cells; ovules pendulous or peltate. Among the genera are *carpinus* (hornbeam), *corylus* (hazel), *fagus* (beech), *castanea* (chestnut), and *quercus* (oak). They are found in the temperate parts of the Old and New Worlds. In the tropics they grow chiefly on mountains. In 1844 Lindley enumerated eight genera, and estimated the species at 265.

Corymb, in botany, that form of inflorescence in which the flowers, each on its own pedicel of different lengths, are so arranged along a common axis as to form a flat, broad mass of flowers with a convex or level top, as in the hawthorn and candytuft.

Corymbiferae, the name given in 1789 by Jussieu to the sub-order of composite plants afterward called *asteraceae*. It is one of three sub-orders of composites, the others being *cynarocephalae* and *cichoraceae*.

Coryphæna, a genus of *scomberidae*, or by some it is made the type of a family *coryphænidæ*. The head is greatly elevated, and the palate and jaws both furnished with teeth. *C. hippuris* and several other species are found in the Mediterranean and the adjacent parts of the Atlantic. They pursue the flying fish. The first-mentioned species is one of the two animals called the dolphin. It has beautiful metallic tints, looking golden while in the water. It is about five feet long.

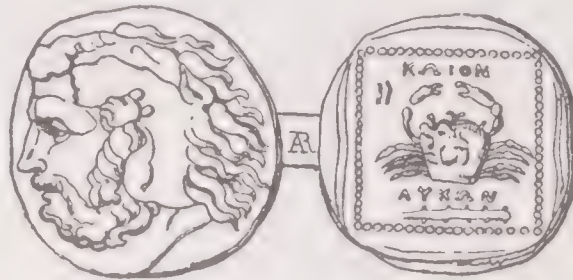
Corypheus (kor-i-fe'us), the leader of the chorus in ancient dramas; by whom the dialogue between the chorus and the other actors of the drama was carried on, and who led in the choric song. Hence, the chief or leader of any company.

Coryza, a synonym for acute nasal catarrh, or "cold in the head." The affection usually subsides without any treatment. If treated at the start, it may be checked by brushing the inside of the nose with a four per cent. solution of cocaine, or using a two per cent. solution with an atomizer.

Cos, now called STANCHIO or STANKO, an island in the Ægæan sea, on the coast of Asia Minor; area, 95 square miles; pop. 11,000. It was the birthplace of Hippocrates, and had anciently a celebrated temple of Æsculapius. In Cos was manufactured a fine, semitransparent kind of silk, much valued by the ancients. Cos is also the name of the principal town, a decayed seaport. The island yields grain, wine, silk, cotton, citrons, etc.

Cosmetic

Coscinomancy, or **Coskinomancy**, a kind of divination effected by means of a sieve, which was either suspended or fixed on the point of a pair of shears. The diviner then uttered a certain formula, and repeated the names of any persons suspected



COIN OF COS.

of a crime. If the sieve moved at the mention of any name, that person was considered guilty.

Cosel, Charlotte von. See AUER, ADELHEID VON.

Cosgrove, Henry, an American clergyman; born in Williamsport, Pa., in 1834. He became a Roman Catholic priest in 1857, pastor of a Davenport (Ia.) church in 1862, vicar-general in 1882, and Bishop of Davenport in 1884. He died Dec. 22, 1906.

Coshering, in old Irish feudal law, a custom whereby the lord was entitled to exact from his tenant food and lodging for himself and his followers at the tenant's house. It was in connection with this practice of coshering, to which the political circumstances of Ireland from time to time gave an unhappy stimulus, that the word Tory arose.

Cosmas, surnamed INDICOPLEUSTES, a merchant of Alexandria, who lived in the middle of the 6th century, and after having traveled much returned to Egypt, where in monastic retirement he wrote in Greek a work of greater interest than value, in 12 vols., on "Christian Topography," extending to countries as far as India. The work is included by Montfaucon in the "New Collection of the Greek Fathers," vol. ii. (Paris, 1706).

Cosmas and Damian, SAINTS, Arabian brothers, who practiced as physicians at Ægæ in Cilicia in the 3d century A. D., and who were cast into the sea as Christians, but, according to the legend, rescued by an angel. Thereafter, burning and stoning having proved ineffectual, they were beheaded in 303. Their relics were translated from Bremen to Munich in 1649, and their names commemorated in the Canon of the Mass.

Cosmetic, a preparation applied externally for the purpose of preserving the bloom and beauty of youth; or for restoring those attractions when lost, or in the

process of decay. Among the articles most used are lead, mercury, bismuth, antimony, and arsenic. Pearl powder, that compound which actresses and ladies of fashion use so extensively to give a blooming complexion to the neck and face, is prepared with bismuth powder, or white oxide, and French chalk, with a small amount of carmine to counteract its deadly whiteness; it is usually put on as a liquid compost, and the lady has to sit for some time before her complexion is dry enough to permit the after-touches of rouge and other pigments to intensify the eyelashes and brows. From the absorbing and exhaling properties of the skin, the extreme danger of thus blocking up the pores of the most sensitive part of the body's surface will be evident to all. For not only is all sensible and insensible perspiration prevented, but when the body becomes heated, the absorbents take up the mineral from the cuticle and carry it to the system, where it is certain, sooner or later, to show its influence on the nervous organization by a partial paralysis of the eyelids, or the corner of the mouth. Nor is this the only danger. The skin is made coarse and wrinkled by fine lines, soon loses all its natural smoothness, and the lady is at length compelled to paint by day as well as by night, to enable her to meet the public gaze. A little of this injurious effect may be prevented by first covering the face and breast with lard or cold cream, when, after having filled up all the pores by this means, and wiped the skin, the wash of pearl powder may be painted in.

There are certain strong odors and gases which the painted lady must carefully avoid coming in contact with, or she may discover her pearly bloom in a few seconds converted into a leaden mask or a negro's darkness. Sulphuretted hydrogen, or sulphur in any form, or the eating or the smell of onions, are two of the causes which produce this effect. Nearly all the washes used so frequently are generally prepared by beating down bitter almonds with rose or elder-flower water, and adding from 1 to 2 grains of corrosive sublimate to each ounce of liquid — sweet almonds, castile soap, and spermaceti, being mere addenda — almond oil, caustic potash, essential oil of almonds as a perfume, and water, being by some used to make a cosmetic cream. Elder-flower water is among the most serviceable of all the washes for the face, and when used to remove freckles, with one grain of corrosive sublimate added to each four ounces, a lotion of considerable utility is produced, which may be employed two or three times a day with good results. Those ladies, however, who wish to preserve their good looks the longest, will trust rather to a happy, cheerful mind, a little constitutional aperient, the use of the bath, and simple elder-flower

water as a lotion for the face, than resort to the deadly properties of such mineral cosmetics as those already enumerated.

Cosmogony, the origin or creation of the world; an investigation or dissertation regarding it. Cosmogony and geology, though having certain relations to each other, are still distinct, cosmogony inquiring into the first origin of things, and geology commencing at a period when, that origin having taken place, successive events in the earth's history began to leave behind them memorials from which their character might be more or less clearly reasoned out. Various epochs may be traced in its history.

Ancient Cosmogony Unmodified by the Bible.—The subject more or less occupied speculative minds in most ancient countries, and a work formally named "Kosmogonia" was published by a Greek poet and philosopher, Parmenides, believed to have been written about 503 B. C. A prevalent opinion among the most ancient theologians — Egyptian, Hindoo, Greek, and Roman — was that the world was created by the Supreme Being. Various philosophers, on the contrary, whose attachment to the creed of their respective countries was but nominal, believed in the eternity of the world. The acceptance of this latter tenet did not necessarily exclude belief in a Supreme Being. Thus, Plato held at the same time that there was a Supreme Intelligence, and that matter was eternal. Though not created by the Supreme Being, He operated on it and fashioned it according to His will. Successive creations and catastrophes of the world were held to have occurred, and its ultimate destruction or renovation by fire was also expected.

Jewish and Christian Cosmogony.—The doctrine of the eternity of matter disappeared wherever the new phase of belief arose, for the teaching of the Old Testament was precise: "In the beginning God created the heavens and the earth" (Gen. i: 1). See also the whole of Gen. i., with Exod. xx: 11.

Jewish and Christian Cosmogony Blended with Independent Speculation.—While geology was in its infancy, it gave its strength to cosmogonical inquiry, with the result of generating controversies which continued century after century. They were terminated, not by the settlement of the question in dispute, but by the wise resolve of those engaged in it, or at least of the higher minds among them, to confine their inquiries, at least for a time, to geological facts, and reconstruct, as far as it was practicable, the past history of the globe, before speculating as to its origin. Metaphysicians like Kant took up the abandoned field, but without notable result.

Semi-scientific Cosmogony.—Geologists have shown some tendency to return to cosmological speculation, with the aid of the vastly increased number of facts which the investigations of the last half century have accumulated. The revival of the nebular hypothesis of La Place was a return to cosmogonical speculation. The efforts made by Sir William Thomson, Professor Tait, and the others, to ascertain by a study of the sun what fund of bygone time geologists have at their disposal to draw upon, also fall within the province of cosmogony.

Cosmos, order or harmony, and hence the universe as an orderly and beautiful system. In this sense it has been adopted by Humboldt as the title of his celebrated work, which describes the nature of the heavens as well as the physical phenomena of the earth.

Cossa, Pietro (kōs'sa), an Italian dramatist; born in Rome in 1830. He was for some years Professor of Italian Literature. At first an unsuccessful dramatist, his "Nero" (1871) was received with the most enthusiastic approval for its dramatic power, despite certain marked technical defects of composition. His following plays confirmed the popular estimate of his greatness: "Messalina," "Julian the Apostate," and especially "Cleopatra." He wrote also a volume of "Lyric Poems." He died in 1881.

Cossacks, tribes who inhabit the southern and eastern parts of Russia, paying no taxes, but performing instead the duty of soldiers. Nearly all of them belong to the Græco-Roman Church, to which they are strongly attached, and to the observances of which they are particularly attentive. They must be divided into two principal classes, both on account of their descent and their present condition—the Cossacks of Little Russia and those of the Don. Both classes, and especially those of the Don, have collateral branches, distributed as Cossacks of the Azoff, of the Danube, of the Black Sea, of the Caucasus, of the Ural, of Orenberg, of Siberia, of the Chinese frontiers, and of Astrakhan. Writers are not agreed as to the origin of this people and of their name, but they are believed to be a mixed Caucasian and Tartar race. In personal appearance the Cossacks bear a close resemblance to the Russians, but are of a more slender make, and have features which are decidedly more handsome and expressive.

Originally their government formed a kind of democracy, at the head of which was a chief or hetman of their own choice; while under him was a long series of officers with jurisdictions of greater or less extent, partly civil and partly military, all so arranged as to be able on any emergency to furnish the largest military array on

the shortest notice. The democratical part of the constitution has gradually disappeared under Russian domination. The title of chief hetman is now vested in the heir-apparent to the throne, and all the subordinate hetmans and other officers are appointed by the crown. Care, however, has been taken not to interfere with any arrangements which foster the military spirit of the Cossacks. Each Cossack is liable to military service from the age of 18 to 50, and is obliged to furnish his own horse. They furnish the empire with one of the most valuable elements in its national army, forming a first-rate irregular cavalry, and rendering excellent service as scouts and skirmishers. In 1570 they built their principal "stanitza" and rendezvous, called Tcherkask, on the Don, not far above its mouth. As it was rendered unhealthy by the overflowing of the island on which it stood, New Tcherkask was founded in 1805 some miles from the old city, to which nearly all the inhabitants removed. This forms the capital of the country of the Don Cossacks, which constitutes a government of Russia, and has an area of 61,900 square miles, and a population of 1,474,133. It has a military organization of its own.

Cossus, a genus of nocturnal *lepidoptera*, family *hepialidæ* or ghost-moths. They have long, slender, half-serrate antennæ, a small head, and the upper wings longer than the lower ones. The larvæ feed on wood, the pupa is inclosed in a cocoon. *C. ligniperda* is the goat-moth, so called because its larvæ emit a disagreeable smell, as the goat does. It is a large moth, the expansion of its wings being about three inches to three and one-quarter inches; the upper pair gray mottled with white, and having moreover black bands; the lower ones brownish ash; the body brownish gray, with silvery lines. The ground color of the larva is yellow; it is pink above, with the head and the first segment of the body black. It takes three years to come to maturity. It feeds on old pollard willow-trees, as well as on the poplar, the oak, and the aspen.

Cossus, Servius Cornelius, a Roman hero, who, having slain the King of Veii in single combat, in 428 B. C., dedicated his armor in the temple of Jupiter on the Capitol.

Costa, Sir Michael, an English musical composer and conductor; born in Naples of an old Spanish family, Feb. 4. 1810. In 1828 he went to England, and in 1839 became a naturalized British subject. He was conductor of the Philharmonic Society, the Sacred Harmonic Society, Her Majesty's Opera, the Handel Festivals, etc. His chief works are the opera "Don Carlos" and the oratorios "Eli" and "Naaman." He was

knighted in 1869, and died in Brighton, April 29, 1884.

Costa Rica, a republic of Central America; bounded on the N. by Nicaragua; E. by the Caribbean Sea; S. by Colombia; W. by the Pacific Ocean; area, 23,000 square miles; pop. (official estimate, 1908) 360,326; capital, San Jose.

Topography.—The interior of the country is very mountainous, the ranges reaching an altitude of 11,000 feet, and having many volcanoes. The highest point is Pico Blanco, 11,800 feet. There are many small rivers, the drainage usually being N. E. or S. W., and the fall great. The principal rivers are the Tempisque, Colorado, and Rio Grande. The coast is very irregular, being indented by many large gulfs and bays, of which the Gulfs of Nicoya and Dulce are the most important. The Nicaragua Lake forms nearly half the N. boundary. The E. coast is a gradual slope and is heavily wooded, while the W. is covered with immense savannahs.

Climate and Productions.—The climate in the interior is temperate, and that on the coasts averages about 80° up to an altitude of 3,000 feet. The rainy season on the W. slope lasts from April to November. The soil is exceedingly fertile, and the forests are extensive, yielding mahogany, cedar, rosewood, lignum-vitæ, granadilla, ebony, Brazil-wood, and caoutchouc. Nearly all tropical fruits abound, including cocoa, banana, sugar, sarsaparilla, and vanilla. Other important productions are tobacco, coffee, rice, barley, dye woods, and cotton. The mineral resources are quite extensive, but as yet they have not been systematically worked. Gold is the principal metal mined, and is found both in rock and in placers. Silver, lead, and copper also exist in large quantities. Cattle raising is carried on to a large extent.

Commerce.—Official reports for 1898 showed imports to the value of \$4,258,896, and exports to \$5,659,219. The principal exports were coffee, valued at \$4,209,569; bananas, valued at \$923,090; hides, skins, cedar and hard woods. The coffee exports were to Great Britain, Germany, and the United States. The imports consisted of merchandise, flour, machinery, oil, cotton, iron, woollens, and worsteds.

Finances.—For the fiscal year 1898-1899 the expenditures were estimated at \$3,599,000 and the revenue at \$3,753,000. The principal expenditures were for various departments of the government and the revenue was chiefly derived from customs and excise. The total debt amounted to \$11,125,000. During the period 1896-1900 the government accumulated a reserve of \$5,000,000,000 in gold, and about \$1,600,000 in subsidiary silver.

Communications.—In 1899 there were 131 miles of railroad in operation, belonging to a line running inland from Limon on the Atlantic to Alejuela, 117 miles, and from Puntarenas on the Pacific to Esparza, 14 miles. This line is intended ultimately to form a continuous route between the E. and W. coasts. Foreign commerce is carried by steamers touching at Limon and Punta Arenas, as follows: Atlantic side, to Europe, via Hamburg, twice a month; by British Royal Mail, once a month; and, via Marseilles, once a month; to the United States, via New Orleans, three times a week; and to the United States and Europe, via New York, once a week. Pacific side, to South America, via Panama, three times a month; and to the other States of Central America, three times a month. In addition there were three Costa Rican merchant steamers and two sailing vessels employed in the foreign commerce. There were also 83 postoffices, transmitting nearly 2,000,000 letters per year; and 917 miles of telegraphs, with 43 offices, and sending 400,000 messages annually.

Government.—The government is purely republican in form. The president is elected for a term of four years and is assisted by a cabinet of four members. The legislative power is vested in a Chamber of Representatives, on the basis of one representative to every 8,000 inhabitants, chosen in electoral assemblies, the members of which are elected by the suffrage of all who are able to support themselves. The members of the chamber are elected for four years, one half retiring every two years.

Religion and Education.—The Roman Catholic is the State religion, but there is entire religious liberty under the constitution. In 1897 there were 327 primary schools, with 21,913 pupils, and five other institutions for higher education. Public instruction in all branches is rigidly enforced.

History.—Costa Rica was discovered by Columbus in 1502 and settled in 1504. During the Colonial period it was part of the Kingdom of Guatemala, which proclaimed independence in 1821. From 1824 to 1839 it was a State in the United Provinces of Central America. On the dissolution of the latter, it became an independent republic. In 1856 it declared war on the troops under the filibuster William Walker and defeated them. Its constitution is a most liberal one. Foreigners enjoy every civil right without being admitted to citizenship or being compelled to contribute heavy sums. Admission to citizenship may be applied for at any time and will be granted after one year's residence. Settlers are not obliged to become naturalized citizens. They can carry on business

and manufacture, possess real estate, buy and sell, navigate the rivers and coasts, exercise their religious creeds, marry, and dispose of their property by will. Although from time to time minor revolutions have taken place, the population is more homogeneous and progressive than in any other Central American republic.

SEÑOR DON JOAQUIN BARNARDO CALVO.

Costello, Dudley, an English novelist and journalist; born in Sussex in 1803. He was a magazine writer and the author of popular works of fiction. He died Sept. 30, 1865. His sister, LOUISA STUART COSTELLO, born in Ireland in 1799, published two romances, entitled "The Queen Mother" (1841) and "Clara Fane" (1848), a poem called "The Lay of the Stork" (1856), and various historical and descriptive works. She died April 24, 1870.

Coster, the usual name of *Laurens Janszoon*, according to the Dutch inventor of printing, who was born in Haarlem about 1370. He is supposed to have made his great invention between the years 1420 and 1426, to have been sacristan at Haarlem, and to have died of the plague about 1440. No question has caused more discussion than that between Coster and Gutenberg.

Coster, Samuel, a Dutch dramatist; born in 1579. He was one of the founders of the Dutch Academy. He is best known for his delightful comedies "The Play of Tiisken van den Schilden" (1613), and "The Play of the Rich Man" (1615). He also wrote tragedies, including: "Iphigenia," "Polyxena," "Isabella." He died in 1662.

Costmary, or **Alecost**, a composite herbaceous plant, a hardy perennial, a native of Italy, introduced into Britain in 1568, and common in almost every rural garden. It was formerly put into ale to give it an aromatic flavor, hence the name alecost.

Costs, in law, are the expenses incurred by the plaintiff and defendant. As a rule these are paid by the loser in a suit, but there are always extra-judicial expenses incurred by both parties, which each has to pay whatever be the issue of the suit. In criminal cases the party accused may have his expenses if the court thinks the accusation unreasonable. In matrimonial suits, the wife, whether petitioner or respondent, is generally entitled to her costs from the husband.

Costume, the style of attire characteristic of an individual, community, class, or people; the modes of clothing and personal adornment which prevail in any period or country. Costume balls, also called fancy dress balls, are entertainments at which the guests adopt a style of dress different from the one usually worn. It may be one which was worn at another period, or one worn in

another country, or a modern dress worn by some particular class of society. A favorite plan is to make up as some well-known character in history or literature.

Costus, or **Costus Arabicus**, an aromatic much esteemed by the ancients, is the dried root of *Aplotaxis auriculata*, a composite plant, and is not derived from the plant *Costus Arabicus*, as was at one time supposed. It is a native of the moist open slopes surrounding the valley of Cashmere. The roots are there burned as incense. They have a strong, aromatic, pungent odor, and are employed in protecting bales of shawls from moths. It is also used in India as a hair wash, as a stimulant in cholera, and as a stimulating ointment.

Cote d'Or (kōte-dor), an E. Department of France, formed of part of the old province of Burgundy; area, 3,383 square miles. The surface is in general rather elevated, and is traversed by a chain of hills forming the connecting-link between the Cevennes and the Vosges. A portion of that range, called the Côte d'Or (golden slope), receives its name on account of the excellence of the wines produced on its declivities. A great part of the Department is covered with forests. The valleys and plains are fertile, and there is good pasture land; but the vine culture is by far the most important branch of industry. To this Department belong the first-class wines of Clos Vougeot, Romanée, Chambertin, Corton, Richebourg, Volnay, Pomard, Beaune, Montrachet, and Meursault. Côte d'Or is watered by the Seine, which rises in the N. W., and by several of its affluents; by the Saone, and by Arroux, a tributary of the Loire. The climate is temperate; iron, coal, marble, gypsum, and lithographic stones are found, the first in large quantities. Côte d'Or is divided into four arrondissements, viz., Beaune, Châtillon-sur-Seine, Dijon, and Semur, with Dijon for its capital. Pop. (1906) 357,959.

Cotes, Sara Jeannette (Duncan), a Canadian author; born in Brantford, Ontario, Canada, in 1862. She entered journalism as a correspondent for several Canadian and American newspapers at the Cotton Centennial in New Orleans in 1884-1885; served on the staff of the Washington "Post," the Toronto "Globe," and the Montreal "Star"; married Everard C. Cotes, of the Indian Museum; and has lived for several years in India. Her books include "A Social Departure," "An American Girl in London," "A Daughter of To-day," "Vernon's Aunt, an Oriental Story," "The Simple Adventure of a Mem Sahib," "His Honor and a Lady," etc.

Côtes-du-Nord (kōt-dü-nōr), a maritime Department in the N. of France, forming part of ancient Brittany; capital, Brieuc. Area, 2,659 square miles. The

Cotidal

coast extends about 150 miles, and the herring, pilchard, and mackerel fishing is actively pursued. One of the main branches of industry is the rearing of cattle and horses. In manufacturing industries the principal branch is the spinning of flax and hemp, and the weaving of linen and sailcloth. Among the minerals are iron, lead, and granite. Pop. (1906) 611,506.

Cotidal, having the tides at the same moment of time. Cotidal lines are imaginary lines marked on the surface of the globe, indicating where the tides are in the same state at the same time.

Cotillion, a brisk dance of French origin performed by eight persons together, resembling the quadrille which superseded it. The name is now given to a dance which often winds up a ball, and which is danced with any number of dancers and with a great variety of figures, the pairs of dancers following in this the leading pair, and partners being successively changed.

Cotinga, a genus of *ampelidæ* (chatterers). They have beautiful plumage, and are found in South America.

Cotise, or **Cost**, in heraldry, one of the diminutives of the Bend.

Cotman, John Sell, an English artist; born May 16, 1782; educated at Norwich Grammar School till about 1798, when he went to London to study art, and there made Turner's acquaintance. In 1807 he returned to his native city, where he taught drawing and published etchings and engravings of local architecture, brasses, etc. In 1834 he obtained, through Turner, the post of drawing-master in King's College, London. He died July 24, 1842.

Cotner University, a coeducational institution in Bethany, Neb.; organized in 1889, under the auspices of the Disciples of Christ; has an endowment of \$50,000; grounds and buildings valued at over \$150,000; volumes in the library, about 3,000; ordinary income, \$23,000; average number of faculty, 58; average students, 385.

Cotoneaster, a genus of plants, order *Pomaceæ*. The flowers are polygamous, the calyx turbinate, with five short teeth; petals five, small, erect; stamens erect, as long as the teeth of the calyx; fruit turbinate, its nuts adhering to the inside of the calyx, but not united in the center of the fruit. *C. vulgaris* is the common cotoneaster. Several varieties of it are cultivated in gardens. Other species are from the European continent, from India, etc.; some of them also have been introduced into Great Britain. *C. Uva Ursi* and *microphylla* have acid in their seeds.

Cotopaxi, the most remarkable volcanic mountain of the Andes, in Ecuador, about

Cotton

60 miles N. E. of Chimborazo; lat. $0^{\circ} 43'$ S.; lon. $78^{\circ} 40'$ W.; altitude 19,500 feet. It is the most beautiful of the colossal summits of the Andes, being a perfectly symmetrical truncated cone, presenting a uniform, unfurrowed field of snow of resplendent brightness. Several terrific eruptions of it occurred in the course of the 18th and the beginning of the 19th century.

Cotswold Hills, a range of hills in England, county of Gloucester, which they traverse N. to S. for upward of 50 miles; extreme elevation near Cheltenham, 1,134 feet. The Cotswold sheep are a breed of sheep remarkable for the length of their wool, formerly peculiar to the counties of Gloucester, Hereford, and Worcester.

Cotta, Johann Friedrich, Baron von, a German bookseller; born in 1764. He began business at Tübingen, but in 1811 removed to Stuttgart. He was the publisher for many great writers in Germany, including Goethe, Schiller, Wieland, Richter, Uhland, Fichte, Hegel, the Humboldts, and others. He died in 1832.

Cottin, Sophie Risteau, better known by the name of *Madame Cottin*, a French novelist; born March 22, 1770. In 1790 she married M. Cottin, a banker of Bordeaux, who died in 1793, and thenceforth she followed literature. Her best-known work is "Elizabeth, or the Exiles of Siberia"; other novels are "Claire d'Albe," "Malvina," "Amélie," and "Mathilde." She died in Paris, Aug. 25, 1807.

Cottle, Joseph, an English bookseller and publisher, and the author of some now almost completely forgotten poems; born in 1770. He was a generous friend to Coleridge and Southey in their early days, and wrote an interesting volume of recollections of those authors. He died in Bristol, June 7, 1853.

Cotton, a vegetable hair or filament constituting the wing of the seed of the different species of *Gossypium*, a plant belonging to the order of *Malvaceæ*, growing both in the temperate and tropical climates, indigenous in Asia, Africa, and South America. Both fiber and seed are produced in pods not unlike the outer shell of the walnut. When the seed approaches maturity the fiber in which it is enveloped, which had previously been in a cylindrical form filled with watery sap, becomes dry. The sap is then deposited upon the walls of the outer cell, which then collapses longitudinally and takes on a spiral form slightly blunt at the point where it is attached to the seed, and pointed at the end. In the green-seed variety, the one chiefly cultivated, it is of a white or yellowish hue, soft, flexible, and a non-conductor of heat. The fiber consists chiefly of carbonaceous material drawn from

Cotton

the atmosphere, and is one of the purest forms of cellulose. One may obtain an idea of the tenuity of the cotton fiber by consideration of the fact that it takes from 14,000 to 20,000 filaments of American cotton to make the weight of one grain, while the separate fibers, within the weight of a single pound of 16 ounces avoirdupois, placed end to end in a straight line, would extend 2,200 miles. It is to this spiral form that the possibility of spinning cotton is due. The fibers interlock one with another nearly to the end. They are somewhat like a twisted ribbon, a little thicker at the edges than in the middle.

After rags have been made into pulp and converted into paper, cotton can be detected in the latter if the separate fibers are put under the microscope, so persistent is the spiral twist in each fiber. Although cotton-seed, which is produced at the ratio in weight of two and a half to three parts of seed to each one of fiber, has long been the source of valuable oils and food for cattle in Egypt and India, the cotton-seed of the United States was in former days mostly wasted. It has now become a secondary product of very great value. Tree cotton (*G. arboreum*) is found in India, China, Egypt, on the W. coast of Africa, and in some parts of America, especially in the West Indies. It attains only the height of from 12 to 20 feet; but another cotton-bearing tree (*Bombax ceiba*), seen in the West Indies and elsewhere, familiarly called the umbrella tree, attains the height of 100 feet. The produce of the latter, however, is of a short and brittle fiber, and is also without the convolution or spiral twist which gives other varieties their spinning quality. Being unfit for spinning, it is only useful for stuffing pillows and beds. Shrub cotton (*G. religiosum*) occurs in one or other of its varieties throughout the tropical parts of Asia, Africa, and America. In appearance it resembles a currant-bush. Its duration varies according to the climate; in the hottest countries it is perennial, while in cooler places it becomes an annual. In the former two crops a year are gathered, one from October to December, the other from February to April. The Guiana, Brazil, and most of the West Indies cotton, is of this kind, the whole being long-stapled.

Herbaceous cotton (*G. herbaceum*), commonly called the green-seed variety, is by far the most useful and important of the three kinds noticed. It is an annual plant cultivated in the United States, India, China, and many other countries. It attains the height of one to five feet. The seed is usually planted in rows in March, April, and May; the cotton is gathered by hand within a few days of the opening of the pods, in August, September, and October; in the United States often through November and December, or even till it becomes necessary

Cotton

to prepare the land for a new crop. It is to this kind that planters mainly confine their attention in the United States. In places where cotton is more extensively cultivated the following varieties are commonly distinguished: (1) Nankeen cotton, abundant in produce, the seed covered with down, the wool of a dirty yellow color, and usually low-priced. (2) Green-seeded cotton, which, as well as the former, is grown in upland and middle districts, whence the latter is called upland, also short-staple, and from the mode in which it was formerly cleaned, "bowed Georgia cotton." This kind was at first chiefly raised in Georgia and South Carolina, but in later years its cultivation has been very greatly extended throughout the Southern States. (3) Sea-island, or long-stapled cotton, the finest of all, is distinguished by the black color of its seed, and the fine yellowish-white, strong and silky long staple by which it is surrounded; it is grown in the lower parts of Georgia and South Carolina, near the sea, between Charleston and Savannah, and on small islands adjoining the shore and in Florida. Owing to the peculiar combination of circumstances requisite for the production of this kind, it forms only a trifling proportion of the cotton grown in the United States; nor is the quantity materially increasing.

A heavy black loam produces the best average yield of cotton. Marshy ground is wholly unfit for it, and a wet season is destructive to the crops, which are besides precarious from the diseases to which the plant is subject, particularly blight produced by wetness at the roots. In general it flourishes most luxuriantly and yields produce of the best quality on the coast, as is proved by the growth of the sea-island cotton, which is mostly exposed to the action of the ocean's spray; and a manure of soft mud is known to impart a healthful action to the plant and to produce a staple at once strong and silky. To this rule, however, the fine Pernambuco cotton is an exception; also the Egyptian, the growth of the upper provinces being greatly superior to that of the Nile Delta; and certain varieties, among them the "Peeler" and "Bender" cottons, grown in the valleys and deltas of the Mississippi river in the United States. The average yield in the United States under normal conditions is about six hundred pounds of seed cotton, equivalent to about two hundred pounds of lint cotton, though as much as twenty-five hundred pounds of fiber have been produced on a single acre. The Mississippi river about equally divides the cotton-producing territory, measured by the quantity grown; the per cent. grown in 1904 was 53.8, east, and 46.2, west, while in 1900 the percentages were 52.8 west and 47.2 east.

The world's crop in 1907 was 16,955,682

Cotton

bales of 500 pounds net weight. The distribution by countries was as follows: United States, 11,325,882; British India, 2,444,800; Egypt, 1,296,000; Russia, 620,000; China, 428,000; Brazil, 370,000; Mexico, 85,000; Turkey, 80,000; Peru, 55,000; Persia, 51,000; other countries, 200,000. The largest crop grown in the United States was that of 1904, which, according to the returns of cotton ginneries to the Census Bureau, was 13,679,954 bales of 500 pounds gross weight, that is, including the weight of wrapping and bands. This crop was grown in 838 counties in fourteen States and two Territories.

Of this crop, 8,834,929 bales, or 61 per cent., were exported, 4,728,980, or 30 per cent., consumed in the country, and the remaining 9 per cent. left over as stocks at the end of the year. The cotton exported from the United States during the year ending Aug. 31, 1905, figured in percentages, was distributed among the countries taking it as follows: United Kingdom, 45.8; Germany, 23.9; France, 9.7; Italy, 6.1; Spain, 3.3; Belgium, 1.8; Russia, 1.4; other Europe, 2.0; Japan, 3.7; British North America, 1.4; Mexico, 0.8; and all other countries, 0.1. A bulletin of the Department of Commerce and Labor, dated Jan. 23, 1909, gives the following report on the total quantity ginned in the United States from the crop of 1908 to Jan. 16, 1909:

	Bales
Alabama	1,316,803
Arkansas	931,133
Florida	68,624
Georgia	1,952,113
Kansas, Kentucky and New Mexico	1,825
Louisiana	458,762
Mississippi	1,551,792
Missouri	55,299
North Carolina	661,669
Oklahoma	612,144
South Carolina	1,192,723
Tennessee	321,727
Texas	3,528,981
Virginia	12,608
	12,666,203

See also the articles COTTON-GIN; COTTON SEED OIL; COTTON SPINNING.

Revised by DANIEL C. ROPER.

Cotton, John, a Puritan clergyman; born in Derby, England, Dec. 4, 1585. He came to America in 1633, and became teacher of the First Church in Boston. He had a religious controversy with Roger Williams. Cotton was a voluminous writer, and published nearly fifty books. He died in Boston, Dec. 23, 1652.

Cotton, Sir Robert Bruce, an English antiquary; born in Denton, Huntingdonshire, Jan. 22, 1571; educated at Westminster School and Cambridge; knighted in 1603; created a baronet in 1611. For years he sat in Parliament. He is famous as a collector of literary and other antiquities, and as founder of the Cottonian Library, now in the British Museum. He died May 6, 1631.

Cotton Famine, the destitution caused

Cotton Seed Oil

in English cotton manufacturing districts, especially in Lancashire, by the American Civil War, during which cotton imports from the United States almost ceased.

Cotton-gin, a machine for separating the seeds from cotton fibers. The first device of the kind was the saw-gin invented by Eli Whitney (*q. v.*) in 1792, which greatly facilitated the work of separation. It has been improved in various ways, and a single machine such as those now in use will do many times as much ginning in a day as one person could do by hand in a year. The Whitney gin has a gang of fine-toothed circular saws mounted on a revolving mandrel. The fibers being caught by the teeth of the saws, are drawn away from the seeds. These are too large to follow through the interstices, and they pass down out of the machine. A revolving brush removes the fibers from the saws, and rollers deliver the cotton in laps. In some other machines wire teeth, or needles projecting from a revolving cylinder, take the place of saws. In the Whitney gin the fibers are exposed to injury by the action of the saws, and for sea-island, Egyptian, and other long-stapled cottons an improved roller gin, in which the fibers are drawn between rollers, the seeds being kept back by blades, is in use, but owing to its limited capacity—less than one-fourth of that of the saw-gin—it has not been generally adopted. In the cotton States of the South ginning plants have been established with varied machinery, compresses for baling, etc., and the numerous improvements in these establishments have revolutionized the methods of a vast industry. The number of ginneries operated prior to Jan. 16, 1909, was 27,456.

Cotton-grass, a name given to the species of the genus *Eriophorum*, because of their fruit being clothed at the base with a silky or cotton-like substance. It really belongs, not to the grasses, but to the sedges (*Cyperaceæ*). There are several species; the most common is *Eriophorum angustifolium*, the narrow-leaved cotton-grass. Paper and the wicks of candles have been made of its cotton, and pillows stuffed with the same material. The leaves were formerly used in diarrhœa, and the spongy pith for the removal of tapeworm.

Cotton Seed Oil, a valuable oil obtained from the seed of the cotton plant, which is crushed between powerful rollers.

The manufacture of cotton seed oil and all of its resultant by-products furnishes one of the best examples of the development of a business based upon the utilization of a waste product. The seed of the cotton plant, of which cotton oil is the fatty ingredient, was for many years a waste product of the cotton field. The first cotton oil mill was established in 1837, but for many years after the business did not

Cotton Seed Oil

amount to much; in fact, the real advances in this industry have been made in the past 20 years, with the greatest development in the last 10 years. Prior to the advent of the oil mill and during the interval of its development cotton seed was used in some localities as fertilizer. Later on it was used to a certain extent as a cattle food; but the main proposition seems to have been how to get rid of the seed with the least trouble, and, in fact, laws were passed in certain States making it a punishable offense for ginnerers within certain limits of towns to allow cotton seed to lie around and rot, or to dump it into streams.

It is computed that as late as 1870 only 4 per cent. of the seed produced from a cotton crop of 3,011,996 bales, was utilized in the oil business. In 1890 this had increased to 25 per cent. of the seed on a crop of 7,472,511 bales, and in 1900 it was 53 per cent. on a crop of 9,645,974.

According to the census of 1900, the value of the entire cotton seed crop was 13.8 per cent. of the total value of the seed, while the value of the products from the manufacture of all the seed produced would have been 20.4 per cent. of the total value of the cotton crop. Thus it will be seen that the full benefit of the cotton seed product to the planting and commercial interests of the South is not yet fully realized; not within \$26,000,000 on the size of a crop equal to that in the census year of 1900. The seed which is not worked up in the oil mills is used for fertilizing, feeding, and planting. It has been unquestionably demonstrated that for feeding and fertilizing purposes the product of the cotton seed, after expressing the oil, has a greater economical value than has the whole seed, so that eventually the entire seed crop will be worked through the cotton oil mills, with the exception of the amount reserved for planting.

Cotton seed meal contains, by a large percentage, a greater amount of nitrogen (protein) than any other food. It is, in fact, the most concentrated cheap and most nutritious of foods, and in feeding, mixing it with bran, middlings, hulls, or other feeds it produces an ideal cattle food. The tendency of the times is toward more scientific feeding, and the utilization of cotton seed meal, with its high percentage of flesh-forming properties, makes a great advancement over the old method of feeding the whole seed.

One of the principal uses and development of cotton seed oil contingent upon the improvements in refining methods in the past decade is that of the manufacture of lard compound—a mixture of lard, oleo stearin and refined cotton seed oil—making a most palatable and economical food. Another product of cotton seed oil, white cotton-lene, is a mixture of oleo stearin and specially processed cotton seed oil, marking,

Cotton Spinning

perhaps, the highest development of cotton oil as a food product.

Cotton oil is also used in the making of salad oils, packing sardines, in the oleomargarine industry, for miners' burning oil, cathedral burning oil, tempering oil, oil for heavy tool-cutting machines, mixing with putty, and, while not exactly a drying oil, yet for rough painting the crude oil can be and is used to a considerable extent. The cheapness of cotton oil compared with other fats, as well as its excellent soap-making properties, has caused it to be largely used by soap makers, both in America and abroad. It is also used in the manufacture of washing powders. Cotton seed oil is used today to a great extent by bakers. It is also used as a substitute for olive oil. Chemists and physicians now recognize cotton oil as a high-class food product.

Cotton Spinning. When or where cotton was first manufactured is uncertain, but long before our era, India and other nations of the far East had a world-wide fame for its cultivation and manipulation. It was, however, under Mohammedan rulers that the Indians carried the arts of cotton spinning and weaving to an unsurpassed degree of excellence. In their celebrated Dacca muslin industry each spinner held a ball of cotton in her right hand; she drew from it some of the filaments and made them fast upon a spindle which carried near its base a ball of clay, and rested in a shell embedded in the earth. The spindle was rotated by the forefinger and thumb of the left hand until she could move her right arm no farther from its point; she then coiled the thread about the spindle. A repetition of these operations gave a thread of so attenuated a character that it not infrequently equalled 530s by our system of computation; namely, 530 hanks each of 840 yards in one pound avoirdupois. In early times the Indians used a wheel shown in Plate I. It had a spindle mounted horizontally in a framework, and its whorl or "warve" was connected by a band to a large wheel. After attaching some filaments of cotton to the spindle, they were attenuated with the right hand, and fully twisted by holding them obliquely to the spindle, and turning the wheel with the left hand. When a stretch was completed the spinner moved the thread to a right angle with the spindle, and wound it on. This wheel was used with or without a distaff, but never to spin the finest yarns.

In Europe a similar contrivance known as the "bobbing wheel" was in constant use down to the close of the 18th century, and fine threads were made upon it by first drawing and slightly twisting the carded material, so as to produce what is called a "roving"; and then by further attenuating and fully twisting the roving from the first

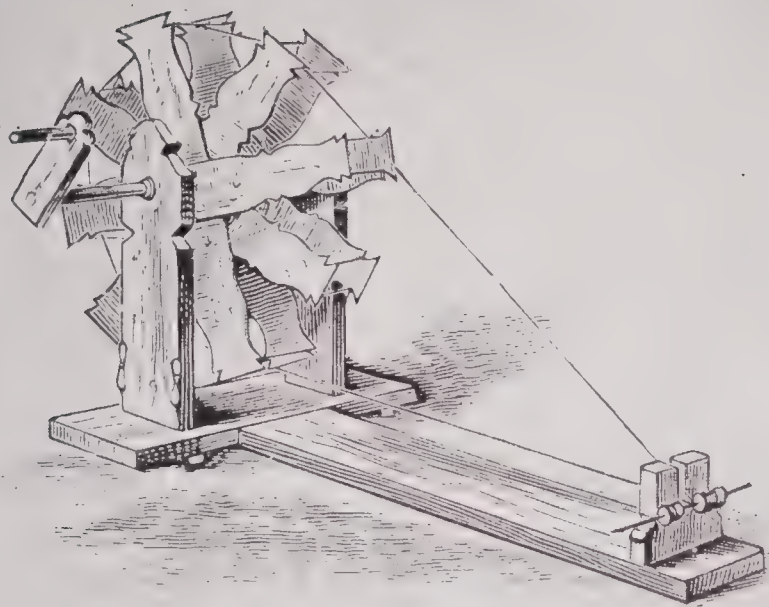
spinning. Changes were made in the intermittent spinning-wheel, which introduced the principle of continuous spinning. The first of these is said to have been made in 1533 by a citizen of Brunswick, who, by adding a treadle, enabled a spinner to rotate her spindle with one foot and left both hands free to manipulate the fibers. This was speedily followed by an invention known as the "Saxony wheel" (see Plate I.), which consisted of a large driving-wheel whose axis was cranked, and connected by an arm to a treadle. The spindle differed materially from those previously described. It had a warve at the rear and an eye at the forward end for the thread to pass through, while in front of that a wooden flyer was secured, having legs wide enough apart to cover a spool. At short intervals bent wires, known as the "heck," were driven into both legs. A spool was loosely threaded upon the spindle, and one grooved flange served as a pulley. A double band from the large wheel drove both the spindle and spool, but the former at a higher rate than the latter. The filaments, drawn from a "rock" or distaff, were threaded through the spindle eye, led along one leg of the flyer, and made fast to the spool. By operating the treadle, the heck gave a twist to the thread at each revolution, simultaneously the spool wound up the length spun. A spool was filled evenly by slipping the thread from tooth to tooth of the heck. In or about 1764 a second spindle was added to enable a spinner to draw out a roving with each hand, and spin two threads at the same time. The last improvement on the Saxony wheel was made early in the 19th century. It consisted in adding a cam and lever to automatically move the flyer across the spool, and thus prevent the loss of time arising from shifting the thread along the heck.

Long before the last-named changes had been effected a machine was introduced which eventually revolutionized spinning, as it rendered the construction of a thread independent of human manipulative skill. This was invented by John Wyatt in 1733, and patented by his partner, Lewis Paul, in 1738. Its essential features consisted in joining together short lengths of carded fiber into long "slivers" of uniform thickness, and in passing one end of each between two parallel rollers, that, by rotating, drew in and delivered them to other pairs of rollers moving proportionately faster than the first pair, thus reducing the slivers to the required degree of fineness. The spindle, flyer, and spool previously described appear to have been used to twist and receive the thread. Machines of this type, or with a single pair of rollers so contrived that the winding spool drew out the material faster than the rollers delivered it, were used, either in Northampton or in Birmingham,

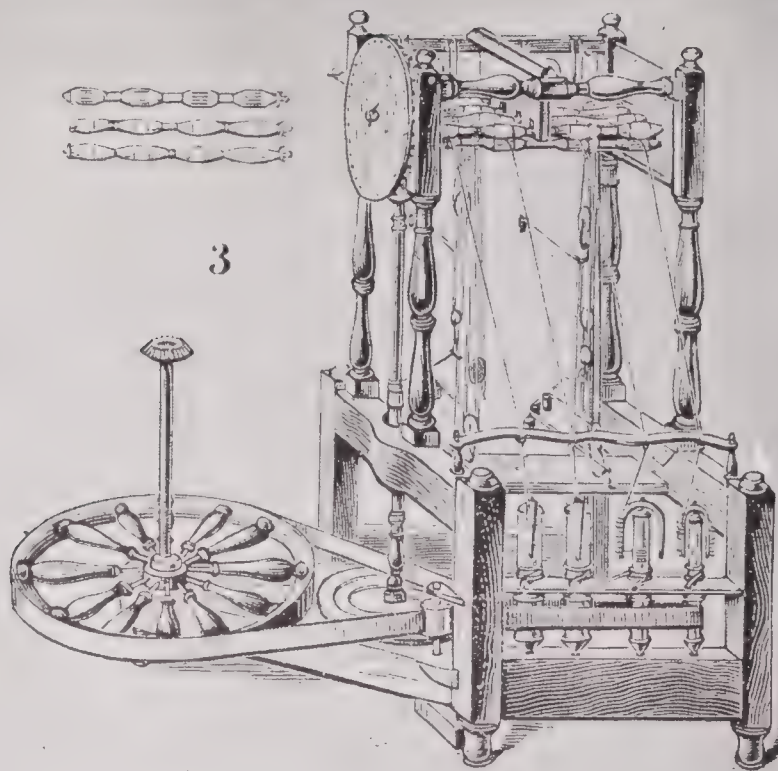
until 1743. Wyatt's invention was a commercial failure, but this was probably due less to inherent defects in the machine than to faulty preparation of the material. Highs and others worked on similar lines, but it was Arkwright and his assistants who directed all their energies toward the inventing or improving of a practical spinning plant.

The first machine thus produced was patented in 1769, but, as will be seen from the figure in Plate I., it contained no really new feature. It consisted essentially of Wyatt's drawing rollers, and the spindle, flyer, and spool from the Saxony wheel. A wooden framework supported the working parts, to which motion was transmitted by means of a large pulley and a belt, the latter driving the line of spindles and also giving a rotatory motion to an upright shaft, whence was conveyed a varying motion to four pairs of rollers. The bosses of the bottom rollers were of wood, fluted longitudinally; those of the top ones were of wood sheathed in leather. Pulley blocks, levers, and weights held the upper rollers in close contact with the lower ones. From the bobbins placed at the top of the machine the rovings were fed to the rollers and were there successively attenuated. Finally each passed to a flyer and was made fast to a spool. These spools were loosely dropped upon the spindles, and their grooved flanges had a cord threaded alternately before and behind them to regulate the drag upon the threads. In the Bolton Museum a spinning frame is exhibited which is said to have been used in Cromford Mill from 1770 to 1860. If the former date is correct, Arkwright discarded the wooden flyer and heck within a year of securing his patent, and substituted for it a metal flyer having an eye coiled on each leg as in Plate II., fig. 3. The spools also rested upon a rail which rose and fell through a space equal to the length of the spool barrel, such movement being derived from a cam, from levers and from links. This alteration relieved the attendant from the labor of slipping the threads along the heck; it also gave automatic and satisfactory winding. A line of 24 spindles, and lines of rollers, were mounted on each side of the framework. Four spindles were driven from one drum, and four bosses of each line of rollers were actuated from the shaft of every drum. Subsequently the "water-twist frame," as this machine was called (being originally driven by water power), was changed into the "throstle" (see Plate I., fig. 6) partly by constructing the machine of metal and by overhauling its details, but principally by connecting the bosses of each line of rollers *b, c, d*, to which the roving passed from the bobbins at *a*, so that one driving gear would serve for the whole length; also in placing a long tinplate cylinder in the center of the frame-

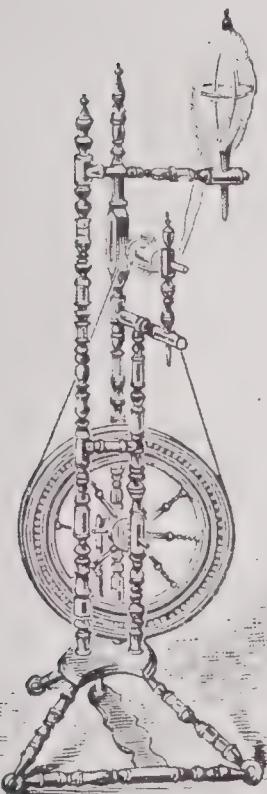
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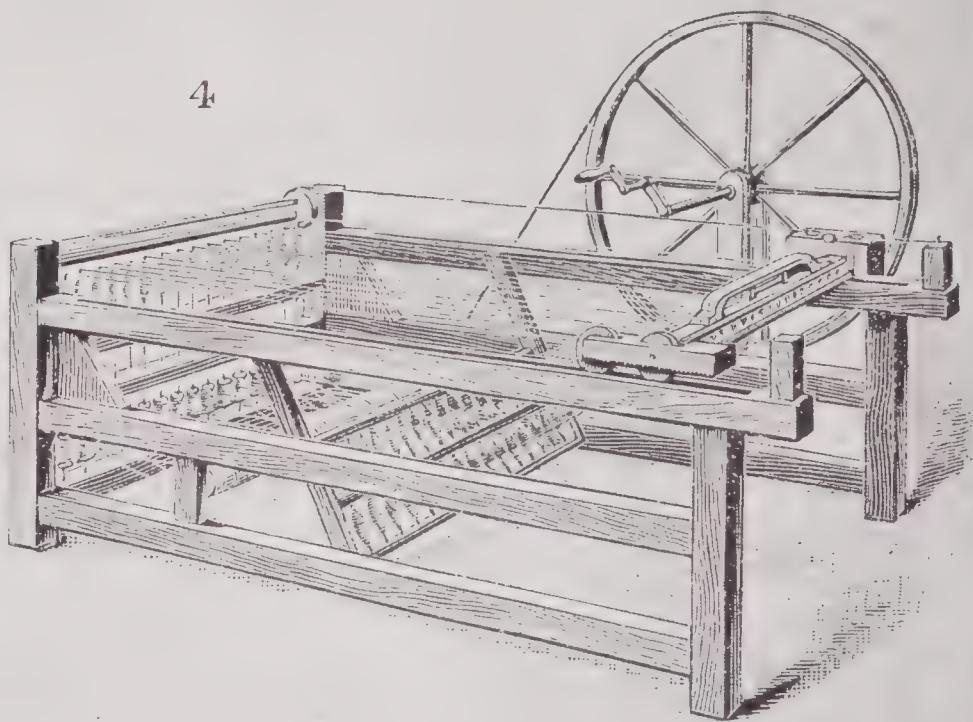
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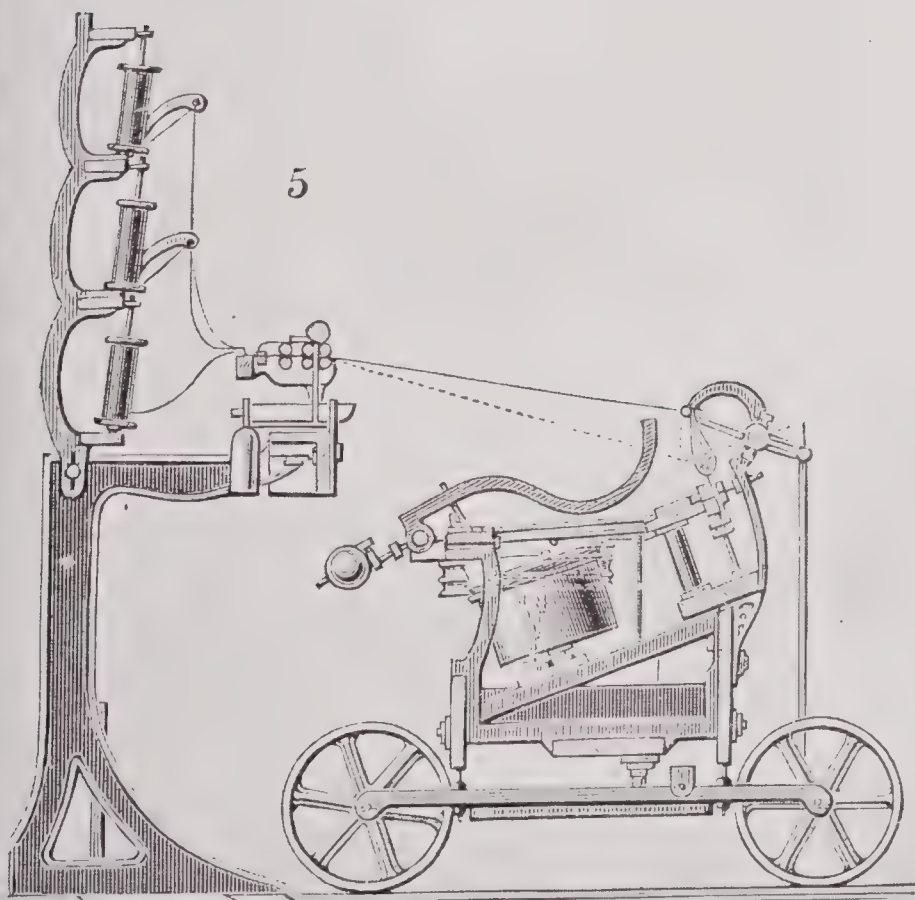
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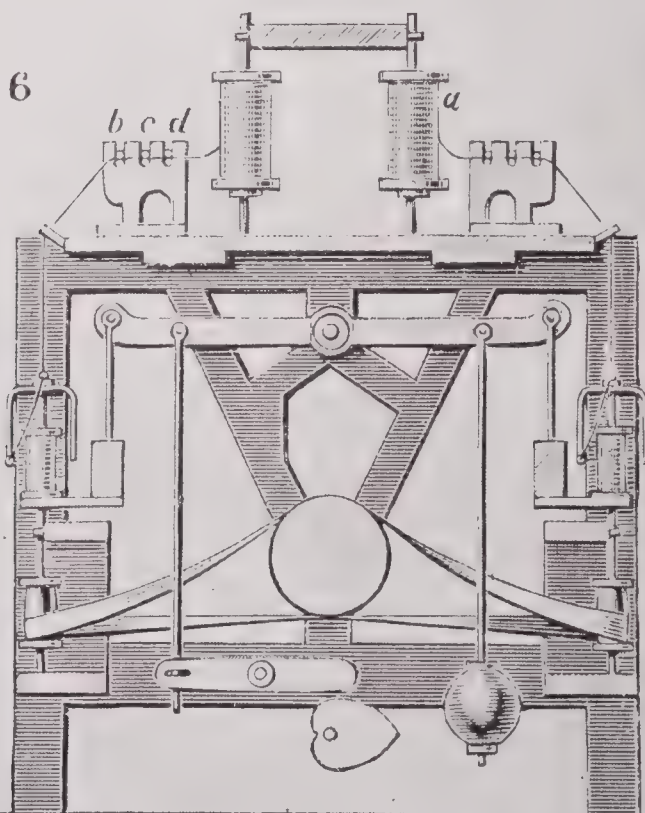
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6



DEVELOPMENT OF SPINNING MACHINERY.

FIG.

1. Indian Spinning-Wheel.
2. Saxony Spinning-Wheel.
3. Arkwright's Water-Frame.
4. Hargreaves' Spinning-Jenny.
5. Crompton's Mule.
6. Throstle.

Fig. 1. CARD

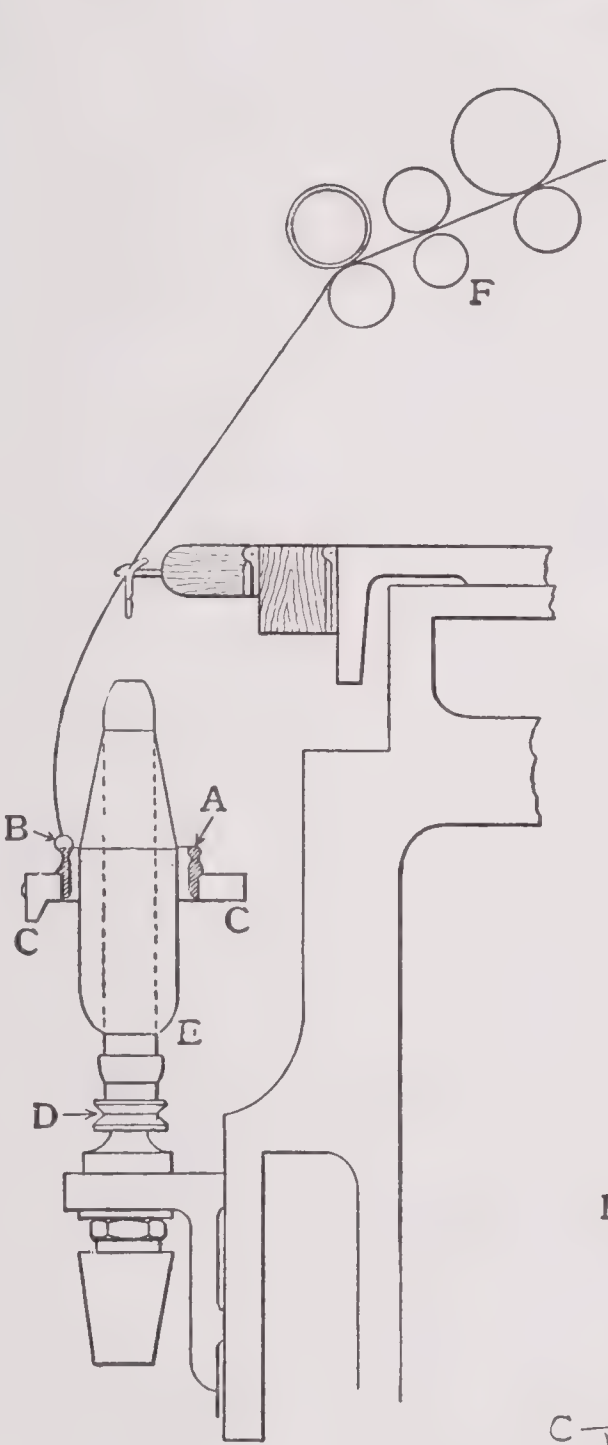
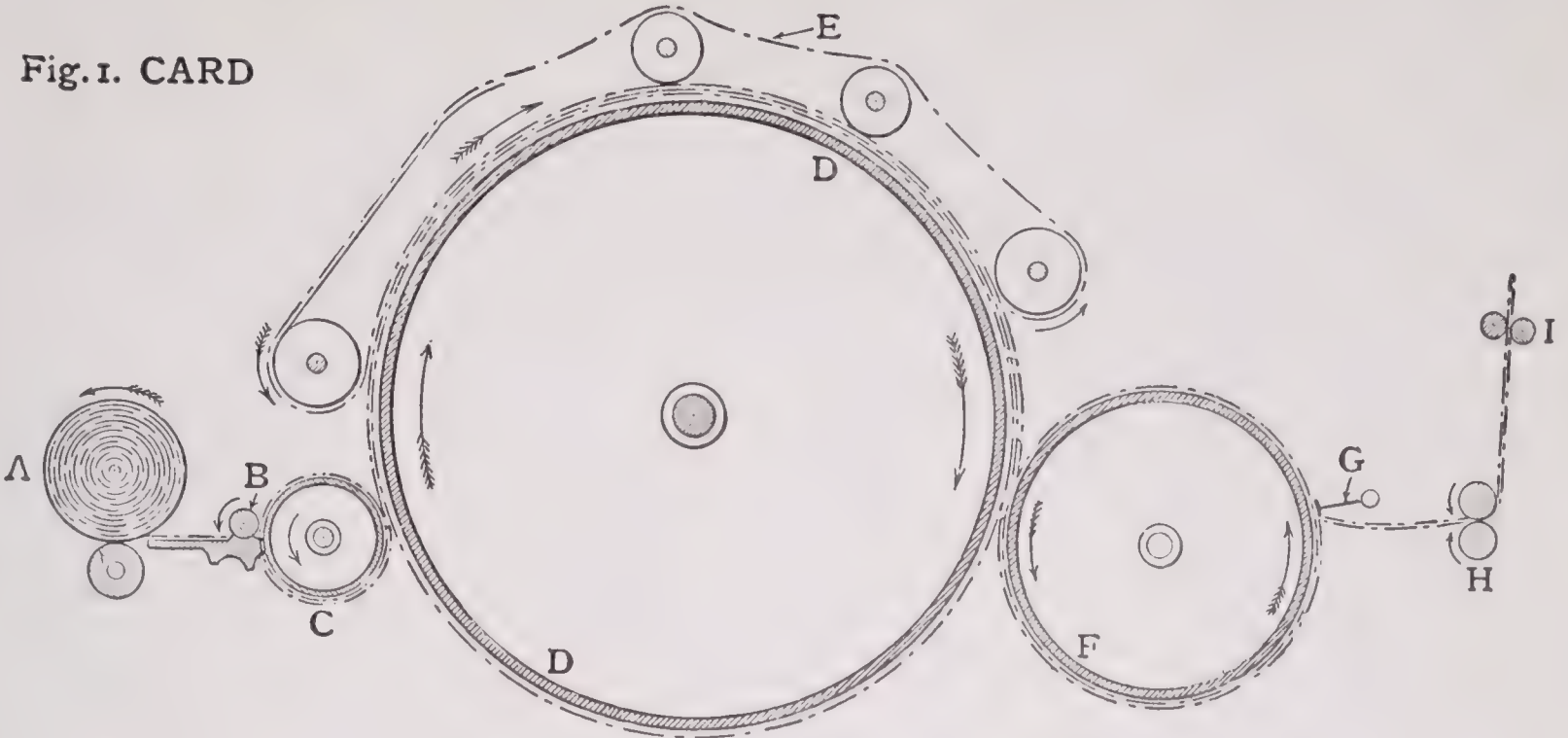


Fig. 2. RING

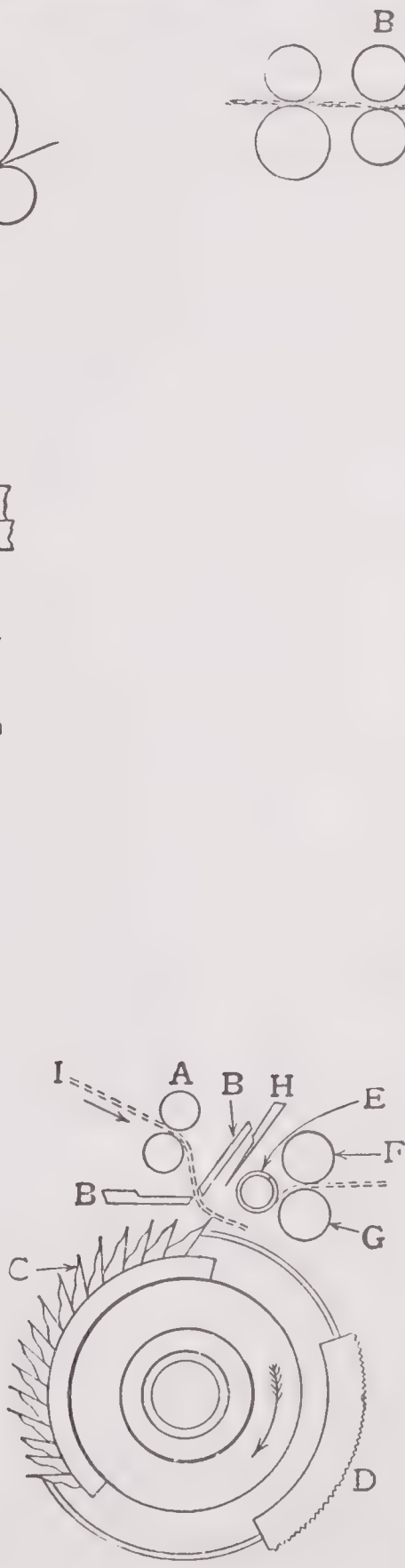


Fig. 4. COMBER

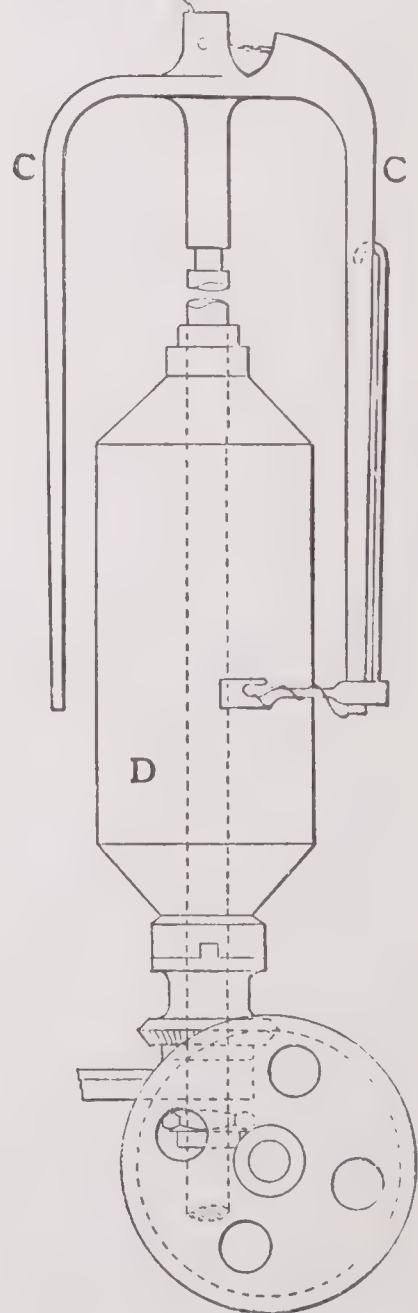


Fig. 3. FLYER FRAME

work, and leading from it in each direction a sufficient number of bands to separately drive the spindles. In or about 1829 Danforth used a "dead" spindle, and on the top of it he placed a smooth, hollow cap, which completely encased a spool. A freely fitting sleeve and warve were mounted on the spindle, the former to receive a spool, the latter to rotate both. A thread passed from the drawing rollers down to a spool, and the lower edge of the cap served as the winding point. In rotating, a spool pulled its thread round the cap, and it was uniformly wound by a slowly rising and falling rail on which the sleeve rested.

In 1828 Thorpe invented the first ring-spinning frame, and his efforts were ably assisted by those of others. Yet it was not until 1866 that rings were much used. Even then it required the Booth-Sawyer spindle to render this principle secure. The chief feature of ring-spinning consists in the substitution for the flyer or the cap, of a smooth annular ring A (Plate II., fig. 2), formed with a flange at the upper edge, over which a delicate C-shaped piece of wire B, called a traveler, is sprung. All the rings are equidistant, and secured in a rail C that rises slowly and falls quickly, but at each succeeding ascent and descent it attains a higher point than that formerly reached. A spindle D passes through the center of every ring, and has a spool E pressed upon it. As now constructed, a spindle is supported by and turns inside a bolster secured to a rail. The bolster sometimes provides one, at other times two bearings for the spindle. In the latter case each bolster is so recessed that its spindle only touches at the foot and at the top. The recess is then filled with sufficient oil to lubricate the spindle for long periods. But if a bolster only provides one bearing at the top, its spindle is free to move at the foot, and is then known as a self-balancing spindle, for in turning it finds its own position of steadiness. Both kinds have a sleeve fitted upon them, which covers the upper part of the bolster and carries at its lower end a warve turned by a band from a pair of tin drums; they are run at speeds as high as 11,000 revolutions per minute. The attenuated roving is twisted, hooked into the traveler, and made fast to the spool. The office of a traveler is to put a drag on the thread during spinning, and hold it in the best position for winding. The amount of twist put into a given length of thread is governed by the speed of the front rollers F and that of the winding surface. For if the rollers were stationary while a spindle rotated, its traveler would revolve round the ring at an equal speed with the spindle, and a twist would be put into the thread at every revolution. But since the rollers deliver the roving, the traveler must lag behind the spindle in proportion to the length deliv-

ered, and to the diameter of the spool at the winding point.

Although the appliances for spinning threads intermittently have not, so far, been carried beyond the old bobbing-wheel, yet they were developed side by side with those for continuous spinning. To discover how the intermittent system was brought into line with its rival it will be necessary to go back to 1764 (or 1767), when Hargreaves invented the "jenny" to conduct the second spinning. This he accomplished by mounting a number of spindles vertically in a frame (see fig. 4, Plate I.). He connected each spindle warve by an endless band to a drum that extended across the machine, the drum shaft being driven by a rope from a grooved wheel on whose axis a handle was fastened. A horizontal "faller wire" could be vibrated by a cord secured at the front of the machine. Upon the upper framework a clamp was free to move to and fro on rollers; it consisted of two horizontal jaws which could be opened and shut like a parallel ruler. A sloping "creel" contained the rovings, which were passed between the open jaws of the clamp and secured upon the spindles. That portion of each roving extending from the closed clamp to a spindle was reduced to the proper degree of tenuity by drawing out the clamp with the left hand, while with the right hand the handle was turned to drive the spindles. When the clamp reached its farthest point of outward traverse, and the rovings were sufficiently stretched and twisted, spinning ceased. The spindles were then reversed to clear their blades of the coarsely pitched coils of thread; the faller wire pressed the yarn down to the winding point, the spindles were rotated in their normal direction, and the clamp was pushed in to wind up the lengths spun. After this the clamp was again opened, a fresh supply of rovings fed forward, and the operations repeated. The jenny was afterward made to contain 120 spindles, and a treadle enabled the spinner to run the faller with his foot.

Between the years 1774 and 1779 Crompton invented and used the "mule" which, although more complicated than its predecessors, was yet more perfect in action. In some points it resembled machines then in use; for example, it contained drawing-rollers, and included the principle of simultaneous stretching and twisting. Yet its action differed from continuous spinning in not fully attenuating the roving before twisting it; and it also differed from the jenny in not relying entirely upon stretching for attenuation. By combining the two principles a thread could be spun with a minimum of strain upon it, and one which possessed the maximum of regularity and elasticity. Indeed, from its introduction this machine could and still can spin finer and better yarns than any of its rivals.

In fig. 5 (Plate I.) certain features of the mule are to be seen. At the left of the figure a stationary creel contains three tiers of spools filled with rovings; the latter pass over guide-wires to and between three lines of fluted rollers, and thence to spindles situated in the carriage on the right. The carriage is provided with grooved wheels that run upon raised pieces of metal, called "slips"; these permit it to readily recede from, or advance toward the rollers. A faller wire is mounted on the carriage and above the line of threads. It is connected to a shaft by "sickles," and can be lowered to force the threads down the spindles. A counter faller, normally below the threads and supported in curved levers, is attached to a shaft at the rear of the carriage. This shaft also carries an arm with a spherical weight, so that as the threads in descending bear upon the counter faller, the tension upon them can be regulated to suit their strength.

In a mule used by Crompton in 1780, and now preserved in the Bolton Museum, the carriage contains 14 spindles which were driven by bands from one drum. All motion was derived from a "headstock," which automatically controlled most of the principal movements of the machine. The operations were conducted as follows: Assuming all the rovings to be connected to the spindles, the carriage to be against the roller beam, and the belt upon the fast pulley, the drawing rollers fed forward the partially attenuated cotton and the carriage moved out faster than the rollers delivered it, thus completing the attenuation; but while the carriage was in motion the spindles were twisting the threads. It was this reserve of power in the carriage that enabled the mule to surpass its competitors, for inequalities in the rovings could not be removed by continuous spinning. But in the mule the twist went first to the places where least resistance was offered to bending, namely, the thin ones, and so the thick places were left almost untwisted. The carriage, however, stretched each roving at those places where the fibers could most readily slip one upon the other; these were the thick, untwisted ones, and hence the greater equality of mule yarn than of other yarn. The carriage moved out 54 to 56 inches from the rollers, but before it reached the end of its journey it stopped the delivery of rovings. At the journey's end it disconnected its own driving-gear, and was kept steady by a latch and catch, while the spindles completed the twisting of the threads. Then the belt moved upon the loose pulley and all parts became stationary. At this point the manual operations commenced. They consisted in turning, with the right hand, a large grooved wheel to "back off" the spiral of yarn from the spindle blades; at the same time the faller was pressed down with

the left hand, then the spindles were turned in their normal direction and the carriage pushed home, to wind up the threads.

The efforts of later inventors to render the mule thoroughly automatic commenced shortly after Crompton's machine became known and have continued without intermission to the present time. In 1792 Kelly placed the controlling headstock in the center of the carriage instead of at the end; he also lengthened the machine considerably and attempted to make all its movements automatic. In the latter, however, he and many others failed. Indeed it was not until 1825 to 1830 that Richard Roberts successfully solved the problems involved. From the latter date onward, efforts have been directed toward perfecting the details, and rendering everything beyond mere attendance independent of human control. By attention to little things much has since been achieved in the matters of increased output, perfection of working, and reduction in the cost of labor.

During the evolution of cotton spinning it was found that increased productiveness resulted in decreasing the compass of a machine. For example, the old bobbing wheel and the Saxony wheel could spin from cleaned and carded material; but the water twist frame, and all succeeding ones, have required carefully prepared rovings; and further, improved rovings have been obtained at the cost of increased processes. This principle has influenced all stages of the industry, by rendering new machinery and processes essential. Today the ends to be accomplished are sevenfold, namely:

- I. Combining or mixing the cotton to obtain a homogenous mass.
- II. Cleaning it from all adhering impurities, such as seed, broken leaf, and mineral matter.
- III. Brining all the fibers into a state of parallelism.
- IV. Attenuating the fibers.
- V. Giving them an equal distribution.
- VI. Twisting them about a common axis to form a thread; and
- VII. Winding the thread upon a spindle or upon a spool.

These operations are sometimes conducted consecutively, at other times concurrently.

Mixing is essential, because the cotton contained in every bale differs in length, strength, and color of staple, and since the yarn to be spun from it must be of uniform quality, the contents of all the bales to be used for one "stack" or "bin" require to be thoroughly mixed. This is especially the case where cottons of different values are to be worked up into one yarn. Pulling and mixing are now done by the "bale breaker" or mechanical cotton puller, and by endless traveling aprons or lattices. Both made their appearance soon after hard pressed bales became the rule. The bale breaker consists of several lines of spiked drawing rollers, by all of which the caked cotton is pulled asunder. Mixing results

Cotton Spinning

from disposing a number of unwrapped bales around the feed lattice of the breaker. Thus, if three different cottons, *a*, *b*, and *c*, are to be mixed in the ratio of two parts of *a* to one part of each of the others, the first bale would be of *a*, the second of *b*, the third of *a*, and the fourth of *c*, and so on throughout the series. The attendant proceeds to feed in rotation an armful of cotton from each bale, and when pulled it is delivered to lattices and deposited upon the mixing room floor, where it is either mechanically or manually spread, layer upon layer, to form a stack.

The cotton is raked down from top to bottom of the stack in order to draw out a certain portion from each layer. It is next conveyed by a lattice to a rapidly revolving cylinder whose surface is studded with projections which beat, open, and feed it into a tube. It is drawn through this tube by penumatic action, and over sharp-topped grids that scrape off the heaviest adhering dirt. By means of a tube, or lattices, the cotton is passed on to the hopper of the opening machine. The function of a hopper is to feed a uniform supply of cotton to the cleaners. It consists of a large box, in which a spiked lattice is fitted to elevate a sheet of cotton, and of eveners to sweep excess material from the spikes. What is left passes to rapidly rotating beaters, which are often constructed to effect a rough combing, and always to dash the tufts of cotton against an irregular grating. By this means the matted fibers are disentangled, and much of the dirt falls between the bars. A blast of air, generated by a fan, wafts the cotton to a pair of rotating, perforated cylinders; they conduct it to a series of calender rolls, which compress it into a fleecy sheet, and other rollers coil it into a "lap" approximately 38 to 40 inches wide and 35 to 40 yards long. Mixing and cleaning are continued at the next stage by taking three or four laps from the opener to a scutcher. In unrolling, one sheet is superposed upon another, and they are slowly moved to beaters consisting of two or three steel blades, which by rotating deliver from 2,500 to 3,000 blows every minute. The cotton is again thrown upon a rough grating, the dirt passes between the bars and a lap is formed which contains at every part fibers from each of those fed in. Scutchers are provided with automatic regulating mechanism that immediately accelerates or retards the velocity of the feed roller on the sheeted cotton becoming thin or thick. A finished lap should have a uniform bulk throughout its width and length, but no attempt is made to lay the fibers in any fixed order. Such a lap is taken to a card, consisting of wire teeth embedded in fillets composed of layers of cloth and india rubber. The teeth are fashioned from fine-drawn, hard wire; those on one part of a

Cotton Spinning

card are uniform in thickness, in length, distribution, and shape. Each wire resembles a staple, with both legs bent forward in the direction in which they are to act. Automatic machines of great ingenuity are now used to make cards. They cut the wire, bend it, pierce the foundation, and set from 300 to 600 staples per minute with the utmost regularity.

From the early days of this industry, carding machines have been built on two plans, namely, those in which all the cards are secured on cylinders of varying sizes, and those in which three cylinders and a number of plane surfaces, called "flats," are covered with cards. The favorite machine of today (see Plate II. fig. 1) unrolls the lap *A*, and guides it below a fluted feed roller *B*, having a diameter of $2\frac{1}{2}$ inches. In front of this roller a licker-in, *C*, makes from 400 to 430 revolutions per minute; its diameter is 9 inches and its surface is covered with strips of saw-toothed metal pressed into spiral grooves. There may be 30 teeth to the square inch, and as they pass through the fringe of lap, the transverse fibers are first seized, and then those longitudinally placed are combed. Finally, all are carried to a large cylinder *D*, that makes an average of 165 revolutions per minute; it has a diameter of 50 inches, a width of 38 inches, and its surface is covered with card teeth, all bent to oppose those on other parts of the machine, and approximating to 550 on the square inch. This high surface velocity, combined with the large number of teeth, enable the cylinder to remove the cotton from the licker-in to its own surface. It then carries the fibers into contact with 44 slowly traveling "flats" *E*, which form part of an endless chain of 110; each being covered throughout its length, and for $\frac{7}{8}$ inch of its width, with about 600 teeth per square inch. The above-named 44 are placed in close proximity to the upper portion of the cylinder, so that if the fibers do not point in the direction of rotation they will be transferred to one or other of the flats, and combed by the cylinder until they assume the desired direction. All the straight fibers pass onward to a collecting cylinder, or "doffer" *F*, which is 24 inches in diameter, is equal in width to the cylinder, and contains about 650 carding points to the square inch. In making from 8 to 16 revolutions every minute the "doffer" covers itself with a thin film of fibers, which is struck off by a rapidly vibrating comb *G*. This film is conducted through a trumpet-shaped tube, pressed between rollers *H*, *I*, and coiled in a can. In the resulting "sliver" all fibers should point in the direction of its length, and only such as approximate to uniformity should remain; the dirt and the imperfect fibers should adhere to the several carding surfaces.

Cotton Spinning

If a fine thread is required, the next process consists in placing 14 or 16 "slivers" behind a "ribbon lap" machine, where they are ranged side by side to form a ribbon, are slightly attenuated, and coiled into a lap from $7\frac{1}{2}$ to $8\frac{1}{2}$ inches wide. Six such ribbons go to a combined drawing and ribbon lap machine to be separately attenuated, superposed, and again coiled into a ribbon 8 to 10 inches wide. The product is ready for the "comber" (see fig. 4, Plate II.), which may consist of eight "heads," each capable of intermittently passing one end of a lap I, down to a pair of feed rollers A, and between the open jaws of a nipper B, B. In closing upon the lap the jaws leave a fringe of about $\frac{3}{16}$ or $\frac{1}{4}$ inch protruding into the path of a cylinder on whose periphery either one set of 17, or two sets of 13 combs, C, and one or two fluted segments, D, are secured. The first comb to reach the cotton has teeth set to a pitch of about 20 to the inch, but succeeding combs become finer, the last having 88 teeth to the inch. After all have passed through the fringe, the nipper opens, a fresh supply is fed in, three rollers, E, F, G, turn backward, and E moves into contact with D, by which the combed fibers are then supported. The rollers E, F, G next reverse the direction of their rotation and draw the partially combed fibers through the teeth of a top comb H, to cleanse the rear ends and piece them up to those previously combed. Continuous lengths are thus formed, and are condensed into a sliver. The slivers from all the heads are combined, passed between drawing rollers, and deposited in a can in a clean, parallel condition.

Carded and combed slivers have their fibers irregularly distributed, and these irregularities must be eliminated before further attenuating the rope. Hence cotton for fine counts passes from the comber, that for low or medium counts from the card, to the "drawing frame." This machine is one of the least elaborate found in a spinning mill. It consists of three or four heads, each containing four lines of drawing rollers. Six to eight slivers are fed into the rollers, and delivered by them in so attenuated a condition that when combined they approximate to the thickness of a single sliver fed in. Equal numbers of once-drawn slivers are fed into the second head, where they are again drawn, combined, and deposited into cans for a third and similar treatment. This machine is a most perfect combiner and straightener of fibers, for, with eight slivers fed in at each head, that delivered by the third head is the product of 512 drawings and combinations, thus — $8 \times 8 \times 8 = 512$. And with four heads it is the product of $8 \times 8 \times 8 \times 8 = 4096$ drawings and combinations.

After drawing, the sliver is usually converted into a roving by three machines,

Cotton Worm

known respectively as the "slubber," the "intermediate," and the "rover." In the first the slivers are all attenuated, slightly twisted, and wound on straight spools. They are fed singly into three lines of drawing rollers B (Plate II. fig. 3), where they are reduced to about a fourth of their former bulk. From the rollers each ribbon, A, is drawn through a flyer C, and attached to a spool D. By rotating, the flyer twists the cotton, and the spool winds it layer on layer in close spiral coils. To do this, however, without injury to the delicate slubbing, it is essential that the spool shall have a fixed surface velocity which shall exceed that of the flyer by the exact surface speed of the front drawing rollers. But since every layer of cotton increases the circumference of a spool, the revolutions made by that spool in a given time must be reduced at the commencement of every layer. This is done by a differential driving gear which is one of the most beautiful pieces of mechanism to be found in a spinning mill. The rail on which the spools rest rises and falls at a speed proportionate to the thickness of the slubbing; but it also moves through lessening spaces to build the material conically at both ends. In the intermediate and the roving frames four points are gained — namely, combination, attenuation, twisting, and winding. Both machines resemble the slubber, except in the sizes of their parts and in the creels. In the intermediate, two slubbing spools supply one spindle; in the rover two intermediate spools are employed for a similar purpose. The former attenuates each slubbing to about one-fifth of its original bulk, while the latter reduces each intermediate roving to about one-sixth of its bulk. Single or double rovings are fed into the drawing rollers of the mule or the ring frame, where a thread is completed.

In 1902 the United States had one-fifth of all the cotton spindles of the world, and was consuming nearly one-third of the world's product of cotton.

Cotton Worm, a caterpillar (*aletia argillacea*) which often feeds in vast numbers on the leaves of the cotton-plant. It has a loping gait; is slightly hairy, green, dotted with black along a subdorsal yellowish line, with black dots beneath, and changes to a pale reddish-brown moth. The insect, as shown by Riley, "never hibernates in either of the first three states of egg, larva, or chrysalis, and it survives the winter in the moth or imago state only in the S. portion of the cotton belt. The moth," he adds, "hibernates principally under the shelter of rank wire-grass in the more heavily timbered portions of the South, and begins laying its eggs (400 to 500 in number) on the ratoon cotton when this is only an inch or two high." The localities where it hibernates, and where, consequently, the

Cottus

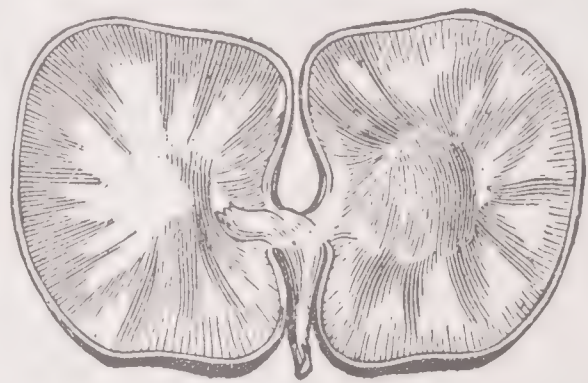
earliest worms appear, seem to be more common in the W. part of the cotton belt (Texas), than in the Atlantic cotton States. It is inferred that from this region the moths emigrate E. and N., laying their eggs later than the original Texan brood, as in Alabama, Georgia, and toward the N. The recently hatched worms of different sizes were found late in March on ratoon cotton in Southern Georgia and Florida, and in late seasons from the middle of April to the middle of May, though they do not attract the attention of planters until the middle or last of June. In midsummer the period from hatching to the time when the moth lays her eggs is less than three weeks, while in spring and late autumn twice that time may be required. There are thus in the Northern cotton States at least three "crops" or broods of caterpillars in a season, while in Texas there are at least seven annual generations. The first generation is only local, but in Texas, says Riley, "The third generation of worms may become, under favoring conditions, not only widespread, but disastrous, and the moths produced from them so numerous that they acquire the migrating habit. This generation appears in Southern Texas during the latter part of June, and in Southern Alabama and Georgia somewhat later," and this is the first brood which attracts general attention. When the worms are very abundant and the cotton well "ragged," the moths, driven by need of food and with favoring winds, migrate to distant points, and thus spread late in summer, having been seen as far N. as Boston, Buffalo, and Racine, Wis.

Cottus, a genus of fishes, by some made the type of a family *Cottidæ*, by others placed under the *Triglidæ* or *Gurnards*. The head is large, depressed, furnished with spines or tubercles; there are teeth in front of the vomer and in both jaws, none on the palatines; there are two dorsal fins; the anal fin is small; the body is without scales; the branchiostegous rays six. Yarrell enumerates four species: *C. gobio*, the River Bull-head, Miller's Thumb, or Tommy Logge; *C. scorpius*, the Sea Scorpion or Short-spined Cottus; *C. bubalis*, the Father Lasher or Long-spined Cottus; and *C. quadricornis*, the Four-horned Cottus. In this country there are several representatives of the species called indifferently bull-head and catfish.

Cotyledon, a genus of plants, order *Crasulaceæ*. Calyx, 5-partite; petals, united into a tubular or campanulate corolla; stamens 10, inserted in the tube of the corolla. *C. umbilicus* is a succulent plant with pettate, mostly radical, leaves, and a simple raceme of pendulous cylindrical flowers of a yellowish-green color. It is from 6 to 12 inches high.

Couch Grass

The word is also applied to the first leaf, or one of the first two leaves, developed in a plant. In exogens two such leaves are present in the embryo of every plant, while in endogens there is one. In exogens the two cotyledons are always opposite; in endogens the second leaf developed is alternate with the first. On these distinctions or their absence have been founded three primary divisions of the Vegetable Kingdom, viz., *Dicotyledons*, *Monocotyledons*, and *Acotyledons*. Sometimes, though rarely, there are more than two cotyledons: thus the *Boraginacæ* and the *Brassicacæ* have four, and the *Coniferæ* 10, 12, or even 15; hence the term *Polycotyledons* has been used. In some cases they are absent; at other times they cohere instead of unfolding.



COTYLEDONS OF A BEAN.

Cotytto, the Thracian goddess of immodesty, worshiped at Athens with nocturnal rites.

"Hail! goddess of nocturnal sport,
Dark-veiled Cotytto."

—Milton, "Comus."

Couberen, the god of wealth in Hindu mythology.

Coucal, or **Lark-heeled Cuckoo**, a genus of common bush-birds in Africa, India, and through the Malayan Archipelago to Australia. The hind-toe is prolonged into a very long spur. Their call is loud and in some cases apparently ventriloquistic. They build their own nests.

Couchant, in Heraldry, a beast lying down, with his head up. If the head is down, he is dormant.

Couch Grass, a grass (*Triticum repens*) sometimes called in books creeping wheat-grass. It has long spikes, the spikelets with four to eight flowers; the glumes, which are awned or the reverse, having five to seven ribs. It is very common in fields and waste places. When occurring as a weed in corn-fields, its long, creeping root renders it difficult of extirpation. Couch grass is a diuretic and aperient, and is useful in cases where the mucous membrane of the urinary tract is irritated or inflamed, as in irritation of the bladder, gonorrhœa, etc. The dose is from one-half

Couching

to a full tablespoonful of the fluid extract three times a day.

Couching, an old operation for cataract, which consisted in passing a needle into the eye, and with it pushing the lens out of its place to leave the pupil of the eye clear.

Coudert, Frederic Rene (kö-dār'), an American lawyer and expert in international law; born in New York in 1832; was graduated at Columbia College in 1850, and admitted to the New York bar in 1853. In 1892 he was appointed one of the counsel on the part of the United States before the Bering Sea Tribunal of Arbitration in Paris, and was especially complimented by Baron de Courcel, president of the tribunal, for his argument on the necessity of putting a stop to pelagic sealing. On Jan. 1, 1896, President Cleveland appointed him a member of the Venezuela Boundary Commission. He had a world-wide reputation as an advocate and an authority on international law, and because of his large practice had several times declined the offer of appointment to the bench of the United States Supreme Court. He was long the American legal representative of the French government. He died Dec. 20, 1903.

Coues, Elliott (kouz), an American naturalist; born in Portsmouth, N. H., Sept. 9., 1842. He was of late years connected with the Smithsonian Institute, and was author of "Key to North American Birds" (1872), "Field Ornithology" (1874), "Check-List of North American Birds" (1882), "Biogen," "The Dæmon of Darwin," etc. With J. S. Kingsley, he edited the "Standard Natural History" (four vols., 1883). He was actively interested in Theosophy. He died Dec. 26, 1899.

Cougar, the name given in Brazil to the puma, formerly called the American lion, and now the American panther. It extended formerly throughout a great part of both North and South America; but it has been destroyed through a great part of the former, except its most southerly portions. It is the *Felis concolor* or the *Puma concolor* of naturalists.

Cough, a spasmodic effort, attended with noise, to expel from the air passages of the lungs some foreign body or irritating matter, which else would injure the delicate respiratory apparatus. Properly speaking it is not a disease; it is the effort of nature to remove what, if it be allowed to remain, may generate one; or it may be the symptoms of a disease of the lungs, the liver, the stomach, or the intestines; or may be produced by the over-excitability of the system in the nervous temperament. At the same time, when itself violent, it may produce morbid effects. Physiologically viewed, a cough acts thus: Some irri-

Coumarin

tation produced by the passage through the air tubes of intensely cold air, or some other cause, affects their lining membrane, the capillary vessels of which become distended with blood. As these become thickened and tumified, the aperture for the passage of air is diminished and oppression ensues, the effect being greater if the venous rather than the arterial capillaries are the seat of the congestion. The secretion of mucus now exceeds what it would be in a state of perfect health, and the mucus itself becomes depraved in quality, and is itself a fresh cause of obstruction. A cough comes to the relief of the patient. The violent expiration of air expels the matter causing the obstruction, and as the proper stimulus to the capillaries is that produced by arterial blood, this, which is always driven from the lung during expiration, removes the congestion in the capillaries, and at least temporarily relieves the system.

Coulanges, Numa Denis Fustel de (kö-lonzh'), a French historical writer; born in Paris, France, March 18, 1830. After filling chairs successively at Amiens, Paris, and Strasburg, he was transferred in 1875 to the École Normale at Paris, and became a member of the Institute in the same year. His earlier writings, "Memoir on the Island of Chios" (1857), and "Polybius, or Greece Conquered by the Romans" (1858), had hardly prepared the reading public for the altogether exceptional importance of his brilliant book, "The Ancient City" (1864; 10th ed., 1885), which threw a flood of fresh light on the social and religious institutions of antiquity. The work was crowned by the French Academy, as was also his profoundly luminous "History of the Political Institutions of Ancient France." He died in Passy, near Paris, Sept. 12, 1889.

Coulomb, Charles Augustin de, a French scientist; famous for his experiments on friction, and the invention of the torsion balance for measuring the force of magnetic and electrical attraction; born in Angoulême in 1736. In early life he entered the Engineers, and served some time at Martinique. In 1777 he gained an Academy prize by a work on magnetic needles, and again two years later by his "Theory of Simple Machines." For speaking the truth about a projected canal in Brittany, he was for some time imprisoned, but earned the hearty approval of the honest Bretons, as well as his own conscience. Coulomb lived in retirement during the Revolution, became a member of the Institute in 1804, and died Aug. 23, 1806.

Coumarin, in chemistry ($C_9H_6O_2$, or $CH=CH$
 $C_6H_4 < \begin{matrix} O-CO. \end{matrix}$), occurs in the tonka-

bean, the fruit of *Coumarouna odorata*, in small white crystals, between the seed-coating and the kernel; also in Woodruff, *Asperula odorata*, and in the leaves and flowers of sweet-scented vernal grass, *anthoxanthum odoratum*, and other plants. It has been prepared synthetically by heating salicylic sodium aldehydes with acetic anhydride, sodium acetate being produced at the same time. Coumarin is extracted from the tonka-bean by strong alcohol; it crystallizes in colorless rectangular plates, melting at 67°. It is nearly insoluble in water, has an aromatic odor and a burning taste, and is soluble in alcohol and ether. Bromine and chlorine unite with coumarin, forming $C_9H_6O_2Br_2$ and $C_9H_6O_2Cl_2$, crystalline substances. Cold nitric acid converts coumarin into nitrol-coumarin, $C_9H_5(NO_2)O_2$, but when heated converts it into picric acid. When boiled with strong caustic potash solution it is dissolved, and is reprecipitated by acids. Coumarin melted with solid caustic potash yields salicylate of potassium. The coumarin existing in *Melilotus cæruleus* imparts to Swiss chapziger cheese the peculiar odor by which it is characterized.

Coumoundouros, Alexander, a Greek statesman; born in 1818. He entered the Greek Chamber of Deputies in 1850, became president of that body, and was subsequently appointed a minister of State with charge of the department of finance. His first official step was to propose to the chamber a bill for the recognition of the Greek debts of 1814 and 1825 contracted in the struggle for freedom, and succeeded in securing its adoption, 1879. He was frequently prime minister of Greece, and held the office longer than any contemporary Greek statesman. His popularity was very great through the country; he was called the Cavour of Greece. He died in 1883.

Council, an assembly met for deliberation, or to give advice. The term specially applies to an assembly of the representatives of independent Churches, convened for deliberation and the enactment of canons or ecclesiastical laws. The four general or œcumenical councils recognized by all Churches are: 1, the Council of Nice, in 325, by which the dogma respecting the Son of God was settled; 2, that of Constantinople, 381, by which the doctrine concerning the Holy Ghost was decided; 3, that of Ephesus, 431; and 4, that of Chalcedon, 451; in which two last the doctrine of the union of the divine and human nature in Christ was more precisely determined. Among the principal Latin councils are that of Clermont (1096), in the reign of Urban II., in which the first crusade was resolved upon; the Council of Constance, the most numerous of all the councils, held in 1414, which pronounced the condemnation of John Huss (1415), and of Jerome of Prague (1416);

the Council of Basel, in 1431, which intended a reformation, if not in the doctrines, yet in the constitution and discipline of the Church; and the Council of Trent, which began its session in 1545, and labored chiefly to confirm the doctrines of the Catholic Church against the Protestants. On Dec. 8, 1869, an œcumenical council, summoned by a bull of Pope Pius IX., assembled at Rome. This council adopted a dogmatic Decree or *Constitutio de Fide*, and a *Constitutio de Ecclesia*, the most important article of which latter declares the infallibility of the Pope when speaking *ex cathedrâ*.

Council Bluffs, a city and county-seat of Pottawattamie county, Ia.; on the Missouri river, opposite Omaha, Neb., with which it is connected by two bridges, 2,750 and 2,920 feet long respectively, that of the Union Pacific railroad having cost over \$1,000,000. The city is the E. terminus of the Union Pacific railroad and the converging point of all E. railroads which join the Union Pacific. It is situated at the foot of the bluffs, four miles from the river; is rectangular in form, and has its streets laid out at right angles; area, 24 square miles.

Business Interests.—The city is the farming trade center of Southern Iowa, and has an annual trade of \$30,000,000. It contains several railway repair shops, stock yards, and other interests. According to the Federal census of 1900 there were 198 manufacturing establishments, with \$1,176,408 capital and 1,179 hands, with annual products valued at \$2,596,830. The principal industries were carpentering, masonry, printing and publishing, plumbing and gas fitting, flour and grist milling, and brick and tile making. In 1899 there were a National bank, with \$100,000 capital, and several private banking houses.

Public Interests.—The city is well lighted by gas and electricity, is connected with Omaha by an electric railway, and has several fine parks. The most noteworthy buildings are the County Court House, United States Government Building, the Bloomer School, High School, Masonic Temple, and Union Depot. There are about 20 churches, a Library Association, Y. M. C. A., and the State Institution for Deaf Mutes. At the end of the school year 1897-1898 there were 18 public schools, with 4,782 pupils and 105 teachers, a public high school, and St. Francis' and St. Joseph's Academies.

History.—Council Bluffs derives its name from a council held on the bluffs between the Indians and the explorers, Lewis and Clarke. It was a Mormon settlement in 1846, and was chartered as a city in 1853. Pop. (1900) 25,802; (1910) 29,292.

Council of Blood

Council of Blood, The, a court created in the Netherlands by the Duke of Alva, its object being to put down all agitation caused by the religious and political tyranny of Philip II. Its first session was held Sept. 20, 1567, and in less than three months it had put to death 1,800 persons, among them the Counts of Egmont and of Hoorn.

Council of Ten, a secret tribunal in the old Republic of Venice, which was formed in 1310 and continued until the downfall of the republic in 1797. It was at first composed of 10 members and later of 17, and through its means some of the most wicked and bloodiest crimes were committed.

Council of War, an assembly of officers of high rank called to consult with the commander-in-chief of an army or admiral of a fleet on matters of supreme importance.

Counsel, in English law, a counselor advocate in a trial; also the whole number of advocates engaged on any side collectively. Queen's Counsel are barristers appointed counsel to the Crown by the Lord Chancellor, and take precedence of other barristers. They have the privilege of wearing a silk gown, that of an ordinary barrister being of stuff. In the United States the word counsel is applied indiscriminately to all members of the legal profession retained in a cause; as, the counsel for the plaintiff, the counsel for the defendant.

Count, a title of nobility in most of the continental States of Europe, equivalent in rank to the British earl and the German *graf*. Under the first two races of the Frank kings, the title was given to officers of various degrees, and was at first attached to the office, and not the person; but in the progress of time, when feudalism had introduced inheritance instead of election as a fixed rule in succession, it became subject to the same law as the higher titles of kings and dukes, and conferred hereditary privileges on its possessor. The term count has in most of the States where it is in use degenerated into a mere title, to which no political importance is attached. Though the title has never been introduced into England, the wives of earls have from the earliest period of its history been designated as countesses.

Counterfeit, to imitate, with the intention of deceit, the current medium of exchange or money of a country. In the United States, the crime of counterfeiting coin or money is punishable with fine and imprisonment at hard labor for a term of from two to 10 years; and includes falsely making, forging, or counterfeiting coins or notes, postal money orders, postal cards, government stamps of all kinds, and government securities, as also importing, possess-

Countess of Huntingdon

ing, uttering, or passing false coins or notes with fraudulent intent. Mutilating and debasing the coin is also counterfeiting, but is not so severely punished as the making of counterfeit coins.

Counterfort, a pier or buttress bonded as a revetment to the back of a retaining wall, to support and also tie the wall, such as the scarp of a fort, to the bank in the rear. The buttress is sometimes on the face. When arches are turned between counterforts, it is called a counter-arched revetment.

Counter-guard, a low outwork designed to cover the revetment of a bastion or ravelin from the fire of the enemy's breaching batteries. It is separated from them by a narrow ditch, and lest the enemy should establish a battery on it when captured, the terre-plein, or flat space behind its parapet, is made very narrow.

Counter-irritant, an irritant application to the external parts of the body designed to diminish, counteract, or remove some other irritation or inflammation then existing. Such are rubefacients, blisters, setons, cauterizing agents, etc.

Counterpoint, in music, a term equivalent to harmony, or the writing of a carefully planned accompanying part; or that branch of the art which, a musical thought being given, teaches the development of it, by extension or embellishment, by transposition, repetition, or imitation throughout the different parts. Counterpoint is divided into simple, florid or figurate, and double. Simple counterpoint is a composition in two or more parts, the notes of each part being equal in value to those of each corresponding part or parts and concords. In florid counterpoint, two or more notes are written against each note of the subject, or *canto-fermo*, and discords are admissible. Double counterpoint is an inversion of the parts, so that the base may become the subject, and the subject the base, etc., thus producing new melodies and new harmonies.

Counterscarp, that side of the ditch of a fort which is nearest to the besiegers; the other side being called the escarp or scarp.

Countersign, in military affairs, is a watch-word used to prevent unauthorized persons passing a line of sentries whose orders are to stop any one unable to give it. It is fixed each day by the commanding officer, but may be changed at any moment if necessary, and is only communicated to those entitled to know it.

Counter-tenor, the highest adult male voice, the same as alto.

Countess of Huntingdon's Connection. See HUNTINGDON, SELINA.

Count Palatine, in England, formerly the superior of a county, who exercised regal prerogatives within his county, in virtue of which he had his own courts of law, appointed judges and law officers, and could pardon murders, treasons, and felonies. All writs and judicial processes proceeded in his name, while the king's writs were of no avail within the palatinate. The Earl of Chester, the Bishop of Durham, and the Duke of Lancaster were the Counts Palatine of England, the corresponding counties being called counties palatine.

Country=dance, a dance in which as many couples can take part as there is space to accommodate them; the gentlemen being ranged at the commencement on one side, and the ladies on the other. The dancers are constantly changing places, leading one another back and forward, up and down, parting and uniting again. "Sir Roger de Coverley" is the best known example.

Country of Paradoxes, Holland, where houses are built on the sand, where the ocean is higher than the land, and where the keels of ships are often higher than the housetops.

"A land that rides at anchor and is moored,
In which they do not live but go aboard."
—Butler, "Hudibras."

County, a county or subdivision of a State for purposes of administration, called in some States a parish or a shire; or, more specifically, the Roman name of what in Saxon times had been called a shire. In Saxon times, one created an earl received a shire to govern. When the Normans took possession of the land these Saxon earls were displaced by noblemen of similar rank who had come across with the Conqueror, and who from being his companions were called comites. These each ruled a shire (*comitatus*), and from the Latin designation *comitatus* the English word county ultimately came. In most of the United States the counties to a great extent preserve an autonomy, each being provided with its own sheriff, coroner, judiciary, and inferior legislative body (for purposes of local enactment), generally styled commissioners. Each county is charged with the support of its own paupers, with the maintenance of good roads, etc., and for local election purposes usually constitutes an independent constituency. It is in many instances subdivided into townships or parishes, which in turn to a less degree preserve an independence.

County Corporate, an English city or town which has received the privilege of becoming in itself a county, having sheriffs and other magistrates of its own. The cities are twelve, viz.: London, Chester, Bristol, Coventry, Canterbury, Exeter, Gloucester, Litchfield, Lincoln, Norwich,

Worcester, and York. The towns five, viz.: Kingston-upon-Hull, Nottingham, Newcastle-upon-Tyne, Poole and Southampton.

Coup (kö), a French word signifying "a stroke," used in certain phrases that have become current almost universally. A *coup d'état* (stroke of State) means an arbitrary encroachment suddenly effected by the governing authorities upon the constitution of the State, altering or setting aside the prerogatives of other parts of the body politic. The term is applied particularly to the treacherous but successful attack upon the liberties of his fellow-countrymen by Louis Napoleon, Dec. 2, 1851. *Coup de main* (a stroke of the hand) is a sudden and successful attack; *coup d'œil* (a stroke of the eye) is a summary view of a complicated matter; *coup de théâtre* is a trick of the stage; and *coup de grâce* is the merciful blow that puts a victim out of pain.

Coupe (kö-pā'), a four-wheeled carriage carrying two inside, with a seat for the driver outside.

Coupon, a warrant or certificate for the periodical payment of interest on bonds issued for any term of years. The interest being payable in different cases quarterly, half-yearly, or yearly, as many coupons are attached to each bond as represent the total number of such payments as are to be made, with the date of payment printed on each. When a payment of interest becomes due at any particular date the holder of the bond detaches the corresponding coupon and presents it for payment at the specified banking house or office.

Courbet, Gustave (kör-bā'), a French painter; born in Ornans, Franche-Comté, June 10, 1819. In 1839 he was sent to study law in Paris, but all the bent of his nature was turned toward art. He made himself acquainted with the Flemish, Florentine, and Venetian schools; but amid all he was careful to preserve—as he phrases it—his "own intelligent and independent individuality." In 1841 he took to landscape work, painting in the forest of Fontainebleau. In 1844 he began to exhibit at the Salon; and his works created a great sensation when shown in the Salon of 1850. His hunting scenes and animal subjects are especially vigorous and spirited. In 1869 he accepted the Cross of the Order of St. Michael from the King of Bavaria, and after the revolution of 1870 he was appointed Director of the Fine Arts. In the following year he joined the Commune, and was concerned in the destruction of the Vendôme Column (May 16), for which, in the following September, he was sentenced to six months' imprisonment, and to be fined for its restoration, his pictures being sold

in 1877 towards that purpose. On his release he retired to Vevey, in Switzerland, where he died, Dec. 31, 1877.

Courier (de Mere), Paul Louis (kö-ryā'), a French Hellenist; born in Paris, Jan. 4, 1772. In 1813 he made an elegant translation of "Daphnis and Chloe," an ancient romance by Longos, discovered by him at Florence; he also translated "The Luciad, or the Ass of Lucius of Patras," published with the Greek text (1818). His numerous pamphlets, especially his "Pamphlet of Pamphlets," are masterpieces of style, of marvelous conciseness, and noteworthy documents for the history of the ancient political and ecclesiastical contentions. He was assassinated near Veretz, Aug. 18, 1825.

Couriers, persons hired to accompany travelers abroad, whose special duty is to make all arrangements for the journey, and relieve their employers as far as possible of all anxiety about passports, exchange of money, hotel negotiations, and the like. The speaking of several languages is one of many important qualifications in a good courier. King's or Queen's messengers are sometimes called Foreign Office couriers.

Courland, or Kurland, a Russian government, and one of what are called the Baltic provinces. It was formerly an independent duchy—properly, indeed, consisting of two duchies, Courland and Semgallen—and belonged, along with Livonia, to the Teutonic Knights. The difficulty of resisting the Russians led to the acknowledgment in 1561 of the feudal sovereignty of Poland. The country was long distracted by the contentions of two parties, one Russian and the other Polish; and after being for some time very completely under Russian influence, it was finally united to Russia in 1795. Biron was made Duke of Courland in 1737. It contains about 10,540 square miles, with a population in 1897 of 672,634, mostly Protestants. It is generally a level country, with ranges of low hills, and contains many lakes, bogs, forests, and sand-dunes, but some parts have a very fertile soil. Cattle-breeding is on the increase; game abounds; and bears, boars, elks, and wolves are met with occasionally. The proprietors of land are mostly German; the peasantry, who constitute the bulk of the population, of Lettish extraction, are chiefly engaged in husbandry. The Russians do not amount to 2 per cent. of the population. There is little manufacturing industry, but trade is rather increasing. The capital is Mitau, but the most flourishing town is Libau.

Courland, Duke of. See BIREN, ERNEST JOHN.

Coursing, the hunting hares with greyhounds, which follow the game by sight,

and not by scent. Coursing meetings are held in open parts of the country where hares are abundant, and the owners of greyhounds enter their respective dogs for various stakes. A judge is appointed, whose duty it is to decide with respect to the merits of the dogs engaged. The sport then begins by two dogs being selected for a course. They are restrained by the slipper, a man who holds them by a long, strong cord, with a spring attached to their collars. The field is then beaten for a hare. When it is found, it is allowed 80 to 100 yards start, or law, as it is called; the judge then gives the word go, and the slipper frees the dogs by means of the spring. The judge follows the greyhounds throughout the whole course, and awards the victory to the dog which shows the finest qualities of speed, endurance, and sagacity; and not necessarily to the dog which kills the hare. Coursing is of great antiquity, and is treated of by Arrian, who flourished A. D. 150. It was first practiced by the Gauls, and was a popular sport with the ancient Greeks. It is now a very popular sport in many parts of Europe. A pastime known as "Hare and Hounds," somewhat similar to coursing, was at one time quite popular in the United States, where several clubs were formed for its advancement. In this form one or more men, known as the Hares, were given a time handicap and provided with slips of paper which they dropped from time to time to show their trail. These runners were followed by others, known as Hounds, and the object was that the Hounds should overtake the Hares before the latter returned home.

Court, all the surroundings of a sovereign in his regal state; the body of persons who compose the household of, or attend on, a sovereign.

Court, in law, a tribunal of justice; the hall, chamber, or place where justice is administered, or the persons (judges) assembled for hearing and deciding causes, civil, criminal, military, naval, or ecclesiastical. Courts may be classified in various ways. A common distinction is into courts of record and not of record; the first being those the judicial proceedings of which are enrolled in records. They may also be divided into courts of original jurisdiction, inferior, and superior courts. In the United States the courts of law are either Federal or State. Federal courts derive their authority from the National government. They comprise the Supreme Court of the United States, the Circuit Courts of the United States, and the District Courts of the United States. The judges of each circuit and justice of the Supreme Court for the circuit constitute a Circuit Court of Appeals. Other courts

existing under the National government are the United States Court of Claims, the United States Court of Private Land Claims, and various local tribunals for the District of Columbia.

The State courts derive their authority from the several State constitutions. They consist usually of a Supreme Court or Court of Appeals, and of local criminal and civil courts for the various counties. Speaking generally, Federal courts have jurisdiction in cases involving the laws of the United States; State courts have jurisdiction in cases involving State laws.

Courts in England derive their authority from royal or parliamentary enactment. They are designated, according to their jurisdiction, as "King's Bench Division," "Chancery Division," "Probate, Divorce, and Admiralty Division," "Court of Appeals," and the like. There are also the terms of court held by the Lord High Chancellor, the Lord Chief-Justice of England, the Master of the Rolls, the Lords of Appeal in Ordinary, and the various county courts. The highest legal tribunal in England is the House of Lords when sitting as a court of appeal.

In France the courts exist in accordance with the provisions of the code Napoleon. At their head is the Court of Cassation. In Germany there are imperial courts and courts of the various German States. The Latin countries organize their courts to some extent upon the French model, except that in Spain, Portugal, and most South American countries the Roman Catholic priesthood have their own courts and cannot be held amenable to the ordinary tribunals.

Court de Gebelin, Antoine (kōr-d-zhā-blān), a French writer; born in 1725. He published, from 1773 to 1774, "The Primitive World Analyzed and Compared with the Modern World," which, after nine volumes had appeared, remained unfinished. Its vast plan embraces dissertations on mythology, grammar, origin of language, history, etc. He also published "Historical Letters in Favor of the Reformed Religion." He died in 1784.

Court of High Commission, a court which was established in Queen Elizabeth's reign, and exercised powers like those which during the reign of Henry VIII. had been intrusted to Lord Cromwell. The judges had the power of arresting suspected persons, imprisoning, torturing them, and causing them to accuse their confederates or their friends. They could impose new articles of faith, and impose them on recalcitrant consciences by compulsion of the severest and most odious kind.

Court of Honor, a court of chivalry, of which the lord high constable was judge.

It was a continuation of what in the time of Henry IV. was called *Curia militaris*, Military Court.

Court of Love, a court established in France and Germany in the 12th century to decide on matters relating to love. There was such a court in Provence in the palmy days of the Troubadours. The following case was submitted to their judgment: A lady listened to one admirer, squeezed the hand of a second, and touched with her toe the foot of a third. With which of these three was she in love?

Court of Requests, a court, or series of courts, instituted under Henry VII., in 1493, for the recovery of small debts. It was superseded in 1847 by the County Courts. Courts of Requests were sometimes called Courts of Conscience.

Court, Presentation at, a formal presentation to the sovereign of persons whose status entitles them to that honor. In Great Britain it takes place either at St. James's Palace, at a levee, intended for gentlemen only, or at Buckingham Palace, a drawing-room, where both ladies and gentlemen appear. The days when levees and drawing-rooms are to be held are always announced some time beforehand. It is difficult in the present day to define exactly who may and who may not be entitled to be presented. Members of families of the nobility and landed gentry, diplomats, members of the House of Commons, persons holding high offices under the crown, judges, magistrates, Church dignitaries, officers in the army and navy, persons who have attained distinction by eminence of any kind, and the wives and daughters of the same classes, form the larger number of those presented at levees and drawing-rooms. Persons are often presented on entering on some office or attaining some dignity. Any one who has been once presented is entitled to appear at any future levee or drawing-room without a new presentation. The whole arrangements connected with presentations are under the supervision of the lord chamberlain, in whose office in St. James's Palace information is given to all persons wishing to be presented. The names of ladies and gentlemen desiring presentation, and of the ladies, noblemen, and gentlemen who are to present them, have to be submitted to the sovereign for approval, and there is a strict exclusion of persons of damaged reputation, whatever their rank. Court dress or official uniform must be worn. A British subject who has been presented at St. James's may on any after occasion claim to be presented by the British minister at any foreign court.

Courtesy, Tenure by, in law, is where a man marries a woman seized of an es-

tate of inheritance, and has by her issue capable of inheriting her estate. In this case, on the death of his wife he holds the lands for his life, as tenant by courtesy.

Courtesy Title, a title assumed by or given to any person by common consent, as an act of courtesy or respect, not of absolute right. Thus in England, the eldest son of a duke is allowed the courtesy title of marquis; the eldest son of a marquis that of earl; the eldest son of an earl, that of viscount, etc. The younger sons of peers above the rank of viscount are allowed the courtesy title of lord, and the daughters of lady.

Court Hand, the old Gothic or Saxon hand or manner of writing used in records and judicial proceedings, and distinguished from the modern or Italian style.

Courtmans, Joanna Desideria, a Flemish poet and novelist; born in 1811. Besides dramas and poems, she wrote 22 volumes of stories. She excelled particularly in her descriptions of the life of the common people. The most notable of her tales are: "The Hunter's Gift"; "Dame Danciel"; "The Cowherd"; "Aunt Clara's Bonnet." She died in 1890.

Court-martial, a court authorized by the articles of war, for the trial of all offenders in the army or navy, for military offenses. It has no jurisdiction over a citizen of the United States not employed in military service.

Courtney, Frederick, a Canadian clergyman; born in Plymouth, England, Jan. 5, 1837. He was graduated at King's College, London, in 1863, becoming an Anglican priest in 1865. From 1876 to 1880 he was stationed in New York, for two years thereafter was rector of St. James Church, Chicago, and from 1882 to 1888 was rector of St. Paul's, Boston. In 1888 he became bishop of Nova Scotia. He resigned this charge in 1903 to accept the rectorship of St. James's Church, New York.

Courtois, James (kört-wä), surnamed IL BORGONONE, a French painter, especially eminent in battle-pieces. His wife dying of poison, which he was suspected of having administered, he took the habit of a lay brother of the Jesuits, with whom, though he still practiced his art, he remained till his death, in 1676. WILLIAM, brother of the above, was also an eminent painter. He excelled in historical pieces, and assisted his brother in some of his works. He died in 1679.

Court-plaster (so-called because originally applied by ladies of the court as patches on the face), black, flesh-colored, or transparent silk varnished over with a solution of isinglass, which is often perfumed with benzoin, used for covering slight wounds.

Courtrai (kör-trä'), a fortified town of Belgium, province of West Flanders, 26

miles S. of Bruges, on the Lys. It is well built, having handsome and spacious streets, and a fine Grande Place, with several other squares. Its manufactures are table-linens, lace (which is celebrated), cambrics, cotton goods, etc., and it has extensive bleaching and dyeing works. Here, in 1302, took place the "battle of spurs" between the French and Flemings. Pop. 29,073.

Cousin, John (kö-zan'), a native of France, and generally regarded as the earliest French historical painter. He chiefly painted on glass, but his "Last Judgment," painted on canvas for the convent of the Minims at Vincennes, is esteemed an excellent work. He was the author of "Livre de Perspective," and some other treatises connected with the art. He died in 1590.

Cousin, Victor, a French philosopher; born in Paris, Nov. 28, 1792. He founded a school of eclectic philosophy; combining the doctrines of the Scotch school of Reid and Stewart, based on sensation, with those of Schelling and Hegel, which rest on the opposite principle of idealism or intuition. He was not an original thinker in philosophy, but he possessed in a high degree the faculty of clear exposition; for that reason his lectures and his writings enjoyed a great popularity. He rendered a memorable service both to philosophy and literature by his translation of "Plato," praised by Jowett. Besides his "History of Philosophy" and other works on that theme, he is author of a few biographical sketches, mostly of characters related to the spiritual and intellectual movements of the 17th century: as "Jacqueline Pascal"; "Mme. de Longueville"; "Mme. de Hautefort"; "French Society in the 17th Century" (two vols.). As a lecturer and philosophical writer, Victor Cousin was distinguished by a rare combination of eloquence, enthusiasm, and clearness of exposition. He possessed a beauty of style such as no modern or ancient philosopher excepting Plato has equalled. He rendered a very valuable service to his native land in the part he took in the organization of primary instruction. In 1831, under a commission from the French government, he visited Germany to study educational methods there, and the report published on his return had powerful influence on subsequent legislation. He died in Cannes Jan. 2, 1867.

Cousins, Samuel, an English engraver; born in 1801. He engraved plates after Lawrence, Landseer, Reynolds, Millais, Leslie, Eastlake, Ward, and others. He was elected a Royal Academician Engraver in 1855, and when this class was abolished he became an Academician proper. He died in 1887.

Couthon, Georges (kö-tôn') a French lawyer, president of the court of justice at Clermont; born in 1756. Becoming a mem-

ber of the legislative assembly, and of the national convention, he voted for the death of Louis XVI. Sharing afterward the power and participating in the atrocities of Robespierre, he was also involved in his ruin. He was guillotined in 1794.

Coutts, Thomas, a Scotch banker; born in Edinburgh, Sept. 7, 1753; the son of a merchant and banker. With his brother James he founded the banking house of Coutts and Co. in London, and on the latter's death in 1778 became sole manager. Keen and exact in matters of business, although charitable and hospitable in private, he left a fortune of some \$4,500,000 at his death in London, Feb. 24, 1822. By his first wife, who had been a servant of his brother, he had three daughters, who married respectively the Earl of Guilford, the Marquis of Bute, and Sir Francis Burdett, Bart.; in 1815 he married Miss Mellon, the actress.

Couture, Thomas, born in Senlis, Dec. 21, 1815; a French painter of ideal subjects and single figures. His best known picture is the "Roman Feast at the Time of the Decline of the Empire," "Les Romains de la Decadence," now in the Louvre. Couture exercised a great influence and formed several American pupils. He died near Paris, March 30, 1879.

Couvade (kö-väd'), a singular custom prevalent in ancient as well as modern times among some of the primitive races in all parts of the world. After the birth of a child the father takes to bed, and receives the food and compliments usually given elsewhere to the mother. The custom was observed, according to Diodorus, among the Corsicans; and Strabo notices it among the Spanish Basques, by whom, as well as by the Gascons, it is still to some extent practiced. Travelers from Marco Polo downwards have met with a somewhat similar custom among the Chinese, the Dyaks of Borneo, the negroes, the aboriginal tribes of North and South America, and elsewhere.

Covenant, in law, an agreement between two or more parties in writing, signed, sealed, and delivered, whereby they agree to do, or not to do, some specified act. In theology, the promises of God as revealed in the Scriptures, conditional on certain terms on the part of man, as obedience, repentance, faith, etc.

Covenant, in Scotch history, the name given to a bond or oath drawn up by the Scottish reformers, and signed in 1557, and to the similar document or Confession of Faith drawn up in 1580, in which all the errors of Popery were explicitly abjured. The latter was subscribed by James VI. and his council, and all his subjects were required to attach their subscription to it.

It was again subscribed in 1590 and 1596. The subscription was renewed in 1638, and the subscribers engaged by oath to maintain religion in the same state as it was in 1580, and to reject all innovations introduced since that time. The SOLEMN LEAGUE AND COVENANT was a solemn contract entered into between the General Assembly of the Church of Scotland and commissioners from the English Parliament in 1643, having for its object a uniformity of doctrine, worship, and discipline throughout Scotland, England, and Ireland, according to the word of God and the example of the best reformed churches. In 1662 it was abjured by act of Parliament, both in England and Scotland.

Covenanters, in Scottish history, the name given to the party which struggled for religious liberty from 1637 on to the revolution; but more especially applied to the insurgents who, after the passing of the act of 1662 denouncing the Solemn League and Covenant as a seditious oath (see above article), took up arms in defense of the Presbyterian form of Church government. The Presbyterian ministers who refused to acknowledge the bishops were ejected from their parishes and gathered around them crowds of their people on the hillsides, or any lonely spot, to attend their ministrations. These meetings, called "conventicles," were denounced as seditious, and to frequent them or to hold communication with those frequenting them was forbidden on pain of death. The unwarrantable severity with which the recusants were treated provoked them to take up arms in defense of their opinions. The first outbreaks took place in the hill country on the borders of Ayr and Lanark shires. Here at Drumclog, a farm near Loudon Hill, a conventicle was attacked by a body of dragoons under Graham of Claverhouse, but were successful in defeating their assailants (1679). The murder of Archbishop Sharp on Magus Moor, and this defeat, alarmed the government, who sent a large body of troops under the command of the Duke of Monmouth to put down the insurgents, who had increased in number rapidly. The two armies met at Bothwell Bridge, where the Covenanters were totally defeated (June 22, 1679).

In consequence of the rebellious protest called the SANQUHAR DECLARATION, put forth in 1680 by Cameron, Cargill, and others, as representing the more irreconcilable of the Covenanters (known as Cameronians), and a subsequent proclamation in 1684, the government proceeded to more severe measures. An oath was now required of all who would free themselves of suspicion of complicity with the Covenanters; and the dragoons who were sent out to hunt down the rebels were empowered to

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kill anyone who refused to take the oath. During this "killing time," as it was called, the sufferings of the Covenanters were extreme; but notwithstanding the great numbers who were put to death, their fanatic spirit seemed only to grow stronger. Even after the accession of William some of the extreme Covenanters refused to acknowledge him owing to his acceptance of Episcopacy in England, and formed the earliest dissenting sect in Scotland.

Covent Garden, corrupted from CONVENT GARDEN, from having been originally the garden of the Abbot of Westminster, is a spacious square in London, celebrated for a great market held within it of fruit, vegetables, and flowers. The square was formed about 1631 from the designs of Inigo Jones, and has the arcade or piazza on the N. and N. E. side, Tavistock Row on the S. and the church of St. Paul's on the W. In the 17th century Covent Garden was a very fashionable quarter of the town. The scene of one of Dryden's plays is laid here, and frequent allusions are made to the place in plays of Charles II.'s time. The market, now so famous, appears to have originated about 1656 in a few wooden sheds and stalls. Covent Garden is for a stranger one of the sights of London, and is seen to greatest advantage about 3 o'clock on a summer morning; Tuesday, Thursday, and Saturday being the principal days.

Coventry, a city in England, county of Warwick, 85 miles N. W. of London. It was formerly surrounded with lofty walls and had 12 gates, and was the see of a bishop early conjoined with Lichfield. Parliaments were convened here by the earlier monarchs of England, several of whom occasionally resided in the place. Pageants and processions were celebrated in old times with great magnificence, and a remnant of these still exists in the processional show in honor of Lady Godiva (*q. v.*). There are still a few narrow and irregular streets, lined with houses in the style of the 15th and 16th centuries. There are several fine churches. Coventry is the center of the ribbon trade. Pop. (1901) 69,877.

Coverdale, Miles, the earliest translator of the Bible into English; was born in Yorkshire, England, in 1487. He was educated at Cambridge, and was ordained priest in 1514. He was led some years afterwards to embrace the reformed doctrines, and, having gone abroad, assisted Tindall in his translation of the Bible. In 1535 his own translation of the Scriptures appeared, with a dedication to Henry VIII. Coverdale was almoner to Queen Catharine Parr, and officiated at her funeral. In 1551, during the reign of Edward VI., he was appointed Bishop of Exeter, but was ejected on the accession of Mary, and thrown into

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prison. After two years' confinement he was liberated, and proceeded first to Denmark, and subsequently to Geneva, where he was employed in preparing the Geneva translation of the Scriptures. On the accession of Elizabeth he returned to England, and held for a short time the rectory of St. Magnus, London Bridge. He died in London, in 1568.

Covered-way, a sunken area around a fortification, of which the glacis forms the parapet. A banquette on the interior slope of the glacis affords a place for the garrison to stand on while delivering a grazing fire over the glacis.

Coverly, Robert, an American composer; born in Oporto, Portugal, Sept. 6, 1863. He has written numerous successful topical songs and piano pieces, including the march, "The Passing Regiment," and a "Spanish Gypsy Dance." He is a resident of New York.

Covington, a city and county-seat of Kenton county, Ky.; on the Ohio river opposite Cincinnati, with which it is connected by a handsome suspension bridge, 2,250 feet long, and costing \$2,000,000. It is the N. terminus of the Kentucky Central railroad, and is also on the Louisville, Cincinnati, and the Lexington railroad. It is a residence town for Cincinnati business men and is the see of a Catholic bishop.

Business Interests.—Covington is the farming, live stock, and whiskey producing trade center of Central Kentucky, and has steamer connections with all river ports. According to the Federal census of 1900 there were 403 manufacturing establishments, with \$4,729,786 capital and 3,898 hands, and having annual products valued at \$6,610,082. The principal manufactories are distilleries, cotton and woolen mills, rolling mills and tobacco factories. In 1899 there were four National banks, with \$1,150,000 capital, and several daily and weekly newspapers.

Public Interests.—Covington is built on a beautiful plain, and has an area of over 1,350 acres. The most notable buildings are the combined City Hall and Court House; the United States Government Building, including the Postoffice and Federal Court rooms; the Public Library, and the Hospital of St. Elizabeth. At the end of the school year 1897-1898 there were 12 public schools, with 4,334 pupils and 120 teachers, a public high school for white children and the William Grant High School for colored youth, the Academy of Notre Dame, and the Rugby School.

History.—Covington was settled in 1812; laid out in 1815, and incorporated as a city in 1834. Pop. (1890) 37,371; (1900) 42,938; (1910) 53,270.

Cow

Cow, the female of the bovine species called the ox (*Bos taurus*), of which the bull is the male. Like other domestic animals it has run into numerous varieties, and its primitive uniformity has given rise to manifold diversity. Nor is it in color alone that it has altered. It has done so in form, besides which there are horned and hornless oxen. The period of gestation of the cow is nine months, and the normal number of her offspring at birth only one.

"A perfect cow," says an old writer, "should have black eyes, large, clean horns, a long thin skin, a large, deep belly, strong, muscular thighs, round legs, broad feet, short joints, etc., white, large udder, with four teats." Speaking broadly, this is correct; but in the choice of a cow attention should be given primarily to the nature of the pasture into which it is to be turned. The Darwinian principle of natural selection with the survival of the fittest has adapted cattle of different sizes and qualities to different parts of the country; little, active cattle, thriving on the scanty herbage found high up the mountainside, and large, heavy, slow-going cattle of luxurious proclivities falling off unless they are allowed to revel amid the rank vegetation of river sides and meadows. The latter furnish the greatest quantity of milk. To preserve them in health, plenty of fresh air, artificial food when natural supply runs short, shelter in winter and in bad weather, and forbearance to force medicine upon them when it is not needed, are the chief requisites.

Cowan, Frank, an American lawyer and writer; born in Greensburg, Pa., Dec. 11, 1844. Making the tour of the world in 1880-1881 and 1884-1885, he entered Korea before that country had made treaties with other nations. He wrote "Zomara, a Romance of Spain" (1873); "The City of the Royal Palm and Other Poems" (1884); "Fact and Fancy in New Zealand" (1885); etc. He died in 1905.

Coward, William, an English physician; author of "Thoughts on the Human Soul; demonstrating the Notion of the Human Soul united to the Human Body to be an Invention of the Heathens, and not Consonant to the Principles of Philosophy or Reason." This work excited considerable indignation among the more zealous divines, who procured an order to have it burned by the common hangman. He died about 1722.

Cowbane, or **Water-hemlock** (*Cicuta virōsa*), a perennial, umbelliferous, aquatic plant, producing an erect, hollow, much-branched, striated stem three or four feet high, furnished with dissected leaves. It is highly poisonous.

Cow-berry, the red whortleberry, a procumbent shrub of high moorlands in Europe, Asia and North America, has ever-

Cow Itch

green box-like leaves, and produces a red acid berry used for jellies and preserves.

Cowboys, in the American Revolution, a band of American Tories who infested the neutral ground of Westchester county, N. Y., robbed the Whigs and Loyalists, and made a specialty of stealing cattle. A similar band of marauders on the British side received the name of "Skinners." The word cowboys is now used to designate the men who have charge of the cattle on the vast ranges in the W. and S. W. of the United States. They are well mounted, wear a fanciful costume consisting of an enormous sombrero, or Mexican hat of felt, buckskin breeches and jackets, and high-top boots, delight in gaudy waist-sashes and neck-cloths, use Mexican saddles with high, stout pommels, to which their horsehair lassoes are attached, carry huge revolvers, and are perfectly at ease on their wiry, bucking broncos, a small mustang of Spanish origin. They are bold and adventurous, and from their necessarily wild and rough mode of life are often spoken of, as a class, with disfavor; but, while doubtless there are among them varieties of character, many of them are as honest and faithful as they are active and strong. Many of them were enlisted in two regiments of cavalry for the war with Spain, and, under the popular name of "Rough Riders," greatly distinguished themselves in the early part of the campaign against Santiago, in Cuba.

Cowen, Frederic Hymen, a British composer; born in Kingston, Jamaica, Jan. 29, 1852, was taken as a child to England. He early showed decided musical talent, which was cultivated by a course of study under Benedict and Goss, as also at Leipzig and Berlin. Among his works are the operas "Pauline" (1876), "Thorgrim" (1890), "Signa" (1893), and "Harold" (1895); the cantatas "The Rose Maiden," "Sleeping Beauty," "The Water Lily," and others; two oratorios (including "Ruth" 1887); half a dozen symphonies, one of which, No. 3 (Scandinavian), is esteemed throughout Europe; a number of overtures, pianoforte pieces, and minor works, and over 200 songs, many of them very popular. From 1888 till 1892 he was conductor to the Philharmonic Society.

Cowes (kōwz), a British seaport on the N. coast of the Isle of Wight. It is built on both sides of the river Medina, dividing it into two towns, East and West Cowes. The town has an excellent harbor, is much frequented for watering ships, and is the headquarters of the Royal Yacht Club, and, moreover, a place of very fashionable resort, not only in the season, but for the greater part of the year.

Cow-itch, **Cow-age**, or **Cow-hage**, the stinging hairs of the plant described below,

Cowley

or any species akin to it, as *Mucuna urens*, *M. monosperma*, etc. They are used as a mechanical anthelmintic. The plant, *Mucuna pruriens*, is a twining annual, with pendulous racemes of dark-colored flowers, which appear in India in the rainy season. The legume, which is shaped like the letter S, is clothed with stinging hairs. These are easily detached and stick on the skin, producing intolerable itching. The legume, when young, can be boiled and eaten like kidney-beans. The name is sometimes (improperly) given by the negroes of the Southern States to the poison-ivy, *Rhus toxicodendron*.

Cowley, Abraham, an English poet and essayist; born in London in 1618. Well educated and high in royal favor, he was a fashionable and fortunate poet till the Civil War made havoc of royal favorites. In 1660 Cowley took part in founding the Royal Society; in 1661 he published a "Proposition for the Advancement of Experimental Philosophy," and a "Discourse by Way of Vision concerning the Government of Oliver Cromwell," which is pronounced by Bishop Hurd one of the best of the author's prose works. He published two books of a Latin poem on plants in 1662; he afterward added four more books, and the whole, together with other pieces, was published in 1678 under the title of "Poemata Latina." His volumes, "The Mistress," "Poems," various Vergilian elegies and anacreontic love songs, and his essays, were set in the first rank by contemporaries; but are mainly curios now, though some poems are familiar. The first collection of his works, in one volume, appeared in 1668. He died in Chertsey, Surrey, July 27, 1667.

Cow Parsnip (so called because the plant is good fodder for cows), *Heracleum sphondylium*, or any other species of the genus.

Cow Pea (*Trifolium medium*), called also cow-grass, etc., but is neither a pea nor a grass; it is a trefoil or clover.

Cowper, William, an English poet; born in Berkhamstead, Nov. 15, 1731; was the great-nephew of the Lord-Chancellor Cowper. After completing his education, his family procured him the place of clerk to the House of Lords, but his nervousness and constitutional timidity were such, that he was obliged to resign it. He now fell into so terrible a state of nervous debility that he was for some time placed in the lunatic asylum of Dr. Cotton. The skill and humanity of that gentleman restored him, and he retired to Huntingdon. Here he became acquainted with the family of the Unwins; and after Mr. Unwin's death he removed with Mrs. Unwin to Olney, Bucks. His natural melancholy colored

Cow-pox

his religious views and feelings, and he fell often into the most painful despondency. But though his mind was so frequently bent down by dejection, he was a very



WILLIAM COWPER.

voluminous writer. In addition to translating Homer, which he did with more accuracy than Pope, if with less polish, he wrote "The Task," the best of all his poems; "Tirocinium"; and a host of smaller works; translated some of Madame Guyon's spiritual songs; and his correspondence, which exhibits him as one of the most elegant of English letter-writers, was extremely voluminous. He died in Norfolk, April 25, 1800.

Cow Plant, a perennial asclepiad of Ceylon, which has acquired a factitious celebrity from the oft-repeated statement that its milky juice is used as milk, and that its leaves are boiled to supply the want of cream. But this, according to Sir J. E. Tennent, arises entirely from the appearance of the juice, which indeed probably contains a share of the poisonous principles so general in this order.

Cow-pox, any disease producing pox on the udder or other parts of a cow. Edward Jenner discovered that there were several of these. In a special sense it is that particular cutaneous disease affecting the udder of the cow, which, being transferred to the human frame, either gives an immunity from smallpox or diminishes its violence. That this is its effect had long been a popular belief among the dairy milkers in Gloucestershire, England, and when, prior to 1770, Jenner was an apprentice to Mr. Ludlow, an eminent surgeon at Sudbury, near Bristol, a young woman who came into the shop where he was, to ask advice, hearing smallpox mentioned, said with decision, "I cannot take that disease, for I have had cowpox." Jenner mused

on the statement, and spoke of it to scientific men, who all treated it with ridicule. Continued investigation, however, satisfied him of its truth, and about 1780 he struck out the brilliant thought that it might be practicable to propagate cowpox as a preservative against smallpox, by inoculating some human being from the cow, and from that person transferring the matter to another and another of the community till protection was obtained for all. This was the origin of vaccination.

Cowry, the English name of the molluscos genus *Cypræa*. The money-cowry is *C. moneta*, a native of the Pacific and Eastern seas. Many tons are annually shipped to Great Britain, whence they are again taken as money to be used in commercial transactions with the tribes of Western Africa. There is another species, *C. annulus*, used locally among the Eastern islands for the same purpose.

Cowslip, a well-known plant, *Primula veris*, of the same genus as the primrose, *P. vulgaris*, the oxlip, *P. elatior*, etc. The two last are very much akin. The first and second widely differ in appearance, but statements from time to time appear that they have been found growing from the same root, in which case they would not be two species, but varieties of one. To naturalists believing in the separate creation and subsequent immutability in essential character of each species, this would be an important fact; but Darwinians would regard it as of little moment. They would probably derive the primrose, cowslip, oxlip, etc., from a now extinct primulaceous plant more generalized than any of these. The cowslip has ovate-crenate, toothed, and wrinkled leaves, with the flowers in an umbellate scape. The flowers are sedative and diaphoretic. They make a pleasant soporific wine. The fresh root, which smells like anise, was formerly used as a tonic nervine and diuretic.

Cow Tree, various milky trees; especially, a large tree, *Brosimum Galactodendron*, sometimes called *Galactodendron utile*. It belongs to the order *Artocarpaceæ*. It has oblong-pointed rough leaves, 10 inches long, alternate with each other, with parallel ribs running laterally from the mid-rib. When wounded it emits a highly nutritious milky juice with an agreeable balsamic smell. It is chemically akin to cow's milk. According to Humboldt, it grows only on the Cordilleras of the coast of Caracas, where it is called *palo de vaca*, or *arbol de leche*. The negroes and other lean natives of the region fatten on its milk.

Cow Wheat, the common name for the personated genus *Melampyrum*, of which there are several species, the most abundant

being the common yellow cow-wheat, *M. pratense*.

Cox, David, an English landscape painter; born in Birmingham, April 29, 1783. He was for several years engaged as scene-painter for various provincial and London theaters, and during a considerable portion of his early life he had to teach his art for a subsistence. After residing in London, Hereford, etc., he returned to Birmingham in 1841. His works are chiefly of English landscape, and in water colors, a department which constituted his peculiar walk. His pictures are now very highly valued. In later life he painted a good deal in oil. He published a work on "Landscape-painting and Effect in Water-colors." He died in Harborne, near Birmingham, June 7, 1859.

Cox, Sir George W., an English writer; born in Benares, India, Jan. 10, 1827; held some curacies in Devonshire, and afterward became Vicar of Bekesborne, Kent, and Scrayingham, York. He has published works on Greek history, the "Mythology of the Aryan Nations," "British Rule in India," etc. He died in 1902.

Cox, Jacob Dobson, an American soldier; born in Montreal, Oct. 27, 1828; was graduated at Cambridge in 1844, becoming a lawyer; but upon the outbreak of the Civil War was made Brigadier-General of Ohio Volunteers. In 1862 he became Major-General of United States Volunteers, and in 1864 commanded a division at Nashville. He was elected governor of Ohio in 1865, and in 1869 became Secretary of the Interior in President Grant's cabinet. He died in Magnolia, Mass., Aug. 4, 1900.

Cox, John, a Canadian educator; born in London, England, in 1851. He was graduated at Cambridge in 1874, becoming a Fellow of Trinity, and in 1887 Warden of Cavendish College, Cambridge. He entered the University Extension movement, and in 1889 went to Canada, becoming Professor of Physics in McGill University, a post he has since retained.

Cox, Kenyon, an American painter; born in Warren, O., Oct. 27, 1856. He studied in Paris under Duran and Gerome, settling in New York in 1883 as a portrait and figure artist. He is a member of the Society of American Artists. He did two decorations in the Library of Congress and numerous similar works elsewhere.

Cox, Palmer, an American artist and writer for young people; born in Granby, Quebec, April 28, 1840. Since 1875 his home has been in New York. His works are both written and illustrated by himself. He is best known by his "Brownie Books," a very popular series containing humorous pictures and verse for children.

Other productions are: "Hans Von Peter's Trip to Gotham" (1878); "How Columbus Found America" (1878); etc.

Cox, Samuel Sullivan, an American statesman and author; born in Zanesville, O., Sept. 30, 1824. He served some terms in Congress, and became minister to Turkey. His works are: "Eight Years in Congress"; "Why We Laugh"; "Diversions of a Diplomat in Turkey"; "A Buckeye Abroad"; "Arctic Sunbeams"; "Orient Sunbeams"; "Search for Winter Sunbeams"; "Free Land and Free Trade"; and others. He died in New York, Sept. 10, 1889.

Coxe, Arthur Cleveland, an American writer, and second Bishop of the Protestant Episcopal Church in the Diocese of Western New York; born in Mendham, N. J., May 10, 1818. Among his many publications are: "Christian Ballads" (1840); "Athanasion and Other Poems" (1842); "The Pascal," a collection of Easter poems (1889); and many valuable contributions to current literature in both English and French. He died in Clifton Springs, N. Y., July 20, 1896.

Coxeyites, the followers of Jacob S. Coxey, of Massillon, O., who, during the financial depression existing in the United States in November, 1893, announced that he intended to lead an army of 100,000 of the unemployed people to Washington, to petition Congress for the issuance of \$500,000,000 in non-interest bearing bonds, to be used for the improvement of roads. Coxey left Massillon on March 25, 1894, at the head of 122 people, and reached Washington May 1. In the attempt to make a speech from the Capitol steps, he was accused of stepping on the grass, and with Carl Browne, was imprisoned for 20 days. The starting of several "commonweal" companies, denominated "armies," for Washington in the early part of 1894, demonstrated how widespread was the condition of idleness, but other and greater excitements coming on caused these Coxey contingents to be forgotten.

Coxwell, Henry Tracey, an English aëronaut; born in Wouldham, near Rochester, in 1810; was educated for the army, but settled as a surgeon-dentist in London. From boyhood he had taken a keen interest in ballooning; in 1844 he became a professional aëronaut, and in 1845 established the "Aërostatic Magazine." After that he made some 700 ascents, the most remarkable being that of 1862, when he reached, with Mr. Glaisher, a height of seven miles. He published "My Life and Ballooning Adventures." He died Jan. 5, 1900.

Coyote (koi-ōt'), the American wild dog or prairie-wolf, *Canis ochropus* or *Lyciscus latrans*. The coyote is virtually a

wild dog and breeds with the domestic dog, and dogs will often refuse to injure the female coyote. Huxley contends that there is no material difference between the skull of a coyote and that of a dog, and a cross between a collie and an Eskimo dog produces a very fair coyote, so far as appearances go. In general appearance the coyote resembles the typical wolf, the fur being a dull yellowish gray, with dark, even black, clouded spots; beneath it is sometimes reddish and white.

Coysevox, Antoine (kwäs-vō), a French sculptor; born in Lyons, Sept. 29, 1640. Among his best works are an equestrian statue of Louis XIV.; the statue of Cardinal Mazarin; the tomb of Colbert; the group of "Castor and Pollux; the Sitting Venus"; the "Nymph of the Shell"; the "Hamadryad"; the "Faun with the Flute"; "Pegasus and Mercury." He died in Paris, Oct. 10, 1720.

Cozens, John Robert, an English water-color painter; born in 1752. He was instructed by his father, Alexander Cozens. In 1776 he visited Switzerland, with R. Payne Knight, and in 1783 returned from an extended tour in Italy with William Beckford, who commissioned many of the washed drawings which he then executed. Among his English subjects are some fine studies of trees made in Windsor Forest. The date of his death has been usually stated as 1799, but there is reason to believe that he was alive after 1801.

Cozumel, an island in the Caribbean Sea, off the coast of Yucatan.

Cozzens, Frederick Swartwout, an American humorist; born in New York city, March 5, 1818; was a merchant, to whom literature was a recreation. In "Yankee Doodle" (1847) were published his earliest humorous poems and sketches. In 1853 a volume entitled "Prismatics" was published under the pen-name of "Richard Haywarde"; and in 1856 the "Sparrowgrass Papers," which attained great popularity. Among his other published works are "Memorial of Col. Peter A. Porter" and a "Memorial of Fitz-Greene Halleck" (1868). He died in Brooklyn, N. Y., Dec. 23, 1869.

Crab, a name applied generally to any crustacean of the sub-class *Malacostraca*, the order *Decapoda* (10-footed), and the sub-order *Brachyura* (short-tailed). The brachyurous crustaceans are so called from having a short abdomen, misnamed tail, which is usually tucked under the cephalothorax. Five tribes of crabs are distinguished, namely *Cyclometopa*, *Catametopa*, *Oxyrhyncha*, *Oxystomata*, and *Anomala*. The best known species, such as the common edible crab (*Cancer pagurus*) and the common shore crab (*Carcinus mænas*), belong

to the first tribe, whose distinguishing characteristic is the rounded front of the carapace. Most of the land crabs belong to the second tribe, characterized by the squared carapace. The tribe *Oxyrhyncha*, characterized by a beaked carapace, narrower in front, includes the largest known crustacean, a Japanese species (*Macrochira Kæmpferi*). The *Oxystomata* are mainly tropical; and the tribe *Anomala*, as the name indicates, includes abnormal types. In the genus *Cancer*, which includes the common edible crab (*Cancer pagurus*), there is a semicircular corselet, and the eyes are at the ends of movable stalks or peduncles, and the sense of sight is peculiarly acute, enabling them to distinguish the approach of objects from a very considerable distance. The organ of hearing is in the basal joint of the second antenna, and consists of a small, hard, triangular prominence, covered by a membrane, within which is a cavity containing the expanded auditory nerve. The senses of taste and smell are probably combined, and the combined function, which thus resolves itself into a kind of tactile sensibility, is perhaps confined to the mouth and its margins.

Decaying bodies attract crabs under circumstances which render it impossible that sight could assist them; the sapid particles floating about may enter the mouth, and the animal thus follow up the train of fragments. Though the body is covered with a hard shell, and thus tactile sensibility must be slight over the general surface, the acuteness of the senses compensates for their limited surface. The antennæ are highly sensitive, and the tips of the walking limbs (not the nip ers) are very delicate tactile organs, especially in some of the land frequenting crabs, as in the violet flat crab of Jamaican morasses. The mouth is surrounded by six pairs of limbs, three of which, viz., mandibles and two pairs of maxillæ, belong to the head; the other three are the first thoracic limbs modified into accessory jaws and known as maxillipeds or jaw-feet. The stomach is supported on a cartilaginous framework, the pieces of which are articulated together so as to have considerable range of motion. These, in crabs, are five in number, and placed at the pyloric extremity, or outlet of the stomach; so that the aliment, after being subjected to the action of the jaws, is again more perfectly chewed by the stomach teeth before entering the digestive tube, where it is exposed to the action of the biliary fluid of the liver. The latter organ is of great size in these creatures, and is all that soft, rich, yellow substance found immediately beneath the superior shell, usually called the fat of the crab, and justly esteemed a delicious morsel. A little posterior to the stomach (commonly called sandbag) the heart is situated—a somewhat globular, whitish

body, which propels a colorless lymph to the gills and rest of the body, whence it is brought back to the heart by a vein (*vena cava*) of considerable size.

As it is obvious that the hard shell of the crab when once perfected, cannot change with the growth of the animal, it becomes necessary that it should be shed entirely; and this shedding or moulting takes place at regular periods, at which the increase of size occurs.

The aquatic crabs, when the season of shedding arrives, generally seek the sandy shores of the creeks and rivers. The body of the crab seems to swell, the large upper shell is gradually detached at the edge, or where it joins the thorax or corselet, and the membrane gradually gives way and rises up from behind, somewhat like the lid of a chest. The crab next begins to withdraw the limbs from their cases, and the large muscles of the claws undergo a softening, which allows of their being drawn through the smaller joints. In some species, if not in all, the sheath of the limbs splits longitudinally so as to facilitate the withdrawal. This movement is slowly effected, and at the time it is accomplished the parts about the mouth, the antennæ and eyes, are withdrawn from their old cases, and the animal escapes, retaining his original figure, but soft, helpless, and incapable of exertion or resistance. By a gentle and not very obvious motion we next observe the sand displaced below the body, and the crab begins to be covered with it, until at length he is sufficiently covered for safety, though still in sight. This is generally in shallow water, where the sun shines freely upon the bottom; and in the course of 12 hours the external membrane begins to harden so as to crackle like paper when pressed on, and the process of hardening goes on so rapidly that by the end of the next 48 hours the crab regains something of his former solidity and ability to protect himself by flight or resistance. Myriads of these animals are caught on the shores of the rivers and creeks of Chesapeake bay when in their soft state. In Baltimore, Annapolis, or Easton, in July and August, soft crabs are accounted one of the highest luxuries of the table.

Some crabs are aquatic and remain on the sands or rocks at great depths in the sea; others inhabit excavations formed in the soft coral reefs or bars on certain coasts; some spend their days altogether on shore, living in burrows or dens formed in a moist or boggy soil; others resort to the rocky flats or beaches to bask in the sun, and seek refuge in the sea when alarmed; while some are completely terrestrial, inhabiting holes upon the highest of the West Indies. Of the most remarkable is the species formerly so abundant in Jamaica (*Gecarci-*

mus ruricola), and still common in less densely peopled or uninhabited islands. When the season for spawning arrives vast armies of them set out from the hills, marching in a direct line toward the seashore for the purpose of depositing their eggs in the sand. With unyielding perseverance they surmount every obstacle intervening, whether a house, rock, or other body, ascending and passing over it in a straight line. Having reached the destined limit of their journey, they deposit their eggs in the sand, and recommence their toilsome march toward their upland retreats. On their seaward journey they are in full vigor and fine condition; and this is the time when they are caught in great numbers for the table. Their flesh, which is of the purest whiteness, is highly esteemed, but like that of all crustaceous animals is rather difficult of digestion. Returning from the coast they are exhausted, poor, and no longer fit for use. They then retire to their burrows and slough or shed their shells, after which operation, and while in their soft state, they are again sought by epicures.

Crabs generally subsist on animal matter, especially in a state of decomposition, though some of them are very fond of certain vegetable substances. This is especially the case with the swift-running or racer-crabs, which live in burrows made in a soft or watery soil in the vicinity of sugar cane fields. From their numbers and activity they become a great nuisance, destroying large quantities of cane by cutting it off and sucking the juice. They sometimes increase to such a degree that, in conjunction with the rats and other destroyers of the cane, they blight the hopes of the planter, and completely spoil his crop. Their excavations in the soil are so deep and extensive, and it is so very difficult to catch or destroy them in any way, that they may be regarded as seriously subtracting from the value of estates situated near the sea or where they are abundant. Few men can run with sufficient swiftness to overtake them; and the wonderful facility they have in darting in any direction, or with any part of their bodies foremost, almost uniformly enables them to elude capture and recommence their flight. It is seldom, however, that they leave the mouths of their dens in the daytime. The species which daily bask in the sun on the rocky shores of the West India Islands are quite as vigilant and very little inferior in swiftness to those above mentioned. Some of them are very large, splendidly colored, and well suited to excite the wishes of a naturalist to add them to his collection. A number of species of crabs occur in the British seas, the best known of which is the common edible crab, *Cancer pagurus*. These are very commonly caught in crab-pots, which are baskets of a rounded form, with an aperture at the top by which

the crab enters, but from which it is prevented from escaping by a circle of willow rods surrounding the aperture and projecting into the interior of the crab-pot.

Crab, a name given to various machines, especially to a kind of portable windlass or machine for raising weights. Crabs are much used in building operations for raising stones or other weights, and in loading and discharging vessels.

Crab, Roger, an English hermit; born in Buckinghamshire about 1621; and served for seven years (1642-1649) in the Parliamentary army. He had imbibed the idea that it was sinful to eat any kind of animal food, or to drink anything stronger than water; and in 1651, distributing his money among the poor, he took up his residence in a hut. His food consisted of bran, turnip-tops, dock-leaves, and grass. The persecutions the poor man inflicted on himself caused him to be persecuted by others, cudged and put in the stocks. He published "The English Hermite" "Dagon's Downfall" and a tract against Quakerism, and died in Bethnal Green Sept. 11, 1680.

Crab Apple, a small, wild, very sour species of apple, from which a fine jelly is made.

Crabb, George, an English lawyer and philologist; born in Palgrave, England, Dec. 8, 1778. He first studied medicine, but never practised; then taught for some time; later studied in Germany, and on his return to England published a series of German text-books which were long in use. In 1821 he was graduated at Oxford; and in 1829 was admitted to the bar. He compiled a number of educational text-books; made several contributions to legal literature, which became standard works; and was the author of "Dictionary of English Synonyms" (1816), a work that attained wide popularity; "An Historical Dictionary" (1825); "Mythology of All Nations" (1847); "A Technological Dictionary"; "A History of the English Law"; "A Digest and Index of All the Statutes at Large"; "A Technical Dictionary of Terms Used in Science and Art"; and "A Dictionary of General Knowledge." He died in Hammersmith, England, Dec. 4, 1854.

Crabbe, George (kräb), an English poet; born in Aldborough, Suffolk, in 1754. Having been educated for the medical profession, he settled as a surgeon and apothecary in his native village, but soon finding his practice insufficient to afford him a livelihood, he resolved to try his fortune as littérateur in London. He obtained the friendship and assistance of Burke, published his poem, the "Library," and soon after entered the Church. He was appointed domestic chaplain to the Duke of Rutland, and afterward obtained ample preferment. In 1873 appeared the

"Village," which was followed two years afterward by the "Newspaper." "The Parish Register" appeared in 1807. The "Borough" appeared in 1810 and was followed in 1812 by "Tales in Verse," and in 1819 by "Tales of the Hall." The latter years of Crabbe's life were spent in the peaceful discharge of his professional duties at Trowbridge in Wiltshire, a living which he had received in 1814. His poems are all characterized by homely truthfulness, simplicity, and pathos. He died in Trowbridge, Wilts, in 1832.

Crab Spider, or **Matoutou**, a spider that belongs to the typical genus of the family *Mygalidæ*, which may be at once known by the shape of its mandibles and the terrible claws which proceed from them. In the greater number of spiders the claws are set horizontally, but in the *Mygalidæ* they are bent downward, and strike the prey much as a lion clutches at his victim with his curved talons. The great crab spider preys on young birds and other small vertebrates, instead of limiting itself to the insects, and similar beings, which constitute the food of the generality of the spider race. The falces or talons of this spider are of enormous size, and when removed from the creature and set in gold, they are used as toothpicks, being thought to possess some occult virtue which drives away the toothache.

Crabtree, Charlotte (best known by her stage name Lotta), an American actress; born in New York in 1847. Her father went to California in 1851, and there engaged in gold-mining. His wife and daughter joined him in 1854. Lotta made her first appearance on the stage when 6 years old in an amateur performance. At the age of 10 she played the part of Gertrude in the "Loan of a Lover" at Petaluma. In 1860 the mother and daughter were members of a variety company that traveled through California. In 1863 Lotta appeared in New York city in spectacular plays at Niblo's Garden, and first gained a reputation in John Brougham's "Little Nell and the Marchioness." She soon became a favorite with the American public in pronounced comedy, playing parts especially written for her. Her chief successes have been as "Topsy," "Sam Willoughby," "Fire-fly," "Musette," "Zip," "Bob," "The Little Detective," and "Nitouche."

Cracovienne, the national dance of the Polish peasantry around Cracow. It has a very marked rhythm in two-four time, and is often accompanied by singing. The Poles have a multitude of little ditties of two lines each, adapted to this music and dance.

Cracow, the old capital of Poland; in 1815-1846 capital of a republic of the same

name now forming part of Austrian Galicia; is on the left bank of the Vistula, where it becomes navigable, and consists of Cracow proper, or the old city, and several suburbs. It is the see of a bishop, is well built and regularly fortified. The cathedral, a fine old Gothic edifice, contains monuments of many Polish kings, of Kosciusko, etc. The university was founded in 1364, but gradually fell into decay, and was reorganized in 1817. It has a library of 300,000 volumes. On a hill near the town stands the monument of Kosciusko, 120 feet high. Pop. (1900) 91,323.

Craddock, Charles Egbert. See MURFREE.

Cradle, or "rocker," a mechanical contrivance used in placer mining, consisting of a box on rockers and moved by hand, used for washing out the gold-bearing soil.

Cradle of Liberty, a name by which Faneuil Hall, in Boston, is known. During the Revolution it was the favorite meeting place of the Americans. The name is also sometimes applied to the city of Boston.

Crafts, Wilbur Fisk, an American clergyman; born in Freyburg, Me., Jan. 12, 1850; was graduated at Wesleyan University in 1869, and Boston University School of Theology in 1872; preached eight years as a Methodist Episcopal minister; in 1880 joined the Congregational church. Later he engaged in literary work. He is secretary of the American Sabbath Union, and prominent in reform work; author of "Successful Men," "The Sabbath for Man," etc.

Crag, in geology, a local name in England for shelly deposits in Norfolk and Suffolk, usually of gravel and sand, of the older Pliocene period, subdivided into three members—viz., the Upper or Mammaliferous Crag, the Red Crag, and the Lower or Coralline Crag.

Crag-and-tail, a crag, rock, or hill, with a precipitous face on one side and with an accumulation of bowlders, gravel, mud, or similar detrital matter on the other. The Castle Rock at Edinburgh, Scotland, with its steep western face, is a "crag" and the eastward slope of the High Street and Canongate constitute the "tail."

Crag, the King's. See KING'S CRAG.

Craig, John, a Scottish reformer; born in 1512. He became Knox's colleague in Edinburgh, refused to publish the banns between Mary and Bothwell, assisted in drawing up the "Second Book of Discipline," and compiled the "National Covenant" signed by the king in 1580. He died in 1600.

Craig, Sir Thomas, a Scottish writer on jurisprudence; was probably born in 1538. He was educated at the University of St. Andrews, and afterward went to France.

Craigie

where he studied civil and canon law. He returned about 1561, and was placed at the head of the criminal judicature of the country as justice depute. He is now chiefly remembered by his "Treatise on Feudal Law." He died in 1608.

Craigie, Pearl Richards. See HOBBS, JOHN OLIVER.

Craik, Dinah Maria Mulock, an English author; born in Stoke-upon-Trent in 1826. She early took the burden of supporting an ailing mother and two younger brothers and wrote stories for fashion-books, as well as for graver publications. Her first published book was quite naturally one for children, and bore the title, "How to Win Love, or Rhoda's Lesson." Her first serious appearance as a novelist was in 1849, with her story, "The Ogilvies," which was followed by "Olive," "The Head of the Family," "Agatha's Husband," "Life for a Life," "The Laurel Bush," and "Sermons out of Church." She never surpassed, however, or even equalled her domestic novel, "John Halifax" (1857), which has had, and still continues to have an extraordinary popularity, and has been translated into French, German, Italian, Greek, and Russian. The scene is laid at Tewkesbury, where a marble medallion has been placed to her memory in the abbey. A pension of £60 a year, awarded to her in 1864, she set aside for authors less fortunate than herself.

In 1865 she married George Lillie Craik a partner in the publishing house of Macmillan and Company, and spent a period of quiet happiness and successful literary industry at her home in Kent, where she died Oct. 12, 1887. For many years she was conspicuous among those in England who favored the legalization of marriage with a deceased wife's sister, to preserve a uniformity in the law in England as well as in the colonies. So earnest was she in this that shortly before her death she offered to republish her "Hannah," with a new preface urging the adoption of the measure by Parliament.

Craik, George Lillie, a Scotch writer; born in Fifeshire in 1799. He was an extensive contributor to the Penny Cyclopædia, in the departments of history and biography. His first independent work of any importance was his "Pursuit of Knowledge under Difficulties" (1830-1831). Other works were: "Romance of the Peerage"; "Spenser and His Poetry"; "History of Literature and Learning in England, afterward recast into "History of English Literature and the English Language"; "History of British Commerce"; "English of Shakespeare"; "Bacon, his Writings and Philosophy," etc. In 1849 he was appointed professor of English litera-

Cramp

ture in Queen's College, Belfast, an appointment which he held till his death, June 25, 1866.

Craik, Georgiana Marion, an English novelist; born in London in April, 1831. Her fictions are concerned with domestic life. "Dorcas" contains some exquisite portrayal of character; "Riverston"; "Lost and Won"; and "Only a Butterfly"; are also good.

Crambe, a genus of cruciferous plants, family *Raphanidæ*. The plant is without valves, the upper joint globose, deciduous, bearing one pendulous seed upon a seed from the bottom of the cell, the lower joint resembling a pedicel. *C. maritima* is the sea kale. It is a glabrous plant with roundish, sinuated, waved, and toothed glaucous leaves and white flowers. It grows, though not very commonly, on sea-coasts or sandy or stony places. When cultivated and blanched, it is an excellent culinary vegetable. *C. tatarica* is the tatar kenyer or tartar-bread of the Hungarians. It is eaten by them, peeled and sliced, with oil, vinegar, or salt, or sometimes is boiled.

Cramp, an irregular spasmodic contraction of the muscles of the whole or different parts of the body, causing most severe pain by the knotty and hardened state into which their fibers are contracted. Though it may involve the greater number of the muscles at once, the parts most generally affected are those of the feet, legs, thighs, abdomen, and arms. The cause sometimes proceeds from the sudden application of cold to the heated body, damp sheets, wet feet, or wet clothes; the irritation produced on the nervous system by the absorption of lead, arsenic, or other mineral poisons, and the exhaustion on long-continued evacuations, as in cholera; from the specific action of some animal virus, as in the bite of venomous reptiles, and in bathing, from coming in contact with cold springs, and a too lengthened stay in the water. In general, it is readily removed by a forcible exertion of the antagonist muscles, so as to overcome the spasmodic contraction, or by friction and warmth.

Cramp, Charles Henry, an American shipbuilder; born in Philadelphia, May 9, 1828. He was graduated at the Central High School and entered the shipyards of his father, William Cramp. He soon established the prestige of the firm of William Cramp & Sons, which he incorporated and of which he became president. Their shipyards in Philadelphia are the most extensive in the United States, executing contracts for the governments of the United States, Russia, Japan, etc., and exercising a great influence upon modern naval development.

Cranach

Cranach, or Kranach, Lucas, a German painter; born in 1472. He was patronized by Frederick of Saxony, and accompanied him in his pilgrimage to Jerusalem. On the commencement of the Reformation movement he became the intimate friend of Luther and Melancthon, whose portraits, as taken by him, are among the most interesting memorials of the age. His works, chiefly portraits and historical subjects, are numerous and much prized. He died in 1553. His son, Lucas, also gained great distinction as a painter.

Cranberry, a plant, *vaccinium oxycoccos*, having also the book-name of the marsh whortleberry. It has a filiform stem, ovate evergreen leaves, glaucous beneath, their margin revolute and entire; a terminal single-flowered peduncle, a four-parted revolute corolla, and a berry of a bright roseate hue. It is found in bogs. The berries are used for preserves and pies. The deeply-divided revolute segments of the corolla have led Richard and other botanists to separate the species from *vaccinium* and call it *oxycoccus palustris*.

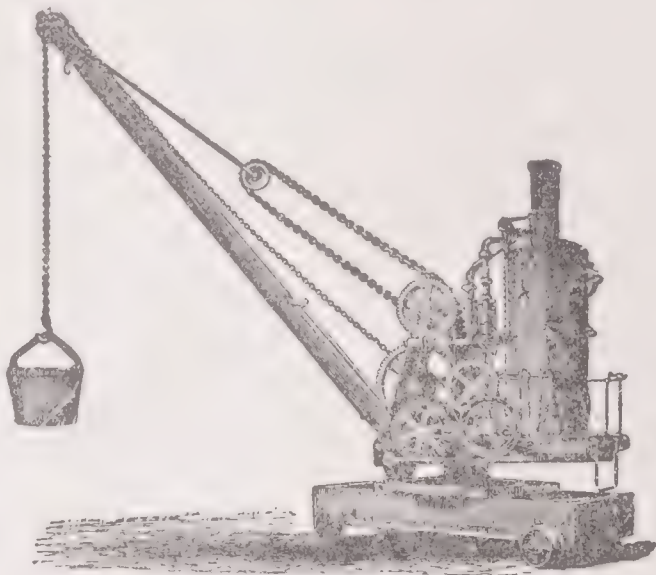
Cranbrook, Gathorne Gathorne-Hardy, Earl, an English statesman; born in Bradford, Oct. 1, 1814. Educated at Shrewsbury and at Oriel College, Oxford, he was called to the bar in 1840, and in 1856, after unsuccessfully contesting Bradford nine years earlier, was elected to Parliament as a Conservative by Leominster. In 1865 he defeated Mr. Gladstone in the celebrated Oxford University election; in 1878 he was raised to the peerage as Viscount Cranbrook. He was Under-secretary of State for the Home Department (1858-1859), President of the Poor-law Board (1866-1867), Home Secretary (1867-1868), War Secretary (1874-1878), Secretary of State for India (1878-1880), and Lord President of the Council. He died Oct. 30, 1906.

Cranch, William, an American jurist; born in Weymouth, Mass., July 17, 1769. He was graduated at Harvard in 1787; admitted to the bar in 1790; appointed an Associate Judge of the United States Circuit Court for the District of Columbia in 1801; and Chief-Justice of that court in 1805. He held this office till his death, and during a period of over half a century had only two decisions overruled by the Supreme Court. His reports of cases decided in the Circuit Court (1801-1841) were published in six volumes 8vo; and those of the United States Supreme Court (1801-1815) in nine volumes, with supplementary issues in 1835. He died in Washington, D. C., Sept. 1, 1855.

Crane, a machine for lifting weights, worked either by hand, or by steam, or by hydraulic power. The most common hand form consisting of an upright revolving

Crane

post and a projecting arm (usually at an angle of about 45°), the jib with a fixed pulley at its extremity. The lifting chain or rope is secured to the weight, passes over the fixed pulley, and then round a drum or cylinder; suitable toothed-wheel gearing worked by a handle revolves this drum, and thus winds up or unwinds the rope or chain, and so raises or lowers the weight, while at the same time the effort applied by the men at the handle is greatly magnified — namely, disregarding frictional losses, in the same proportion that the peripheral speed of the handles is reduced by the gearing interposed between handle axis and drum axis. The revolving motion of the upright post enables the load to be deposited at any point within the sweep of the jib. It is often arranged that the jib shall be hollow; the chain then passes down it, and there is no fear of fouling; if also the jib is of a curved form, we obtain the full benefit of the lift, while in the ordinary



STEAM CRANE.

crane the form of the jib or the tie interferes with the usual height of lift.

Whenever much hoisting or heavy work has to be done, steam or hydraulic power is always used; the cranes are then either stationary or portable, the latter type being used whenever it is more convenient to move the crane to its work than the converse. The stationary power cranes differ from the hand ones mainly in their vastly greater power, and consequently greater size and complexity of gearing; where steam is used there are generally two direct-acting steam-cylinders, which replace the two handles worked by hand. The very powerful stationary cranes used in docks capable of lifting 50 to 75 tons are examples of this kind; they are always mounted on massive foundations, and so arranged as to sweep a whole circle. Hydraulic power is very largely used in cranes for these places and in great steel-works; they are simpler in construction, a

good deal of gearing being done away with; the water in the operating cylinder is always under great pressure.

In the hydraulic cranes originally introduced by Sir William Armstrong (*q. v.*), the power given out by the hydraulic cylinder is reduced by using systems of pulleys in the inverse order, the lifting chain being attached to the cylinder, then passing over a pulley fixed to the head of the ram, then round other fixed pulleys, and so up to the fixed pulley at jib end, the effect being to increase the motion of the ram, and so secure very rapid lifts at the expense of using more power. In one very ingenious steam-crane (Morrison's) the post of the crane is hollow, and forms the steam-cylinder, in which works a piston with flexible piston-rod — namely, the lifting chain; this form is very steady and very readily slewed.

Portable cranes are mounted on plain railway trucks, either of wood or iron. This truck carries firmly attached to it a central post, the whole of the rest of the crane being carried on a strong base-plate capable of revolving round this post as a pivot, the boiler being so placed (often standing on its own feed-water tank) on this base-plate that it forms a counterbalance to the weight to be lifted. The boiler is always of the vertical type, and very simple in its internal arrangements of tubes, because it often has to work with very dirty feed-water. The gearing is usually carried by A frames bolted to the base-plate; the engine, having generally two small direct-acting steam-cylinders, is easily reversed. By means of gearing and clutches, which are operated by the man in charge of the crane by hand or foot levers, the engine can perform the following operations: (1) Lower or raise the outer end of the jib; (2) slew the crane — *i. e.*, the base-plate and all it carries; (3) propel the truck along the rails; (4) hoist the loads. For the last three operations the gearing is generally so arranged that there are two speeds, a quick and a slow, either of which can be used, depending on the work to be done. The figure shows a very common type of this kind, which will lift from 5 to 7 tons, according to the position of the jib. For the maximum load the chain end is often attached to end of jib, and then round a hanging-block, and so up to fixed pulley at jib end, thus doubling pull on chain. For the same purpose as the ordinary crane are used contrivances known as derricks, which consist essentially of a mast or tripod with a long cross-boom at the top, tied to the mast by guys; pulley-blocks attached to one arm of the boom form the means of lifting. They are a good deal used in the United States for very heavy work, such as raising wrecks, bridge-building, etc. They readily lend

themselves for use as floating-cranes, since by making the vessel carrying them in watertight compartments which can be filled, it is a very easy matter to counterbalance the load.

Crane, a genus of birds belonging to the order *Grallæ*, or Grallatores; and by the great Swedish naturalist comprised in his extensive genus *Ardea*, though properly ranked as a distinct genus by all subsequent naturalists. The distinctive characters of this genus are as follows: The bill is but little cleft, is compressed, attenuated toward the point, and rather obtuse at its extremity; the mandibles are subequal, with vertical margins, the upper being convex, with a wide furrow on each side at the base, which becomes obliterated before reaching the middle of the bill. The nostrils are situated in these furrows, and are medial-concave, elliptical, pervious, and bounded posteriorly by a membrane. The tongue is fleshy, broad, and acute. The ophthalmic region and lora are feathered, though the head is generally bald, rough, and sometimes crested. The body is cylindrical, having long and stout feet. The naked space above the tarsus is extensive, and the latter is more than twice as long as the middle toe. The toes are of moderate length, covered with scutellæ, or small plates, and submargined; a rudimental membrane connects the outer one at base; the inner is free; the hind toe shorter than a joint of the middle one, and is articulated with the tarsus, elevated from the ground; the nails are tile-shaped, falcate, and obtuse; the middle one has its cutting edge entire; the hind nail is the longest; the wings are moderate, with the first and fifth primaries subequal; the tail is short, and consists of 12 feathers.

These birds are generally of considerable size, and remarkable for their long necks and stilt-like legs, which eminently fit them for living in marshes and situations subject to inundations, where they usually seek their food. This is principally of vegetable matter, consisting of the seeds of various plants or grains plundered from grounds recently plowed and sown. They also devour insects, worms, frogs, lizards, reptiles, small fish, and the spawn of various aquatic animals. They build their nests among bushes or on tussocks in the marshes, constructing them of rushes, reeds, etc., surmounted by some soft material, so high that they may cover their eggs in a standing position. They lay but two eggs, for the incubation of which the male and female alternately take their place on the nest. During the time one is thus engaged, the other acts as a sentinel; when the young are hatched, both parents unite in protecting them.

The cranes annually migrate to distant regions, and perform voyages astonishing for their great length and hazardous char-

acter. They are remarkable for making numerous circles and evolutions in the air when setting out on their journeys, and generally form an isosceles triangle, led by one of the strongest of their number, whose trumpet-like voice is heard as if directing their advance, when the flock is far above the clouds and entirely out of sight. To this call-note of the leader the flock frequently respond by a united clangor, which, heard at such a distance, does not produce an unpleasant effect. From the sagacity with which these birds vary their flight, according to the states of the atmosphere, they have, from the earliest ages, been popularly regarded as indicators of events; and their maneuvers were attentively watched and interpreted by the augurs and aruspices among the Romans—a circumstance which, together with their general harmlessness and apparent gravity of demeanor, led to their being held in a sort of veneration, even by some civilized nations. When obliged to take wing from the ground, cranes rise with considerable difficulty, striking quickly with their wings, and trailing their feet along and near the ground until they have gained a sufficient elevation to commence wheeling in circles, which grow wider and wider until they have soared to the highest regions of the air. When their flight is high and silent, it is regarded as an indication of continued fine weather; they fly low and are noisy in cloudy, wet, or stormy weather. Against approaching storms the cranes, like various other birds of lofty flight, readily guard by ascending above the level of the clouds, and the atmospheric currents which bear them. When a flock of cranes is engaged in feeding, or while it is at rest, and the birds are standing on one foot asleep, with the head under the wing, one of the number acts as sentinel and keeps a vigilant watch, alarming the whole if any enemy approach, or the slightest danger threaten.

The common crane (*Grus cinerea*) has the general plumage ash-gray, the throat black, the rump ornamented with long, stiff, and curled feathers, the head with bristly feathers, and bare on the top, which in the male is red; legs black, length about 4 feet. It inhabits Europe, Asia, and the N. of Africa. In the spring cranes retire to the N. regions to breed, extending their wanderings to the polar circle; in the autumn they return to the S. Though at one time common in the marshy districts of Great Britain, the crane occurs now only as a straggler. The white crane (*G. leucogeranus*) is white, the quill feathers being black, and the feet red. It is about 5 feet long, and inhabits the neighborhood of the Caspian Sea. The crowned crane (*G. pavonina*, or *Balearica pavonina*) has the general plumage bluish ash-gray, the tail and primary quills black, the wing coverts pure white; the occiput is crowned

with a tuft of slender yellow feathers, which can be spread out at pleasure; it is about four feet long. It inhabits North and West Africa, and is not uncommon in Sicily and Malta. The demoiselle crane (*Anthropoides virgo*), so called from the elegance of its form, belongs to another genus. It is ash-gray, and the head is adorned with two tufts of feathers, formed by a prolongation of the ear coverts; its length is three feet. Its habitat is Africa and the S. of Europe. Among North American species are the whooping crane (*G. Americana*) and the brown or sand-hill crane (*G. Canadensis*). The first-named derive their trivial appellation from their loud, clear, piercing cry, which may be heard at the distance of two miles. They are very shy and vigilant, and consequently shot with difficulty. Their general color is pure white. The brown or sand-hill crane is of an ash color, generally, with shades or clouds of pale brown and sky-blue; brown prevails upon the shoulders and back. It is a very stately bird, standing when erect fully 5 feet high, and measuring 8 or 9 across the wings. The tail is quite short, but the feathers pendent on each side of the rump are very long, of a delicate silky softness, and sharp-pointed. The crown of the head is bare of feathers, and of a reddish rose color, but thinly barbed with a short, stiff, black hair.

Crane, Stephen, an American story-writer; born in Newark, N. J., Nov. 1, 1870. He wrote "Maggie"; "The Red Badge of Courage"; and "George's Mother" (1898), stories; "The Black Riders and Other Lines" (1895), verse; and other books. He died in Badenweiler, Germany, June 5, 1900. His "Red Badge of Courage" excited a wide-spread interest in its author and seemed to presage a career of more than ordinary brilliancy. He broke off his college career to become a journalist. During the American-Spanish War, he was a reporter in Cuba for the New York "Journal."

Crane, Thomas Frederick, an American scholar; born in New York July 12, 1844. He became Professor of Romance Languages at Cornell University in 1868. Besides many contributions to periodicals, he has written: "Italian Popular Tales" (1885); "Pictures of the French Revolution" (6th ed., 1892); "French Romanticism" (3d ed., 1890); "Popular Songs of France" (1891), etc.

Crane, Walter, an English painter; born in Liverpool Aug. 15, 1845; the son of an artist, Thomas Crane (1808–1859). He himself was trained as an artist, and his earlier as well as much of his later work consists of book illustrations. Among these may be named his series of "Toy-books" (1869–1875); "The Baby's Opera" (1877), and "The Sirens Three" in which last the poem as well as the design was his work.

Crane

In 1862 he began to exhibit paintings at the Royal Academy, showing in that year "The Lady of Shalott," and he was a constant contributor to the Grosvenor Gallery from its foundation in 1877 till 1888. His pictures nearly always deal, in a somewhat decorative and archaic fashion, with subjects of an imaginative nature, such as "The Riddle of the Sphinx" (1887). He has also produced many very delicate landscape subjects in water-colors; has designed wall papers; and has published poems, illustrated by himself, "Queen's Summer" (1891), and "The Claims of Decorative Art" (1892). Since 1888 a member of the Royal Society of Painters in Water-colors, he was in 1893 appointed art director to the city of Manchester. He is prominent in the English Socialist movement.

Crane, William H., an American actor; born in Leicester, Mass., in 1845. He made his first appearance on the stage when 18 years old and soon won recognition as a comedian. His rôle in "The Henrietta," in which he was associated with Stuart Robson, was his first great success. His first starring tour after dissolving connection with Robson was undertaken in 1889 when he appeared in "The Senator." He played "David Harum" in 1900 and attained great popularity in that rôle.

Crane-fly, singular, any two-winged fly of the genus *Tipula* or the family *Tipulidæ*; plural, crane-flies, the genus *Tipula* or the family *Tipulidæ*; the typical species is popularly known as daddy-long-legs.

Crane's Bill, the typical genus of the order *Geraniaceæ*. Many species are American plants; some are mere weeds, others extremely showy.

Craney Island, an island in Norfolk Co., Va., near the mouth of the Elizabeth river W. of the entrance. Here is situated a lighthouse 50 feet in height, standing on an iron pier. There are also government powder magazines on the island.

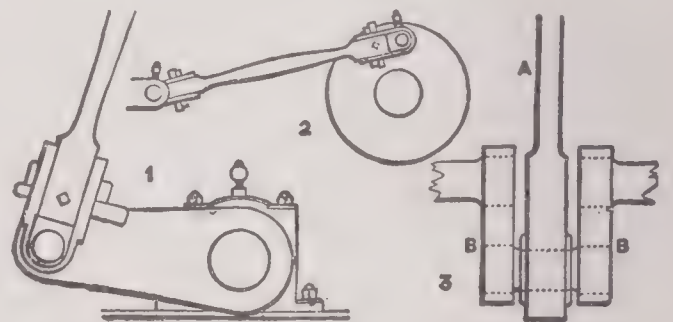
Cranganore, a town in Hindustan, in the Presidency of Madras, State of Cochin, on the Malabar coast. Pop., 9,475. It is the traditional field of St. Thomas' labors in India; Jews have been settled here since the 4th century; and it is certain the Syrian church was established before the 9th.

Craniology, a scientific study of the cranium. It is generally held to be the same as phrenology, but the examination of the cranium is an essential part of anatomy, altogether independent of the inferences with regard to the mental proclivities which may be deduced from it. The comparison of different crania is also essential to ethnology and archæology.

Crank, in machinery, a lever or arm on a shaft, driven by hand (e. g., a winch-

Cranmer

handle), or by a connecting-rod, its object being to convert reciprocating motion into rotary motion. Engine-cranks which convert the to and fro motion of the piston into continuous rotation of the crank-shaft are connected to the piston-rod end by the connecting-rod. They are, when single, of steel, wrought-iron, or cast-iron, the crank in this case being either a simple arm, enlarged at one end to fit over the shaft, and with a pin at the other end embraced by the rod end (fig. 1); or else a disk centered on the shaft, with crank-pin as before (fig. 2). This last form is well balanced. When double, as is usual in large engines (fig. 3), they are now often built up of steel, the two arms being shrunk on to the shaft, and pin on to them. In two positions during each turn, a connecting-rod exerts no power of rotation. These are when rod A and crank-arms B are parallel (as in fig. 3 and opposite position), and are the dead centers; all the push or pull of the rod only causes pressure on shaft-bearings. To carry the crank over these points either a heavy wheel (fly-wheel) is attached to the shaft, which stores up energy during other parts



CRANK.

of the revolution, and gives it out at these points, or else two or more cranks are so placed on the shaft that when one is on its dead center, the others are exerting nearly their maximum effort, which is when rod and crank are at right angles.

Cranmer, Thomas, Archbishop of Canterbury; born in Aslacton, Nottinghamshire, July 2, 1489. The opinion which he gave on the question of Henry VIII.'s divorce from his first wife, Catharine of Aragon, recommended him to that monarch, who employed him to vindicate the measure, and sent him, in 1530, with other envoys, to maintain his view before the Pope. He took with him the opinions which had been obtained from the foreign universities in favor of the same view. His mission was fruitless. On his way home, he visited Germany, and at Nürnberg married a niece of Osiander. After his return he was raised by papal bull to the archbishopric of Canterbury, in which office he zealously promoted the cause of the Reformation. Through his means the Bible was

Cranmer

translated and read in churches; and he greatly aided in suppressing the monastic institutions. A few weeks after his appointment he pronounced, in a court held at Dunstable, the sentence of divorce of Catharine, and confirmed the king's marriage with Anne Boleyn. In 1536, when Anne Boleyn was destined to lose her reputation and her life, he meanly stooped to promote the sentence of divorce. This and other compliances with the monarch's will insured him the gratitude of Henry, who upheld him in all his contests with Bishop Gardiner and others who accused him of heresy and faction. By Henry's will he was appointed one of the council of regency to Edward VI.; and as the young king was brought up chiefly under the archbishop's care, it enabled him to further the objects of the Reformation in a regular and con-



THOMAS CRANMER.

sistent manner, by framing the liturgy, the homilies, articles of religion, etc. On the accession of Mary, he was committed to the Tower, along with Latimer and Ridley. In March, 1554, they were removed to Oxford, and confined there in the common prison, called the Bocardo. Latimer and Ridley bore their cruel fate with magnanimous courage; but the spirit and principles of Cranmer temporarily gave way under the severity of his sufferings. He was induced, in the hope of saving his life, to sign no fewer than six recantations; but his enemies were determined to be satisfied by nothing short of death. On March 21, 1556, he suffered martyrdom, as his fellow-reformers had done, opposite Baliol College. His courage returned at the end, and he died protesting his repentance for his unworthy weakness in chang-

ing his faith, and showing an unexpected fortitude in the midst of the flames.

Crannog, a fortified lake dwelling, of which many are to be found in Ireland. They are supposed to have been formed about the 9th or 10th century.

Cranston, Earl, an American clergyman; born in Athens, O., June 27, 1840. He was graduated at Ohio University in 1861 and served on the Union side throughout the Civil War, rising to a captaincy. In 1867 he entered the Methodist ministry, and after holding various pastorates became publishing agent for the Church in 1884. In 1896 he was made a bishop, his diocese including China and the Orient.

Crape, a gauzy fabric made of raw silk, and woven without crossing. Uncolored, or gaily dyed, it is a rich shawl-stuff. Colored black and crimped, it is a mourning-goods. Smooth crape is used in ecclesiastical habits of a certain order, not quite so elevated as the cambric lawn of a bishop. Silk intended for crisp crape is more twisted than that for the smooth. The twist of the thread, especially that of the warp, is what gives the wrinkled appearance to the goods when taken out of the loom. Aërophanes and gauze are goods of a similar description, either white or colored. Crape is said to have been made by Ste. Badour, Queen of France, A. D. 680. It was first made at Boulogne.

Crashaw, Richard, an English poet; born in London in 1613; was educated at the Charterhouse and at Cambridge, where he graduated in 1633. In 1637 he became a fellow of Peterhouse, and having been admitted to orders, was noted as an eloquent and powerful preacher. He officiated in St. Mary's Church, near his college, and employed himself frequently in the composition of religious poems. In 1634 a volume of Latin poems, under the title of "Epi-grammata Sacra," had been published anonymously by Crashaw at Cambridge.

In 1644 he was ejected from his fellowship by the Parliamentarians, and went to Paris and became a convert to the Roman Catholic faith. Through the introduction of Cowley, then also an exile, he obtained from Henrietta Maria letters to various Italian dignitaries, and proceeded to Rome, where he became first secretary to a cardinal and afterward a canon in the church of Loretto. He died in 1650. A collection of poems by him, entitled "Steps to the Temple, Sacred Poems, with Other Delights of the Muses," was published in London in 1646; and a posthumous volume appeared in Paris in 1652, under the title "Carmen Deo Nostro." Crashaw displays considerable poetic genius in the treatment of religious subjects, though his works are now almost forgotten. Collected editions of

them were published in 1670 and 1785; another, under the editorship of W. B. Turnbull, appeared in London in 1858. Dr. George Gilfillan has also published some of Crashaw's poems in his edition of "British Poets"; and an edition by Grosart was published in 1872.

Crassulaceæ, house-leeks; an order of *hypogynous exogens*, alliance *violales*. It consists of succulent herbs or shrubs with entire or pinnatifid leaves and no stipules, flowers usually in sessile, often unilateral cymes. Sepals 3 to 20, more or less united at the base, petals inserted in the bottom of the calyx distinct or united into a monopetalous corolla; stamens equal in numbers to the petals, or twice as many; a hypogynous ovule at the base of each carpel. Fruct of several follicles, opening by the stature or a several-celled capsule opening at the back. Seeds variable in number. Lindley estimated the known species at 450.

Crassus, Lucius Licinius, a Roman orator; B. C. 140, who is introduced by Cicero, in his treatise "De Oratore," as the representative of that writer's own opinions on the subject of oratory. He was unfortunate as a legislator, inasmuch as the law proposed by him, to compel all who were not citizens to depart from Rome, was a main cause of the Social War. He was distinguished for his love of the arts; and his mansion upon the Palatium is cited, both for its architecture and for the statuary and paintings with which it was adorned, as having been one of the most noteworthy buildings in ancient Rome. He died 91 B. C.

Crassus, Marcus Licinius, a Roman triumvir, surnamed DIVES (the rich), on account of his vast riches; born about 115 B. C. His father and brother suffered death for their resistance to Marius and Cinna (in 87 B. C.), and he himself thought it prudent to retire to Spain, where he concealed himself in a cavern. When Sulla landed in Italy, 83 B. C., Crassus joined him and rendered him important services, for which he was rewarded with donations of confiscated property, besides being allowed to purchase confiscated estates at an almost nominal value. He was exceedingly fond of wealth, and also exceedingly skillful and by no means scrupulous in the ways and means of accumulating it. In 71 B. C. he was created prætor, and took the command against Spartacus and the revolted slaves. Spartacus was defeated and slain, along with a great number of his followers, and 6,000 captured slaves were crucified along the road between Rome and Capua. In 70 B. C. Crassus was elected consul, having Pompey as his colleague.

To gain favor with the populace he once gave an entertainment to the whole people, in which 10,000 tables were set, and besides this distributed corn enough to last each family three months. As he was one of the most influential men in Rome, and very ambitious, his friendship was sought by Cæsar, who formed with him and Pompey the first triumvirate in 60 B. C. The power of the triumvirs secured the reëlection of Pompey and Crassus as consuls in 55 B. C., and according to the Trebonian law Syria and the two Spains were assigned to the consuls for five years, Gaul and Illyricum falling to Cæsar. Crassus obtained Syria as his province, and envious of the military glory that both Pompey and Cæsar had attained, now determined to rival them. Accordingly, without the sanction of the senate, and in violation of treaties, he proceeded to attack the Parthians, reckoning on an easy victory, and expecting to obtain enormous treasures.

In his history Josephus tells us that on this expedition he plundered the temple of Jerusalem, but the story is doubtful. His whole campaign was marked by a neglect of the necessary military arrangements, and allowing himself to be misled by a crafty Arab chief, he was taken at a disadvantage on the open plains of Mesopotamia by Surenas, the general of the Parthian king Orodes, and perished with his son and a large portion of his troops, 53 B. C. His head was sent to Orodes, who caused melted gold to be poured into the mouth, in scorn of the greed of Crassus.

Crataegus, a genus of trees, order *Pomaceæ*. Calyx segments short and acute, petals large and roundish, styles 1 to 5, fruit oval or round, concealing the upper end of the cells, which are long. It differs from the genus *Pyrus* in containing a variable number of stones, and from the medlar by having the fruit closed. The genus contains about 80 well-marked species and varieties, occurring in the temperate parts of both hemispheres. *C. oxyacantha* is the hawthorn, or may. It is a European thorn. The Oriental species have heavy leaves, large, fragrant flowers, and large, succulent, somewhat angular fruit; those of America are often very spinous. Finally, some species of the genus—viz., *C. mexicana* and *C. pyracantha*—are evergreens.

Crater (a cup), the central cup-shaped cavity in the summit of a volcano through which the lava, stones, scoria, etc., are for the most part ejected.

Crater (the bowl, or goblet), a constellation S. of the equator and N. of Hydra, one of Ptolemy's original 48. Its brightest star is only a little above the fourth magnitude. The constellation lies between Leo, Virgo, Corvus, Hydra, and Sextans.

Crater Lake, a small lake in the Cascade Mountains, in Oregon, remarkable for

Crathis

its wall of perpendicular rock, from 1,000 to 2,000 feet high.

Crathis, a river in Magna Græcia, distinguished for giving a yellow color to the hair and beard of those who drank its waters.

Cratinus, an Athenian poet, to whom the invention of satirical comedy is attributed. His powers of sarcasm are said to have been unrivalled. Though a very intemperate man, he attained the age of 96. Died B. C. 422.

Cratippus, a celebrated Peripatetic philosopher; born in Mytilene, and a contemporary of Cicero. He appears to have been held in the highest estimation by the great men of his age. Cicero calls him the prince of all the philosophers whom he had known. Pompey visited him after his defeat at Pharsalia, and received at his hands the consolations of philosophy; and Brutus went to Athens, to which city Cratippus had latterly betaken himself, to listen to his prelections, even while making preparations to meet Octavius and Antony. Nothing that he wrote has survived.

Craven, Alfred Wingate, an American engineer; born in Washington, D. C., Oct. 20, 1810; was graduated at Columbia College in 1829, and was largely employed in railroad construction and management. His most important work was in New York, in connection with its sewerage, its supply of Croton water, and the improvement of Fourth Avenue. From the organization of the Croton Water Board, in 1849, till 1868, he was its engineer, and planned and supervised the construction of the great works of that period. He was a founder, director many years, and president in 1869-1871 of the American Society of Civil Engineers. He died in Chiswick, England, March 29, 1879.

Craven, Mme. Augustus (Pauline de la Ferronays), a French novelist; born in Paris in 1820; married the publicist, Augustus Craven. Her "Family Memoirs"; "The Story of a Sister"; "The Labor of a Soul," and other fictions, are well known. She died in Paris, April 1, 1891.

Craven, Charles, governor of South Carolina from 1712 to 1716, had been previously secretary to the proprietors. They ordered him in 1712 to sound Port Royal river, and probably he built Beaufort soon afterward. In 1715, on the occurrence of an Indian war, he displayed great vigor and talents, and expelled from the province the invading savages.

Craven, Thomas Tingey, an American naval officer; born in Washington, D. C., Dec. 30, 1808; joined the navy in 1822; was promoted captain in June, 1861, and the same year was given command of the

Crawford

"Brooklyn," with which vessel he took part in the capture of New Orleans and the later actions on the Mississippi. In 1862 he was placed in command of the "Niagara," and during the remainder of the war he served along the coasts of England and France. He was promoted rear-admiral in October, 1866; retired in December, 1869. He died in Boston, Mass., Aug. 23, 1887.

Crawfish, or **Crayfish**, a name of various crustaceous animals, the common crawfish being the river lobster, a macrurous (long-tailed), 10-footed crustacean, resembling the lobster in appearance and habits. It inhabits the fresh waters of Europe and the N. of Asia, and is common in some of the streams of England. It lurks under stones or in holes in the banks. Its food consists of small mollusks or fishes, the larvæ of insects, and almost any sort of animal matter. In the United States crawfish of the genus *Astacus* and *Cambarus* occur. Some of them by their burrowing habits injure mill-dams and the levees of the Mississippi.

Crawford, Francis Marion, an American novelist; born in Tuscany, Italy, Aug. 2, 1853; son of THOMAS CRAWFORD (*q. v.*). He was educated at Concord, N. H.; Trinity College, Cambridge; Karlsruhe, and Heidelberg. At Rome he devoted himself



CRAWFISH.

to the study of Sanskrit, and during 1879-1880 was engaged in press work at Allahabad, where he was admitted to the Catholic Church. He was selected by the government committee to write the National Ode at the centennial of the American Constitution, Sept. 17, 1887. His first novel, "Mr. Isaacs" (1882), was a book of striking and

Crawford

quite unusual merit, securing a new romantic element in certain of the aspects and contrasts of modern Oriental life. His works include: "Dr. Claudius" (1883), "To Leeward" (1883), "A Roman Singer" (1884), "An American Politician" (1884), "Zoroaster" (1885), "A Tale of a



F. MARION CRAWFORD.

"Lonely Parish" (1886), "Saracinesca" (1887), "Marzio's Crucifix" (1887), "Paul Patoff" (1887), "With the Immortals" (1888), "Greifenstein" (1889), "Sant Ilario" (1889), "A Cigarette-Maker's Romance" (1890), "The Witch of Prague" (1891), "Khaled" (1891), "The Three Fates" (1892), "Love in Idleness" (1894), "Katharine Lauderdale," and its sequel "The Ralstons" (1895), "Casa Braccio" (1895), "Takisara" (1896), "A Rose of Yesterday" (1897), "Corleone" (1897), "Ave, Roma Immortalis," "In the Palace of the King," "Eleanor," "Via Crucis," "Rulers of the South," "Marietta," etc., and others at frequent intervals. He died April 9, 1909.

Crawford, Isabella Valency, a Canadian author; born about 1829. She was one of the best known of Canadian writers, and furnished many stories for American publications. She published a book of poems which were highly commended by critics. She died in 1887.

Crawford, Louise Macartney, an American author; born in London, England, in 1808. Her song "Kathleen Mavourneen" is usually attributed to Frederick W. N. Crouch, who, however, wrote only the music. She wrote much prose miscellany.

Crawford, Thomas, an American sculptor; born in New York city, March 22, 1814. His most famous works comprise "Orpheus and Cerberus," "Adam and Eve," "Hebe and Ganymede," "Mercury and Psyche," and "Dancing Jenny." He performed important works for the National Government and State of Virginia. He died in London, Oct. 16, 1857.

Crawford, William Harris, an American statesman; born in Amherst county, Va., Feb. 24, 1772. In 1783 he settled in Columbia county, Ga., began teaching school, was admitted to the bar in 1798, and entered on practice in Lexington. He

Creameries

assisted in compiling the first digest of State laws, was elected to the State Senate in 1802, and to the United States Senate to fill a vacancy in 1807 (fighting two duels during the canvass); was reelected for a full term in 1811; was chosen president of the Senate pro tem. in 1812; and, refusing the secretaryship of war, was appointed minister to France in 1813. Two years later he was appointed Secretary of War, and the next year became Secretary of the Treasury, and held the latter office till March, 1825. He was urged as a candidate for the Presidency several times, received the nomination in 1824, and in the election had 41 electoral votes. No choice for President having been reached, the election was decided in the House of Representatives, but meanwhile Crawford had been stricken with paralysis, which precluded his effectual candidacy. He died, Sept 15, 1834.

Crawfordsville, a city and county-seat of Montgomery county, Ind.; on the Sugar creek, and the Chicago, Cleveland, Cincinnati, and St. Louis and the Vandalia and Monon Route railroads; 44 miles W. of Indianapolis. It is the trade center of an extensive agricultural region, with annual dealings of \$3,500,000. It is the seat of Wabash College, and has foundries, planing and flour mills, electric lights, water works, high school, daily and weekly newspapers, two National banks, and an assessed property valuation of \$5,000,000. Pop. (1900) 6,649; (1910) 9,371.

Crayon, a colored pencil consisting of a cylinder of fine pipe-clay colored with a pigment. Black crayons are colored with plumbago, or made of Italian black chalk. A white crayon is a cylinder of chalk, common in Europe and America. Red chalk is found in France. The holder is a porte-crayon. Crayons are said to have been made in France in 1422. It is hard to say how long ago charcoal, chalk, and ochreous earths were used.

In lithography, a composition formed as a pencil, and used for drawing upon lithographic stones. It is of a soapy nature, consisting of soap, wax, resins, and lamp-black, melted, and sometimes burned, together.

Cream, the most oily part of milk. It is specifically lighter than the other constituents, and therefore rises to the surface, whence it is generally skimmed to be used as an adjunct in making tea and coffee palatable, or for other purposes. If a saturated solution of white sugar be boiled for a couple of minutes and cream added before it cools, the cream, if preserved in a cool place, will keep fresh for some weeks.

Creameries, Coöperative. It will be news to most Americans that \$30,000,000 of business is done annually in coöperative

creameries in the United States. Curiously enough it is in creameries alone that any co-operative effort worthy of mention has been made in America. In Minnesota 450 out of 650 creameries are coöperative; in Wisconsin 1,000 out of 7,000, and in Iowa more than one-third. In Vermont there is one coöperative creamery that uses the milk of 3,000 cows and turns out 10 tons of butter a day.

Ireland has always been an unrivaled butter country, owing to her climate and soil. But since the making of butter passed from the dairy to the creamery the profits of the business have gone into the pockets of the man who operated the latter. The Hon. Horace Plunkett, a young statesman, warmly interested in the regeneration of Ireland, set himself heart and soul to the task of getting the farmers to organize co-operative creameries. He gave not a penny in money, but he gave unlimited time and brains to convincing the better class of farmers. The first creameries were established in 1889, and in 1898 there were 131 coöperative creamery and agricultural societies with a membership of 8,750 of the best class of Irish farmers. They found that owning and operating the creameries themselves raised the profits of their cows from 10 to 35 per cent. The farmers conduct the creameries through committees elected from their own organizations. The individual creameries have federated in order to handle the bulk product, and this federation has a representative in every English city. In 1896 the sales were \$553,630.

Cream of Tartar (*potassæ supertartras*; *cremor tartari*), a salt that exists in grapes, tamarinds and other fruits; the dregs of wine also contain a considerable quantity of it. Cream of tartar consists chiefly of bitartrate of potassium, about seven or eight hundredths of tartrate of calcium, and a small quantity of silica, albumen, iron, etc., but the quantity varies. It is a white crystalline powder, insoluble in alcohol, but it may be dissolved in 15 parts of boiling and 60 of cold water. It may be rendered much more soluble by mixing with it a certain quantity of boracic acid or borate of sodium, which renders the cream of tartar soluble in its own weight of cold water, and in the half only of that menstruum when boiling. This preparation is known by the name of soluble cream of tartar.

Cream of tartar is manufactured by dissolving in boiling water the common tartar or ARGOL (*q. v.*), a white or reddish crystalline matter which deposits in the vessels in which wine has been kept—mixing with it some clay, which precipitates the coloring matter, and then permitting the liquor to crystallize. As the solution cools, a crust forms on the surface which may be skimmed off. It was to this the

name "cream of tartar" was originally applied.

The medicinal action of this salt varies according to the dose which is administered. In small doses it is absorbed and acts as a temperant; and in this quality it is employed in jaundice, foulness of the stomach and intestines, etc. In larger doses it principally spends its action on the mucous intestinal membrane, and induces alvine evacuations, especially when given in powder. Its taste being rather less unpleasant than that of some other neutral salts used in medicine, and its operation being of a very gentle nature, it is very frequently administered. In France the soluble cream of tartar is generally preferred. Cream of tartar is used in calico printing and in dyeing, but crude argol is more commonly employed.

Cream of tartar is adulterated with sawdust, gypsum, clay, chalk, flour, etc.

Cream of Tartar Tree, also called the sour gourd; a tree with a trunk sometimes 70 feet 85 feet in girth, and only 20 to 30 feet high. It has a very soft, juicy wood, from which the thirsty traveler can easily squeeze out a refreshing drink. The fruit is about six inches long, oval in shape, and contains an agreeable acid pulp, tasting like cream of tartar. It grows in the N. port of Australia.

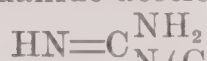
Creasote, or **Creosote**, an impure creasol, mixed with phenol. Wood creasote has powerful antiseptic power. Wood smoke contains this substance, hence its power of preserving meat. Creasote is used to relieve toothache, but often injures the neighboring teeth. It is also employed to check persistent vomiting and as an outward application for cancer. It forms an irritant poison for which magnesium sulphate is an antidote. Creasotum is obtained by distilling wood-tar. It is a colorless liquid, with a strong empyreumatic odor. It is slightly soluble in water, readily soluble in alcohol, ether, and in glacial acetic acid; it coagulates albumen, and turns the plane of polarization of a ray of polarized light to the right. It is used to prepare *mistura creasoti*, *unguentum creasoti*, and *vapor creasoti*. A slip of deal wood dipped into it, and afterward into hydrochloric acid, acquires on exposure to the air a greenish-blue color. German creasote is prepared by distilling beech-wood. Creasote is a mixture of phenol, guaiacol, paracresol, etc.

Creasy, Sir Edward Shepherd (krē-se), an English historian; born in Bexley, Kent, in 1812. He was educated at Eton, and at King's College, Cambridge, of which he was elected a fellow in 1834. He was called to the bar at Lincoln's Inn in 1837, and was for about 20 years a member of the home circuit. In 1840 he was appointed Professor of History at the London Univer-

Creatine

sity, and in 1860 was made Chief-Justice of Ceylon, receiving at the same time the honor of knighthood. His principal works are: "The Rise and Progress of the British Constitution," and "The Fifteen Decisive Battles of the World." He died Jan. 27, 1878.

Creatine, methyl-glycocyamine. Methyl-guanido-acetic acid, $C_4H_9N_3O_2 + H_2O$, or



— CH_2 — CO OH . Creatine is obtained from the muscular flesh of mammalia, birds, reptiles, and fishes. It has been found in the blood and urine and in the brains of pigeons and dogs. It is obtained by chopping up the lean muscular flesh, removing the fat, and rubbing it with water and pressing it; the liquid is heated in a water-bath to coagulate the albumen, then strained; to the filtrate baryta-water is added so long as it gives a precipitate, the filtrate concentrated on a water-bath, the crystals, which separate, decolorized by animal charcoal and re-crystallized from water. Creatine crystallizes in rhombic needles containing one molecule of water, which is driven off at 100° . The water solution has a bitter taste, and is neutral to litmus. It gives a white precipitate with silver nitrate, which is soluble in potash. After a time the solution solidifies to a transparent gelatinous mass, which is reduced when heated. Creatine heated gives off ammonia and hydrocyanic acid. Creatine is dissolved by strong acids; it loses a molecule of water, and is converted into creatinine. By boiling with baryta-water creatine is decomposed, yielding sarcosine, methyl glycocine, $C_3H_7NO_2 + urea$ CO



Creatine has been formed synthet-

ically by heating cyanamide $C \begin{bmatrix} NH \\ NH \end{bmatrix}$

with sarcosine, $CH_2 \begin{matrix} NH \cdot CH_3 \\ CO \cdot OH \end{matrix}$, in an alco-

holic solution to 100° for some hours; or leaving a mixed aqueous solution to evaporate, the creatine separates out in crystals. Creatine heated to redness with soda-lime in a tube, yields NH_3 and methylamine, $NH_2 \cdot CH_3$.

Creationism, the doctrine that a soul is specially created for each human foetus as soon as it is formed in the womb; opposed to **TRADUCIANISM**, which teaches that the souls of children as well as their bodies are begotten by reproduction from the substance of the parents; and to **INFUSIONISM**, which holds that souls are preëxistent, and that a soul is divinely infused into each human foetus as soon as it is formed by generation. Many theologians, however, regard the mode of the soul's coming into being as a part of the mystery which envelops the whole subject of the existence and transmission of life. The term **CREATION-**

Credence

ISM has also recently been applied to that theory of the origin of man which is opposed to Evolution.

Crébillon, Claude Prosper Jolyot de (krā-bē-yōn'), the Younger, a French novelist; son of Prosper Jolyot de Crébillon; born in Paris, Feb. 14, 1707. Author of several licentious novels; personally his life was above reproach. For certain strictures on the Papal bull "Unigenitus" in one of these novels, he was immured for a time in the Bastille. To the most objectionable of all his stories he gave the title "Sopha: A Moral Tale," after the manner of other impure writers. He died in Paris, April 12, 1777.

Crébillon, Prosper Jolyot de, a French dramatic poet; born at Dijon, in 1674. He was intended for the legal profession, but devoted himself to the tragic muse, and produced "Idomeneus," which met with success. This was followed by "Atreus," "Electra," and "Rhadamistus," which were still more successful. The last named play was considered his masterpiece. After producing "Pyrrhus" he retired from public notice and lived 20 years in seclusion and poverty. Being persuaded to resume his dramatic labors, he wrote the tragedies of "Catiline" and "The Triumvirate," the latter coming from his pen when he was 81 years of age. He died June 17, 1762.

Crèche (krāsh), a sort of public nursery where, for a small payment, the children of women who have to go out to work are fed, nursed, and taken care of during the work hours of the day.

Crécy-en-Ponthieu, or Cressy, a village in the French Department of Somme, on the Maye, 12 miles N. of Abbeville. Crécy is celebrated on account of the brilliant victory obtained here, Aug. 26, 1346, by Edward III., with 40,000 English soldiers, over a French army amounting, according to Froissart, to 100,000 men under the command of the Count of Alençon. In this great battle perished the flower of the French chivalry, as well as the blind King of Bohemia, who was fighting on the side of France. The Black Prince here distinguished himself greatly, and gained his spurs. After this battle the Black Prince assumed the crest of the slain King of Bohemia, which consisted of three ostrich feathers with the motto *Ich dien* (I serve). The crest has continued to be borne by the princes of Wales from that day. The battle of Crécy was one of the first in which cannon were used by English troops.

Credence, a small table placed near the altar or communion table, at its S. side, on which the bread and wine intended for consecration are placed in readiness. In the

Greek Church this is called the *trapeza protheseōs*, or simply *prothesis*, but is always placed N. of the altar, usually in a structural side-chapel. Archbishop Laud was a great stickler for the credence, and pleaded the authority of Bishop Andrewes and other bishops for its use.

Credit, in economics, is the postponement agreed on by the parties of the payment of a debt to a future day. It implies confidence of the creditor in the debtor; and a "credit system" is one of general confidence of people in each other's honesty, solvency, and resources. By means of a credit system a comparatively small stock of money can be made to do duty for carrying on a number of different transactions; but it is indispensable for every good system of credit that money must be instantly available when required, and this principle applies to every species of transaction where postponed payment is concerned. Public credit is the confidence which men entertain in the ability and disposition of a nation to make good its engagements with its creditors; or the estimation in which individuals hold the public promises of payment, whether such promises are expressed or implied.

The term is also applied to the general credit of individuals in a nation; when merchants and others are wealthy and punctual in fulfilling engagements; or when they transact business with honor and fidelity; or when transfers of property are made with ease. So we speak of the credit of a bank when general confidence is placed in its ability to redeem its notes, and the credit of a mercantile house rests on its supposed ability and probity, which induce men to trust to its engagements. When the public credit is questionable it raises the premium on loans.

Credit, Letter of, an order given by bankers or others at one place to enable a person to receive money from their agents at another place.

Credit Foncier (krā-dē'fōn-syā), a mode of raising money on land in France, the peculiarity of which is that the advance must not exceed one-half of the value of the property pledged or hypothecated, and that the repayment of the loan is by an annuity terminable at a certain date. Several companies have been established by the French government with the privilege of making such loans.

Credit Mobilier (-mō-bēl-yā'), the name given to a gigantic scheme promulgated in France in 1852, and sanctioned by the existing government, the objects of which are: 1. To take in hand and originate trading enterprises of all kinds, on the principle of limited liability. 2. To supersede or buy up trading companies; and to substi-

tute script and shares of its own, for the shares and bonds of the company. The Credit Mobilier of America was a corporation with a Pennsylvania charter, granted in 1859 nominally to conduct a banking business. The charter passed into the hands of railroad financiers in 1864, who used it to finance the Union Pacific Railroad and to shield themselves from loss in case the railroad proved a failure. Congress investigated the enterprise in 1872-1873, and two members of the House of Representatives, Oakes Ames, of Massachusetts, and James Brooks, of New York, were censured by resolution of the House.

Creed, a summary of belief, from the Latin *credo* (I believe), with which the Apostles' Creed begins. In the Eastern Church, a summary of this sort was called *mathēma* (the lesson), because it was learned by the catechumens; *graphē* (the writing), or *kanōn* (the rule). But the most common name in the Greek Church was *sumbolon* (the symbol) which has also passed into the Western Church. Of the earlier creeds, there are three which require particular attention.

I. The Apostles' Creed is so called from its having been formerly considered as the work of the apostles themselves. This notion is now acknowledged to be without foundation. When and by whom it was drawn up is not known. It can only be traced to the 4th century. It contains a profession of belief in the Holy Ghost, in the divinity of Jesus, His descent into hell, and His ascension into heaven, in the resurrection of the body, and life everlasting, etc.

II. The Nicene Creed, so called because it was adopted at the Council of Nice, A. D. 325, held to oppose the Arian heresy. It therefore contains an explanation of the article of the Apostles' Creed—"I believe in Jesus Christ, the only Son," etc., which is as follows: "The only Son of God, begotten of His Father before all worlds; God of God, light of light, very God of very God, begotten, not made, being of one substance with the Father; by whom all things were made." Macedonius, Bishop of Constantinople, having denied the divinity of the Holy Ghost, it became necessary to settle this point, which was done by the Council of Constantinople, A. D. 381, who added the words which follow—"I believe in the Holy Ghost"; namely, "the Lord and Giver of life, who proceedeth from the Father ("and the Son" was afterward inserted by the Spanish bishops), who, with the Father and the Son together, is worshiped and glorified, who spake by the prophets." The insertion of the words "and the Son" was finally sanctioned by the Roman Church in 883, but has never been received by the Greek Church.

III. The Athanasian Creed is now acknowledged not to have been the work of Athanasius, whose name it bears. It was probably written in Latin in the 6th century. In the 10th century it was generally received in the Western Church and at the Reformation was adopted by the Protestants. It consists of an introduction and two positions, with their proofs, deductions, and conclusions. The introduction declares, that "whosoever will be saved must hold the Catholic faith." The first position then states, "The Catholic faith is this—that we worship one God in Trinity, and Trinity in Unity, neither confounding the persons nor dividing the substance." For (to give briefly the remainder of this position) there are three persons, but one Godhead. The Father, Son, and Holy Ghost are uncreated, incomprehensible, eternal, almighty, God, Lord; yet there are not three Lords, Gods, almighty, eternal, incomprehensible, uncreated, but one. The Father is neither made, created, nor begotten; the Son is of the Father alone, not made, nor created, but begotten. The Holy Ghost is of the Father and the Son, neither made, nor created, nor begotten, but proceeding; and in this Trinity none is afore or after another; none is greater or less than another. He, therefore, that will be saved must thus think of the Trinity. The second position establishes the doctrine of Christ's incarnation. It is necessary to everlasting salvation that we believe rightly in the incarnation of our Lord Jesus Christ. The right faith is, that He is the Son of God, God and man; perfect God and perfect man; yet not two, but one Christ; one, not by conversion of the Godhead into flesh, but by taking of the manhood into God; one altogether, not by confusion of substance, but by unity of person.

Besides these creeds, there are numerous Confessions of Faith which have been adopted by different Churches, as standards, to which the ministers in the respective communions are required to conform.

I. The Greek Church presented the "Confession of the True and Sincere Faith" to Mohammed II. in 1453; but in 1643 the "Orthodox Confession of the Catholic and Apostolic Greek Church," composed by Mogila, Metropolitan of Kiew, was approved with great solemnity by the patriarchs of Constantinople, Alexandria, Antioch, and Jerusalem, and for a long time was the standard of the principles of the Russian Greek Church; it has been superseded by the "Summary of Christian Divinity," composed in 1765 by the Metropolitan of Moscow.

II. The Church of Rome has always received the Apostles', the Nicene, and the Athanasian Creeds; but a public authoritative symbol was first fixed by the Council

of Trent. A summary of the doctrines contained in the canons of that council is given in the creed published by Pius IV. (1564), in the form of a bull. It is introduced by the Nicene Creed, to which it adds 12 articles, containing those doctrines which the Church of Rome finally adopted after her controversies with reformers.

III. The Lutherans call their standard books of faith and discipline "*Libri Symbolici Ecclesiæ Evangelicæ*" ("Symbolical Books of the Evangelical Church"). They contain the three creeds above mentioned, the "Augsburg Confession," the "Apology" for that Confession by Melancthon, the "Articles of Schmalkalden," drawn up by Luther, the "Catechisms of Luther," and, in many churches, the "Form of Concord or Book of Torgau." The Saxon (composed by Melancthon), Würtemberg, Suabian, Pomeranian, Mansfeldtian, and Copenhagen "Confessions," agree in general with the symbolical books of the Lutherans, but are of authority only in the countries from which they are respectively called.

IV. The confessions of the Reformed Churches are numerous. The following are the principal: (1) The "Helvetic Confessions" are three—that of Basel (1530); the "Summary and Confession of Faith of the Helvetic Churches" (Basel, 1536); and the "*Expositio simplex*," etc. (1566), attributed to Bullinger. (2) The "Tetrapolitan Confession" (Strassburg, 1531), which derives its name from the four cities of Strassburg, Constance, Memmingen, and Lindau, by the deputies of which it was signed, is attributed to Bucer. It differs from the symbolical books of the Lutherans in the doctrine of the sacraments, and especially in its exposition of the eucharist. (3) The "Palatine or Heidelberg Confession" was framed at Heidelberg by order of the elector palatine, John Casimir (1575). (4) The "Confession of the Gallic Churches" was accepted at the first synod held by the reformed at Paris in 1559. In the following year it was presented to Francis II., and in 1561 it was presented by Beza to Charles IX. (5) The "Confession" of the Reformed Churches in Belgium was drawn up in 1559, and approved in 1561. (6) The "Confession of Faith" of the Kirk of Scotland. The ecclesiastical discipline and doctrine of the Church of Geneva were adopted in Scotland, from the beginning of the reformation there. In 1581 the Scottish nation subscribed a "General Confession," together with a "Solemn League and Covenant," to defend the Protestant religion and Presbyterian government. The Scottish Covenanters afterward adopted the "Westminster Confession," in the compilation of which some delegates from their General Assembly had assisted. In 1688 that "Confession" was received as the standard of the national

Creede

faith. Its doctrines are summarized in the well-known "Shorter Catechism." (7) "Confession of Faith" of the Anglican Church. In the beginning of the reign of Queen Elizabeth she gave her assent to 39 articles agreed on in the Convocation held in London in 1552. They were adopted by the Episcopal Church in the United States in 1801, with some alterations. The first five contain the doctrines of the Church concerning the Father, Son, and Holy Ghost; in the 6th, 7th, and 8th the rule of faith is established; the next 10 relate to Christians as individuals, and the remaining 21 relate to them as members of a religious society. See PRESBYTERIAN CHURCH.

Creede, a town and county-seat of Mineral co., Col.; on the Denver and Rio Grande railroad; 35 miles N. W. of Del Norte. It is a mining town and is named after N. C. Creede, who staked the first claims here in 1889. It was nearly destroyed by fire in 1892, but was rebuilt and has public schools, weekly newspapers, and a National bank. Pop. (1900) 938.

Creedmoor, a rifle range belonging to the State of New York, located at Queen's station on the Long Island railway, some miles E. of the city of New York. Each regiment of the 1st and 2d brigades of the National Guard is required to practise at Creedmoor at stated times. The range extends over 85 acres, has 30 targets, and can be used at any distance from 50 to 1,200 yards.

Creeks, an Indian tribe (nation) occupying a reservation of 4,750 square miles, in the E. portion of Oklahoma. The reservation is rich in natural resources, and the Creeks are in an advanced state of material prosperity. Their chief and legislature are chosen by popular vote. There are good railroads and excellent educational institutions. In 1899 the Creeks numbered 14,771, but the total population of the reservation (1900) was over 18,000. The capital is Okmulgee. The tribe's trust funds aggregate \$2,000,000. There is a public school system of 36 local schools, to which over \$75,000 is annually appropriated. They are classed as one of the Five Civilized Tribes. Most of them profess evangelical Christianity.

Creepers, a family, *Certhiadae*, of birds which strongly resemble the woodpeckers in their habit of creeping on the stems of trees with the aid of the strong quills which project from the tail-feathers, and of securing their insect food by an exsertile tongue. The common creeper is European, but is represented by American species. It is a pretty and interesting little bird, which builds its nest usually in holes or crevices of trees. The wall-creeper of Southern Europe searches for its insect food on rocks.

Cremation

The family is found in all parts of the world.



COMMON CREEPER.

Creepers, a popular name for those plants which, having weak stems, seek support from other objects, chiefly from other plants, in order to ascend from the ground. This, however, is accomplished in very different ways. Some climb by means of small root-like processes growing from the stem, as the ivy; others by means of hooks (e. g., cleavers); others again twining round their support—e. g., hop, convolvulus, etc.; and others, the most evolved, by help of sensitive organs, which are branches or leaves or leaf-stalks more or less modified. The subject of climbing plants has been worked out with peculiar fullness and interest in Darwin's classical monograph.

Cremation, the act of cremating or disposing of a corpse by burning instead of burying it. Cremation was practised among the Greeks and Romans. The mass of the Hindus properly so called thus dispose of their dead, while the Mohammedans have recourse to burial. In 1873 an eminent physician, Sir Henry Thompson, advocated its introduction into England on sanitary grounds, but public feeling was against the innovation, and it made little progress there. Lately, however, in many of the European countries cremation of the dead has received the highest indorsement of the governments, while in the United States crematories have been established in many of the cities. In Europe there are crematories at Berlin, Copenhagen, Geneva, Hamburg, London, Milan, Paris, Rome, Stockholm, Vienna, Zurich, and The Hague. The first crematory in the United States was established in Washington, Pa., in 1876. It was first used for the incineration of the body of the Baron de Palm in

Crémieux

December of that year. Other crematories have since been established at Fresh Pond, N. Y.; Germantown, Pa.; Detroit, Mich.; St. Louis, Mo.; Los Angeles, Cal.; San Francisco, Cal.; San Antonio, Tex.; La Crosse, Wis.; Baltimore, Md.; Pittsburg, Pa.; Troy, N. Y.; Waterville, N. Y.; Davenport, Ia.; Cincinnati, O.; Buffalo, N. Y.; Chicago, Ill.; Roxbury, Mass., and other points.

Crémieux, Isaac Adolphe, (krām-yè'), a French jurist and politician; born in Nîmes, April 30, 1796; became an advocate in Paris in 1830. In 1842 he entered the Chamber, and in 1848 was a member of the provisional government. Imprisoned at the *coup d'état*, he subsequently confined himself to professional work till 1870, when he was a member of the government of national defense. He was made a Senator in 1876, and died Feb. 10, 1880. He was the founder of the Alliance Israélite Universelle.

Cremona, a decayed city of Northern Italy, on the N. bank of the Po, 60 miles S. E. of Milan. Cremona has some fine buildings—the principal the cathedral (1107-1606), with gorgeous interior; the neighboring octagonal Baptistery; the Palazzo Publico (1245); the so-called Campo Santo; and the famous Torrazzo (1288) or belfry—the loftiest campanile in Italy, being 396 feet high, and commanding magnificent views over the fertile plains of Milan. By means of the Po, Cremona carries on a considerable trade in the produce of the district; and it has manufactures of silk, cotton, earthenware, and chemicals. In the 16th, 17th, and 18th centuries it was greatly celebrated for its manufacture of violins, the most famous makers being the Amatis, the Guarneris, and Stradivari. Pop. (1900) 37,661. Cremona is the capital of a province of the same name; area, 695 square miles. Pop. (Feb. 9, 1901) 327,802.

Crenelle (kre-nel'), an opening in an embattled parapet; a loop-hole or embrasure through which to shoot.

Creole, a person, in either America or the West India Islands, of European progenitors; as, a Spanish creole. It is sometimes, also, applied, but wrongly, to any person born within tropical latitudes, of whatsoever color.

Creole State, Louisiana, where the direct descendants of the original French and Spanish colonists form an important element in the social fabric.

Creon, the King of Thebes, who, in the legend of the war against that city, forbade anyone to bury the bodies of Eteocles and Polynices, and condemned their sister Antigone to death for disobeying this order.

Creosote. See CREASOTE.

Crescentia

Crescendo, increasing; a gradual increase in the force of sound. Expressed by the sign <, or the abbreviation *cres.* The sign was first employed in England by Matthew Locke in 1676.

Crerar, John, an American philanthropist; born in New York city, about 1828. He entered mercantile life and accumulated a fortune, removing to Chicago in 1862, and adding to his wealth by railway financiering. He readily bestowed large sums upon charitable undertakings, and in his will left \$2,500,000 to found the John Crerar Public Library, from which sensational novels and skeptical works should be excluded. He died in Chicago, Oct. 19, 1889.

Crescent, anything shaped like the moon in her state of increase; the figure of a new moon borne on the national standard of Turkey; and hence figuratively used for the Turkish power or Mohammedanism itself. The Turks did not bring their symbol—the Crescent—with them from Central Asia, but adopted it on conquering Constantinople in 1453. Part of that city had been built on the site of Byzantium, which was a Greek city flourishing in Xenophon's time. Being besieged in B. C. 340 by the Macedonians, led by Philip, the father of Alexander the Great, that crafty general made an effort to surprise the place on a dark night. The inhabitants, however, had their danger revealed to them by a "light" which "shone suddenly from the north."

In heraldry, (1) the half-moon; an honorable ordinary represented sometimes with the horns turned upward; (2) a name applied to four orders of knighthood; (a) an order instituted in 1268 by Charles I., King of Naples and Sicily; (b) a revival of the first, instituted by René of Anjou, in 1464; (c) an order instituted by Mohammed II., Sultan of Turkey; and (d) an order instituted in 1801 by Selim, Sultan of Turkey.

Crescent City, a name by which New Orleans is widely known, though at the present time it is no longer entirely appropriate. The older portion is built around a semi-circular bend of the Mississippi, but in its recent growth the city has spread around another bend further up stream, and is now nearly S-shaped.

Crescentia, named after Pietro Crescenti, of Bologna, who lived in the 13th century, and published various works on agricultural subjects, the principal one being "*Opus Ruralium Commodorum*," dedicated to Charles II. of Sicily), the typical genus of the order *Crescentiaceæ*. Calyx deciduous, of two equal sepals. Corolla campanulate, with a short fleshy tube and a ventricose 5-cleft unequal crisped limb; stamens 4, didynamous, with the rudiments of a fifth; fruit gourd-like, with a solid external shell, and an internal one-celled pulpy many-seed-

ed cavity. The genus consists of large trees with solitary flowers rising from the trunk or branches. *C. cujete* is the cujete, or common calabash-tree. It inhabits Central America and the West Indies. The sub-acid pulp is eaten by the negroes, and is made into poultices. The hard shell is used for a bottle, and in Bermuda for a pitcher with which to draw water for drinking and other purposes from the inclosed rain-water tanks.

Crescentiaceæ, *crescentiads*, an order of perigynous exogens. It consists of small trees, with alternate or clustered exstipulate leaves and flowers growing out of the old stems or branches. The calyx is undivided, but ultimately splits into irregular pieces. The corolla is monopetalous and irregular, somewhat two-tipped, the stamens 4, didynamous, with the rudiments of a fifth one; the ovary one-celled; the fruit succulent, hard, with parietal placentæ.

Crescentini, Girolamo (kres-chen-tē'nē), an Italian singer; born in Urbania, Feb. 2, 1766. He was styled the Italian Orpheus, because of his exquisite mezzo-soprano. He died in Naples, April 24, 1846.

Crespo, Antonio Candido Gonçalves (kres'pō), a Portuguese poet; born of a slave mother in Rio Janeiro, March 11, 1846. He graduated in jurisprudence at the Coimbra University, but devoted himself almost exclusively to the Muses at Lisbon. He published only two small volumes: "Miniatures" (1870); "Nocturnes" (1882). In collaboration with his wife, Maria Amalia Vaz de Carvalho, herself a notable writer, he was author of "Stories for our Children" (1882). His poems show high sensibility and great power of poetic form and expression. He died in Lisbon, June 11, 1883.

Crespo, Joaquín, a Venezuelan military officer; born in Venezuela about 1840. He received a liberal education, became governor of the State of Guarico in 1880, and was President of Venezuela in 1884-1886. In 1892 he headed a revolution, making himself dictator. Two years later he was again elected president, serving until 1898. He was killed in battle with insurgents April 16, 1898.

Cress, the name of several species of plants, most of them of the natural order *Cruciferæ*. Water-cress, or *Nasturtium officināle*, is used as a salad, and is valued in medicine for its antiscorbutic qualities. The leaves have a moderately pungent taste. It grows on the brinks of rivulets and in moist grounds. Common garden cress is the *Lepidium sativum*; Normandy cress, *Barbarea præcox*; winter cress, *B. vulgaris*; Indian cress, *Tropæolum majus*; bitter cress, *Cardamine pratensis* (cuckoo-flower).

Cressida, a daughter of Calchas, the Trojan priest. She is also known as Briseida, and her fame rests upon the legend of her amour with Troilus. The original story of Troilus and Cressida was the work of Lollius, a historiographer of Urbino. It was written in Latin and translated by Chaucer. Cressida was faithless to Troilus and became mistress to Diomedes.

Cressy. See CRÉCY-EN-PONTHIEU.

Crest, a portion of the armorial bearings of a nobleman or gentleman entitled to bear coat-armor that is commonly used without the shield, being painted on the doors of carriages, and engraved on plate and signet rings. In the days of chivalry, the crest or cognizance of the wearer was borne on the helmet. It was made of leather or light wood, gilded and painted, and a wreath of twisted silk was fastened round the lower part, where it was attached to the helmet. In modern times the crest is always drawn on a wreath composed of the principal metal and color occurring in the bearer's coat-of-arms, the coils being of metal and color alternately. Sometimes the crest rests on a cap of maintenance.

Creste, in architecture, an ornamental finishing, either in stone or of tiles or metal, running along the top of a wall or the ridge of a roof. Such crestings were adopted by the Romanesque architects from the East, but the designs were soon made after their own style. Elaborate ornaments of this kind were frequently used in Gothic buildings. In modern times cast-iron has been greatly used for such ornaments, many roofs being covered with gilded iron rails or crests.

Creswick, Thomas, an English landscape-painter; born in Sheffield, Feb. 5, 1811. He early exhibited a taste for drawing, and removed to London in 1828, where two of his pictures during that year found a place in the Royal Academy's exhibition. Creswick loved to paint the beautiful streams, and glens and wooded dells of his native land; and these, which, along with some coast scenes, form the subject of his best paintings, are represented on his canvas with great delicacy of finished detail and truth of aerial perspective, the figures introduced being frequently from the brush of Ansdell, Cooper, Frith, and other artists. He was well known as a book-illustrator by his drawings for the wood-engravers, and he contributed to the publications of the English Etching Club. He was elected an A. R. A. in 1842, an R. A. in 1851. More than a hundred of his works were collected in the London International Exhibition of 1873. He died Dec. 28, 1869.

Cretaceous System, the highest division of the Mesozoic or Secondary strata, rests

conformably upon the JURASSIC SYSTEM, and is overlaid unconformably by the oldest deposits of the EOCENE SYSTEM. The cretaceous strata of Great Britain are confined chiefly to the E. and S. E. of England. They form the Yorkshire Wolds, extend over large parts of Norfolk, Suffolk, and Hertford, and compose the Chiltern Hills, Salisbury Plain, the Downs, and the S. part of the Isle of Wight. On the Continent the Cretaceous rocks form a broad basin in the N. of France, and stretch E. from Belgium, Holland, Denmark, and the S. of Sweden, through the great plains of Northern Europe to the S. end of the Ural Mountains; but over extensive regions within that wide area they lie more or less concealed under younger formations. There is another extensive development of Cretaceous strata in Southern Europe, where they enter largely into the composition of many of the Mediterranean coast-lands. The chief petrological feature of the Cretaceous strata of Western and Northern Europe is the great development of white chalk in the Anglo-French area, and its gradual replacement, when followed E. into Germany, etc., by earthy limestones, shales, sandstones, etc. The most marked characteristic of the Cretaceous system in Southern Europe is the great development in that region of massive marine limestone (hippurite limestone).

In North America Cretaceous strata likewise occur, especially in the Western States and Territories. They also occupy wide tracts in the Gulf States, whence they extend up the Mississippi Valley to the Ohio; they put in appearance at intervals on the Atlantic borders between South Carolina and New Jersey, and are met with again on the Pacific border and in the coast-range. Strata of the same age occur also in the far W. of British America, at the mouth of the Mackenzie river, and in Greenland. In India the system is marked in the Deccan by a massive series of basalt-rocks 4,000 to 6,000 feet thick, and covering an area of 200,000 square miles. In Australia and New Zealand there is a considerable development of these rocks, such as the "desert sandstones" of Queensland, and a small coal-bearing group of beds. In New Zealand, the system contains coals, some of which are lignites while other are bituminous of fair quality. The Wealden Beds consist largely of clay and sand, and are almost entirely of fresh water origin. In Yorkshire, however, the strata which occur on the same horizon as the Wealden Beds of the S. are of marine origin, as seen in the Speeton clay near Bridlington. The Lower Greensand, consisting of sand, clay, etc., are marine. The gault, a tough blue clay, is likewise marine, and so also are the shallow-water sands of the Upper Greensand, and the thin layer of chalky marl called Chlori-

tic Marl. The most characteristic rocks of the system are the chalk beds.

The Cretaceous strata of Great Britain being almost exclusively of marine origin, it is not surprising that land-plants seldom occur, and that they are met with chiefly in the fresh water beds near the base of the system. They consist chiefly of ferns, cycads, and conifers, a flora resembling that of the preceding Jurassic period. The Upper Cretaceous rocks of Germany, however, have furnished many plant remains. Among those are the oldest known dicotyledons, such as extinct species of maple, oak, walnut, beech, laurel, magnolia, etc., also several proteaceous plants. A similar admixture of forms occurs in the cretaceous strata of North America. Among animals the protozoa played a very important part—the white chalks and earthy limestones being very largely composed of the minute shells of foraminifera, such as globigerina, rotalia, and textularia, which still swarm in the ooze of the Atlantic. Sponges, such as ventriculites, siphonia, etc., were very abundant, and sea-urchins also occurred in great numbers. Star-fishes and bryozoans were fairly common, as were also, among brachiopods, terebratula and rhynchonella. But the brachiopods as a class were feebly represented as compared with their abundance in the earlier stages of the world's history. Ordinary bivalves were also very numerous. In the Danian beds carnivorous gasteropods begin to abound, and they include a number of existing genera. Cephalopods are not only the most abundant, but also the most characteristic fossils of the Cretaceous rocks. Among them are a great variety of ammonites, and many forms of belemnitidae. Among the fishes were ganoids, and various kinds of the shark tribe, together with the earliest representatives of the teleostei, which include most living genera of fishes. The waters of the period seem also to have swarmed with reptiles, such as the ichthyosaurus and plesiosaurus. Winged reptiles were also present, such as pterodactylus. Among dinosaurs were cetiosaurus, megalosaurus, and iguanodon. Another remarkable reptile was the serpent-like mosasaurus. Besides these, there were lizards, chelonians, and crocodiles.

The American Cretaceous system is likewise characterized by the presence of huge dinosaurs and other reptiles, some of them being European types, while others are peculiar. One of the most remarkable features of the American rocks is the occurrence in them of the toothed birds, ichthyornis and hesperornis.

No break separates the Jurassic from the Cretaceous system; there is a gradual passage from the upper beds of the one into the lower beds of the other. At the beginning

of Cretaceous times most of the British and Irish area existed as dry land. Over the S. E. of England lay the estuary of a large river, flowing probably from the N. The Wealden beds are the delta-deposits of that river; the English and French beds of this division covering an area of 20,000 square miles. The sea into which that river flowed occupied a considerable area in the N. of France, spread over the Low Countries into Hanover, filled the basin of the North Sea, and overflowed a portion of Eastern England. Wealden beds occur in Northwest Germany, and indicate the delta of a river, like that of the British area, flowing from the N. While land-conditions predominated in Northern and Middle Europe, an open sea covered vast areas in Southern Europe. Gradual subsidence of the sea-bottom took place during the deposition of the Wealden series, and eventually the great deltas became submerged, and a wide sea covered most of what are now the low grounds of the British area, and passing E. submerged vast regions of middle Europe up to the slopes of the Ural Mountains. The depression was greatest in the W. areas, where in the deep clear waters there gradually accumulated the calcareous matter which subsequently formed our white chalk. There is no deposit forming at present which is quite analogous to white chalk. The calcareous oozes of existing seas which most resemble it are of abyssal origin, but the sea in which the chalk accumulated probably did not exceed 1,000 or 2,000 feet in depth. The extreme purity of the chalk, consisting as that rock does of 95 per cent. and more of carbonate of lime, is difficult to account for on the supposition that the sea in which it formed was comparatively shallow. The sea of Western Europe may have been dotted with small islands, from none of which large rivers descended; and possibly the formation of the chalk was not so slow a process as many geologists suppose. Professor Prestwich even suggests that it may be to some extent of the nature of a chemical precipitate thrown down under special and peculiar conditions prevailing at the time. However that may be, the shells of foraminifera and other organic remains certainly enter very largely into its composition. In the Mediterranean basin, a deep open sea would seem to have persisted all through the Cretaceous period. It was in this sea that the massive hippurite limestone was formed. Open water appears at this time to have extended through the Mediterranean area into Asia, covering there also vast tracts of what is now dry land, and communicating with the Indian Ocean. The conditions of climate seem to have been remarkably uniform over vast regions of the earth's surface. Ferns, cycads, and conifers flourished in the lands within the Arc-

tic Circle, and the waters of the same region were tenanted by cuttlefish, ammonites, and huge reptiles. ROBERT T. HILL.

Crete. See CANDIA.

Cretinism, a kind of idiocy prevalent in various Alpine valleys. In most, if not in all cases, the afflicted person has an ugly swelling called a goitre on his neck. This varies in size from a walnut to a quartern loaf. The existence of such a protuberance does not, however, necessarily imply idiocy. The mental deficiency varies in degree, being in some cases so great that the unhappy person thus affected is unable to do anything for himself, and cannot even articulate words, but makes a sound like that of the inferior animals; in others there are some faint glimmerings of mind.

Creusot, Le (krez-ô'), a town in the French department of Saone-et-Loire, 236 miles S. S. E. of Paris. Situated in the midst of a district rich in coal and iron, it owes its importance to the establishment here in 1837 of the great ironworks of Schneider and Co., which ranks among the largest in the world. They occupy 770 acres, and turn out yearly 190,000 tons of pig-iron, besides steel rails, iron rails, and locomotives.

Crew, the company of seamen employed to man a boat, ship, or vessel. In a broad sense the term includes all enrolled, both officers and men; strictly, it applies to common sailors only.

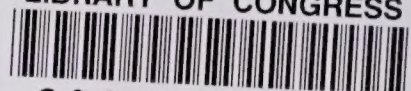
Cribbage, a game played by two persons with a complete pack of 52 playing-cards. It is divided into two classes; the five-card and six-card games. The five-card is the original game, and affords the greatest scope for the exercise of skill. The points are scored upon a board, and 61 points constitute the game. All the kings, queens, knaves, and tens count as ten each, and the rest of the cards according to the ordinary value; that is, six for six, five for five, and so on. The points which reckon for the game are fifteens, sequences, flushes, pairs, etc. After dealing, the players gather up their cards, and having taken out two each, place them, with their faces down, on the table. These four cards form the crib, which becomes the property of the dealer, under certain conditions. Points are scored in two different ways in cribbage—first in play, and second in reckoning up the cards held. After the crib is put out, the pack is cut by the non-dealer, and a card turned up by the dealer. When this card is a knave, it is called two for his heels, and counts two to the dealer; and a knave held in hand, of the same kind as the turn-up card, entitles the player to score one; it is called one for his knob. A six-card cribbage is played in a very similar manner, but is considered inferior in science to five-card cribbage.

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